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Staff Assessment and
Draft Environmental Impact Statement
and
Draft California Desert Conservation Area Plan Amendment

RIDGECREST SOLAR POWER PROJECT

Application For Certification (09-AFC-9)
Kern County

U.S. BUREAU OF LAND MANAGEMENT
and
CALIFORNIA ENERGY COMMISSION

STAFF ASSESSMENT - DRAFT ENVIRONMENTAL IMPACT STATEMENT

MARCH 2010
(09-AFC-9)
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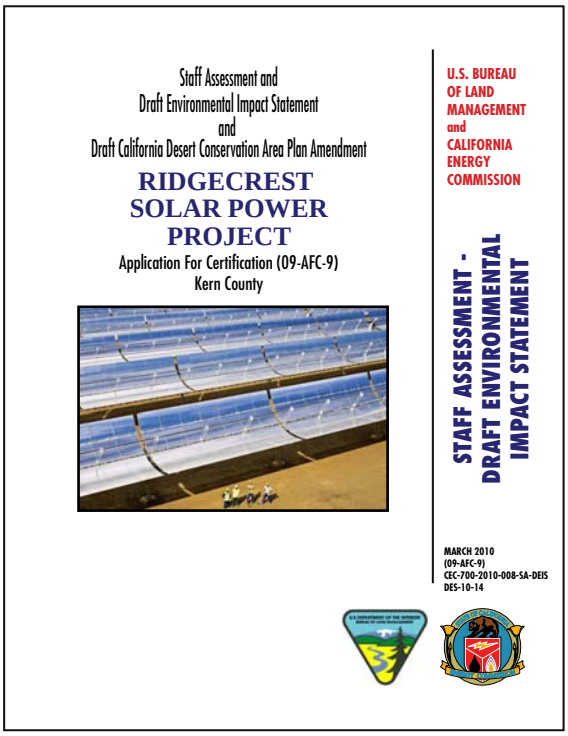

U.S. BUREAU OF LAND MANAGEMENT

Janet Eubanks
Project Manager

Hector A. Villalobos
Ridgecrest Field Manager

James Wesley Abbott
Acting State Director

CALIFORNIA ENERGY COMMISSION

SITING OFFICE

Eric Solorio
Project Manager

Eileen Allen
Siting Office Manager

SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

Terrence O'Brien
Deputy Director

RIDGECREST SOLAR POWER PROJECT
(09-AFC-9)
STAFF ASSESSMENT/DRAFT ENVIROMENTAL IMPACT STATEMENT

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INTRODUCTION

Solar Millennium LLC ("Applicant") filed an application with the U.S. Bureau of Land Management (BLM) for a Right-of-Way (ROW) grant on public land (CACA 049016) together with a related Plan of Development (POD) 4th revision dated February 2, 2010, a Draft Land Use Plan Amendment (DPA) to the California Desert Conservation Area (CDCA) as amended, and is seeking approval to develop the Ridgecrest Solar Power Project (RSPP). The applicant also filed an Application for Certification (09-AFC-9) with the Energy Commission to license the same project. The filing of these applications triggered the need for both agencies to conduct an environmental review of the proposed project. When considering a project for licensing, the Energy Commission is the lead state agency under the California Environmental Quality Act (CEQA), and its certified regulatory program is functionally equivalent to the preparation of an Environmental Impact Report (EIR). Similarly, for the purpose of considering the application for a ROW grant and POD, the BLM is the lead federal agency under the National Environmental Policy Act (NEPA).

This Staff Assessment/Draft Plan Amendment/Draft Environmental Impact Statement (SA/DPA/DEIS) contains an independent evaluation of the RSPP. The SA/DPA/DEIS contains analyses similar to an EIR required by CEQA, and also contains analyses required for a DPA and a DEIS, prepared in accordance with NEPA. Overall, the document contains an independent assessment of the project's design and engineering, and identifies potential impacts to the environment; the public's health and safety, and determines whether the project conforms to all applicable laws, ordinances, regulations and standards (LORS).

The SA/DPA/DEIS is a joint, environmental document because it was generated and published by the BLM and the California Energy Commission (CEC) to meet the needs of both CEQA and NEPA. The joint document approach was implemented because it is in the best interest of the BLM and the Energy Commission to share in the preparation of a single environmental document, in order to avoid duplication of staff efforts, to share staff expertise and information, to promote intergovernmental coordination at the local, state, and federal levels, and to facilitate public review by providing a single comprehensive document for a more efficient environmental review process.

PROPOSED PROJECT LOCATION AND GENERAL PROJECT DESCRIPTION

PROJECT LOCATION AND VICINITY

The RSPP is proposed to be developed on approximately 2,000 acres of the 3,995-acre site, currently managed by the BLM. The project site is located in north eastern Kern County, along U.S. Highway 395, just west of the China Lake Boulevard exit. The site is

approximately five miles southwest of Ridgecrest, California. Ridgecrest is at the southwestern boundary of the China Lake Naval Air Weapons Station (NAWS).

PROPERTY DESCRIPTION

The proposed RSPP is entirely on Federal land, described as follows: Township 27 and 28 South, Range 39 East The applicant filed an amended by SF-299 application with the BLM on February 9, 2010 adjusting the previous acreage from 3,920 to approximately 3,995 to avoid El Paso Wash that was within the project's original footprint. Under the amended application, construction and operation of the project would disturb a total of about 1,944 acres As such, any difference between the total acreage listed in the Right of Way application (3,995) and the total acreage required for project construction and operation (approx. 1,944) would be reduced if authorized to the total disturbed area.

The following Kern County Assessor's Parcel Number's identify the parcels within the overall ROW boundary for the proposed RSPP:

APN 341-091-08	APN 341-091-10	APN 341-091-11	APN 341-110-01
APN 341-110-02	APN 341-110-03	APN 341-110-05	APN 341-110-06

GENERAL PROJECT DESCRIPTION

The proposed RSPP is a concentrated solar powered, electric generating facility that would have a nominal electrical output of 250 megawatts (MW). The process for electric power generation would be to utilize parabolic trough, solar collectors to concentrate solar energy onto heat collection elements that contain a fluid, known as "heat transfer fluid" (HTF). After being heated by the solar troughs, the HTF is run through a heat exchanger where it boils water for conversion to steam. In the next stage, the high pressure steam drives a Rankine-cycle reheat, steam turbine, electric generator.

The project would use an air-cooled condenser (ACC), commonly referred to as "dry cooling". The ACC would eliminate the need to use water for power plant cooling and eliminate visible plume associated with wet cooling towers. Total water consumption (balance of plant) for the 250-MW facility is estimated at approximately 150 acre-feet per year, which is proposed to be supplied by the Indian Wells Valley Water District (IWVWD) via a new pipeline. The new 12 to 16-inch diameter, five-mile long water pipeline would be installed within the Brown Road and China Lake Boulevard rights-of-way to a point of connection with the IWVWD water tank.

A new 230kV transmission line from a new switchyard will connect to a new substation that will in turn interconnect with Southern California Edison's (SCE) existing 230kV Inyokern/Kramer Junction transmission line passing west of the Project site. Additionally, the Project will require the relocation of roughly 10,000 feet (1.6 miles) of two existing transmission lines owned and operated by SCE. The first is a double-circuit 230kV line (with one of the circuits currently operated at 115kV) and the second is a double-circuit 115kV line.

For a more detailed description of the proposed project; and the alternative projects and actions that were considered and analyzed, please see the **PROJECT DESCRIPTION** section.

PUBLIC NOTICES, OUTREACH, AND PUBLIC AND AGENCY INVOLVEMENT

BLM'S INITIAL PUBLIC NOTICE AND OUTREACH

BLM staff issued a formal Notice of Intent (NOI) to prepare an Environmental Impact Statement for the RSPP, and also identified the beginning and end of the Scoping Period. The formal notice was published in the Federal Register, Volume 74, No. 224, Monday, November 23, 2009.

On December 8, 2009, the BLM staff mailed out public notices, informing the public of the NOI. This information was also provided on the BLM's Ridgecrest Field Office's internet website which is also connected to the California Desert District's renewable energy website.

On January 5, 2010 the BLM held a publicly noticed Scoping Meeting at the Ridgecrest, City Hall, Council Chambers in Ridgecrest, California. On January 6, 2010 the BLM held a second publicly noticed Scoping Meeting at the Inyokern, Town Hall in Inyokern, California. Scoping comments were received from the public and are included in this SA/DPA/DEIS, in Appendix 1.

ENERGY COMMISSION STAFF'S PUBLIC OUTREACH

Energy Commission staff provides formal notices to property owners within 1,000 feet of the proposed site and within 500 feet of a linear facility (such as transmission lines, gas lines and water lines). Staff mailed the public notices on September 12, 2009, informing the public, agencies and elected officials of the Commission's receipt and availability of the application, 09-AFC-9. Additionally, each notice contained a link to a website the Energy Commission set up for the project: http://www.energy.ca.gov/sitingcases/solar_millennium_ridgecrest/index.html.

Libraries

Concurrent with the initial public notice of September 12, 2009, the Energy Commission staff also sent copies of the RSPP AFC to the following libraries:

Ridgecrest Public Library 131 E Las Flores Ave Ridgecrest, CA 93555-3648	Walter Stiern Memorial Library 3000 College Heights Blvd Ridgecrest, CA 93555-9571
Boron Library 26965 Twenty Mule Team Rd Boron, CA 93516-1550	San Bernardino Library 82805 Mountain View St Trona, CA 93562-1920
Kern County Library 9507 California City Blvd California City, CA 93505-2280	Naval Air Warfare Tech Library 1 Administration Cir Ridgecrest, CA 93555-6104

In addition, to these local libraries, copies of the AFC were also made available at the Energy Commission's Library in Sacramento, the California State Library in Sacramento, as well as, state libraries in Eureka, Fresno, Los Angeles, San Diego, and San Francisco.

Energy Commission's Public Adviser's Office

The Energy Commission's outreach program is also facilitated by the Public Adviser's Office (PAO). This is an ongoing process that to date has included, paid advertising in the Ridgecrest Daily Independent on December 30, 2009 and January 2, 2010, and paid advertising in the Kern Valley Sun on December 30, 2009. The PAO also requested public service announcements at a variety of organizations including Ridgecrest City Council, three separate Chambers of Commerce, one television station and two radio stations (CEC 2010s). These notices informed the public of the Commission's receipt of the RSPP allocation 09-AFC-9 and invited the public to attend the Public Site Visit (proposed RSPP site) and Informational Hearing/BLM Scoping Meeting.

BLM AND CEC PUBLIC WORKSHOPS

The BLM staff together with Energy Commission staff publicly noticed and held workshops in Ridgecrest, CA, on the following days: December 15, 2009, January 5, 2010 and January 6, 2010 (CEC 2009i and CEC 2009n). During each of these workshops specific time for public comment was allocated in the meeting agenda and public comment was taken during the morning and afternoon sessions of each workshop. These workshops provided a public forum for the applicant, intervener, staff and cooperating agencies to interact regarding the more substantive project issues. At the workshops, staff also provided preaddressed forms for public comment and encouraged the public to use the forms to submit written comments which some members of the public did. Agency Coordination and government-to-government consultation with Native American communities

Policy Level and Programmatic Agency Coordination

On August 8, 2007, the California Energy Commission and the Bureau of Land Management signed an Memorandum of Understanding (MOU) for the purpose on agreeing to prepare joint environmental documents for proposed, solar thermal projects which fall under the jurisdiction of both agencies. The MOU outlines roles and responsibilities of the cooperative process.

On October 12, 2009, California's Governor, Arnold Schwarzeneggar, signed an MOU with the U.S. Department of the Interior's Secretary, Ken Salazar. The purpose of the MOU "is to direct California Agencies and Department of the Interior Agencies…to take the necessary actions to further the implementation of the Governors Executive Order S-14-08 and the Secretary's Order 3285 in a cooperative, collaborative, and timely manner". The agencies identified to in the MOU are the California Department of Fish and Game (CDFG), California Energy Commission (CEC), Bureau of Land Management (BLM) and the U.S. Fish and Wildlife Service (FWS). The MOU also outlined specific objectives.

On January 26, 2010, the U.S. Department of the Interior's Bureau of Land Management signed a Memorandum of Understanding (MOU) with the U.S. Department of Energy's (DOE) Loan Guarantee Program (LGP) office. The purpose of the MOU is to provide a framework for the BLM and the LPG to cooperate in preparing Environmental Assessments, Environmental Impact Statements for renewable energy project's that require federal actions be taken by both the BLM and the LGP.

Project Specific Agency Coordination

On September 12, 2009, the Energy Commission staff sent a notice of receipt and a copy of the RSPP Application for Certification to all local, state, and federal agencies that might be affected by the proposed project. Staff continues to seek cooperation and or comments from regulatory agencies that administer LORS which may be applicable to proposed project. These agencies include the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, California Coastal Commission, State Water Resources Control Board/Regional Water Quality Control Board, California Department of Fish and Game, California Air Resources Board and Kern County, among others.

Staff has worked closely with the CDFG and the FWS to evaluate the proposed RSPP. Both CDFG and the FWS have attended and participated in public workshops to address the wildlife issues and related "Incidental Take Permits" required for the proposed RSPP. Additionally, staff has benefited from the cooperation of the CDFG in evaluating the proposed streambed alteration agreements that would normally fall under CDFG's jurisdiction if not for the Energy Commission's "in lieu" permitting authority.

Staff also worked closely with the Regional Water Quality Control Board (RWQCB), Lahontan District. The RWQCB assisted staff in evaluating the proposed RSPP with respect to potential impacts on water quality and the proposed reuse of process water on site for mirror washing. The RWQCB has been instrumental in providing staff with suggested language for waste discharge requirements.

Staff has also worked closely with Kern County to identify and apply county LORS, gather information regarding potential impacts to county services, develop a mitigation program to offset impacts to potable water resources, and consider the county's suggested mitigation measure for impacts to traffic and transportation resources.

Government to Government Consultation - Notification of the Local Native American Communities

The BLM staff sent letters to various tribes on June 17, 2009. The letter provided an initial briefing on the project and a request for any comments and concerns. The deadline for response was Aug. 7, 2009. The letters were mailed to the following six (6) recipients:

1. Mr. Harold William, Tribal Chair; Kern Valley Indian Council, PO Box 147, Caliente CA 93518; primary federally unrecognized tribe in eastern Kern County, representing Kawaiisu, Tubatulabals, Paiute, and Yokuts native peoples.

2. Mr. Bob Robinson, Tribal Historic Preservation Officer, Kern Valley Indian Council, PO Box 401, Weldon CA 93283

3. Ms. Donna Miranda-Begay, Tribal Chair; Tubatulabals of Kern Valley Tribe; primary federally unrecognized tribe in eastern Kern County representing Tubatulabals of the Miranda and White Blanket tribal allotments, Kern River Valley.

4. Mr. Ron Wermuth, Council Chair; Monache Intertribal Council, PO Box 168, Kernville CA 93238; oldest Native American community organization in Kern River Valley.

5. Ms. Arlene Apalatea, Co-Chair, Nuui Cunni Interpretative Center, PO Box 3984, Wofford Heights CA 93285; operated the Nuui Cunni Center under Special Use Permit from Sequoia National Forest for public education on the culture of the Indians of Kern County. Also known as the Kern River Paiute Council, and Raymond Vega.

6. Ms. Kathy Paradise, Program Lead, Lake Isabella Office, Owens Valley Career Development Center, PO Box 2895, Lake Isabella CA 93240; community social outreach organization in Lake Isabella area.

A second set of letters were mailed to various tribes on October 21, 2009. The letters provided a reminder, contained in a consultation letter regarding three wind energy projects near city of Mojave, eastern Kern County, that the BLM was also reviewing the RSPP project, and again asked for comments and any concerns. The deadline for response was set for December 18, 2009. The letters were mailed to the following six (6) recipients:

1. Tribal Chair, Kern Valley Indian Council, PO Box 1010, Lake Isabella CA 93240

2. Mr. Bob Robinson, Tribal Historic Preservation Officer, Kern Valley Indian Council

3. Ms. Donna Miranda-Begay, Tribal Chair; Tubatulabals of Kern Valley Tribe

4. Mr. Ron Wermuth, Council Chair; Monache Intertribal Council

5. Ms. Arlene Apalatea, Co-Chair, Nuui Cunni Interpretative Center

6. Ms. Kathy Paradise, Lake Isabella Office, Owens Valley Career Development Center

A third set of letters were mailed to tribes on February 5, 2010 and provided an update on the project review, CEC-BLM workshops that were held in December 2009 and January 2010; Native American input that was received, the SA/EIS being released soon, cultural resources survey in summer 2009, invited to consult on eligibility evaluations of archeological sites; invited to be consulting on the Programmatic Agreement (PA) being prepared by BLM, State Historic Preservation Office (SHPO), and the Advisory Council on Historic Preservation (ACHP). The letter identified the deadline for response as March 12, 2010. The letters were mailed to the following five (5) recipients:

1. Ms. June Price, Tribal Chair, Kern Valley Indian Council,

2. Mr. Bob Robinson, Tribal Historic Preservation Officer, Kern Valley Indian Council

3. Ms. Donna Miranda-Begay, Tribal Chair; Tubatulabals of Kern Valley Tribe

4. Mr. Ron Wermuth, Council Chair; Monache Intertribal Council

5. Ms. Arlene Apalatea, Co-Chair, Nuui Cunni Interpretative Center

SUMMARY OF SCOPING COMMENTS IN RESPONSE TO THE BLM'S NOTICE OF INTENT

Summary of the Scoping and Draft Comment Process

The BLM published a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) on November 23, 2009 in the Federal Register. Publication of the NOI began a 30-day comment period which ended on January 21, 2009. BLM provided a website with Project information that also described the various methods of providing public comment on the Project including an e-mail address where comments could be sent electronically.

Notification for a public Scoping Meeting held on January 5, 2010 appeared in the Riverside Press Enterprise and several other local media and newspapers on November 24, 2009. Notification was also published on the BLM website on November 23, 2009.

A public Scoping Meeting was held on January 5, 2010 at the Ridgecrest City Hall located at 100 W. California Ave., Ridgecrest, California. A presentation describing the Project was made by Solar Millennium, LLC with presentations describing the environmental review process presented by members of the BLM and CEC. One-hundred and twenty attendees were documented by signing in on a voluntary sign-in sheet.

Forty-eight comment letters were received between both agencies within the comment period ending on December 21, 2009.

Issues were identified by reviewing the comment documents received. Many of the comments identified similar issues; all of the public comment documents were reviewed and the following section provides a summary of the issues, concerns, and/or questions raised. Issues have been grouped into one of the three following categories:

- Issues or concerns that could be addressed by effects analysis;
- Issues or concerns that could develop an alternative and/or a better description or qualification of the alternatives;
- Issues or concerns outside the scope of the EIS.

The comments discussed below are paraphrased from the original comment letters. To a minor degree, some level of interpretation was needed to identify the specific concern to be addressed. Many of the comments identified similar issues; to avoid duplication and redundancy similar comments were grouped together and then summarized. Original comment letters may be reviewed upon request at the BLM California Desert District at 22835 Calle San Juan De Los Lagos, Moreno Valley, California, 92253, during normal business hours, from 8:00 am to 4:00 pm.

Summary of Comments (Matrix/Table)

SCOPING COMMENTS MATRIX
JANUARY 5TH AND 6TH, 2010 SCOPING MEETINGS

NAME	DATE	PROCESS/FAST TRACK/LNP	ALTERNATIVES	AIR / HEALTH	BIOLOGY / BOTANY/RES	CLIMATE CHANGE	CULTURAL / NATIVE AMERICAN	ECONOMIC/SOCIOECONOMIC	OTHER_CONSIDERATIONS/CUMULATIVE IMPACT	TRAFFIC/ACCESS	WATER/HYDROLOGY	VISUAL/VRM/AESTHETICS	WILDLIFE/T&E/HABITAT	LIGHTING/PUBLIC UTILITIES	DESIGN	FLOODING	RECREATION/OHV	SOIL/GEOLOGY	HAZMAT	NOISE	ADD TO MAILING
A. Archerd	12/10/2009									X											
A. DeMay	1/14/2010										X										
B. & S. Steele	1/14/2010											X									
B. Hughes	12/6/2009-12/7/2009				X				X		X	X	X		X			X			
B. Parker	1/20/2010																				X
C. Lyle Fisher	1/11/2010								X												
Greg Suba, California Native Plant Society	12/23/2009				X				X		X	X									
California Unions for Reliable Energy (CURE)	12/9/2009			X			X	X	X		X	X	X		X			X		X	
Center for Biological Diversity	12/23/2009	X		X	X	X			X		X	X	X					X			
Coplay	12/9/2009																				X
D. Burdick	1/21/2010			X																	
D. Fallgatter	1/20/2010										X				X						
D. G. Burnett	1/20/2010			X	X				X		X		X								
D. Maggie	1/21/2010			X							X		X	X							
D. Miranda-Begay, Tribal Chairwoman Tubatulabals of Kern Valley Tribe	12/14/2009				X		X	X													

SCOPING COMMENTS MATRIX
JANUARY 5TH AND 6TH, 2010 SCOPING MEETINGS

NAME	DATE	PROCESS/FAST TRACK/LNP	ALTERNATIVES	AIR / HEALTH	BIOLOGY / BOTANY/RES	CLIMATE CHANGE	CULTURAL / NATIVE AMERICAN	ECONOMIC/SOCIOECONOMIC	OTHER_CONSIDERATIONS/CUMULATIVE IMPACT	TRAFFIC/ACCESS	WATER/HYDROLOGY	VISUAL/VRM/AESTHETICS	WILDLIFE/T&E/HABITAT	LIGHTING/PUBLIC UTILITIES	DESIGN	FLOODING	RECREATION/OHV	SOIL/GEOLOGY	HAZMAT	NOISE	ADD TO MAILING
S. Silliman, Desert Tortoise Council	1/21/2010				X								X								
Don Peterson	1/21/2010		X		X		X		X		X				X						
E. Copley	12/9/2009																				X
E. Middlemiss	1/20/2010										X		X								
Fish and Wildlife Services	12/23/2009		X		X								X								
Friends of Last Chance Canyon - Charles Hattendorf	1/19/2010			X							X										
J. & J. Bell	12/14/2009									X											
J. & S. Tipton	1/14/2010										X										
J. Aardahl Defenders of Wildlife	1/19/2010		X		X								X								
J. Decker	1/18/2010			X	X						X		X								
J. Robinson	1/14/2010				X																
J. Westbrook	11/26/2009				X								X								
K. Cox	12/16/2009																				X
K. Emmerich	11/28/2009	X				X															
K. Fite Western Watersheds Project	11/30/2009		X		X	X			X		X	X	X					X			
Kern County Planning Department	1/5/2010	X						X		X						X					

SCOPING COMMENTS MATRIX
JANUARY 5TH AND 6TH, 2010 SCOPING MEETINGS

NAME	DATE	PROCESS/FAST TRACK/LNP	ALTERNATIVES	AIR / HEALTH	BIOLOGY / BOTANY/RES	CLIMATE CHANGE	CULTURAL / NATIVE AMERICAN	ECONOMIC/SOCIOECONOMIC	OTHER_CONSIDERATIONS/CUMULATIVE IMPACT	TRAFFIC/ACCESS	WATER/HYDROLOGY	VISUAL/VRM/AESTHETICS	WILDLIFE/T&E/HABITAT	LIGHTING/PUBLIC UTILITIES	DESIGN	FLOODING	RECREATION/OHV	SOIL/GEOLOGY	HAZMAT	NOISE	ADD TO MAILING
Kerncrest Chapter National Audubon Society	1/12/2010	X			X							X	X	X							
L. Cunningham Basin & Range Watch	1/24/2010								X												
L. Sutton	1/9/2010		X																		
M.J. McEwan Law Office on behalf of Desert Tortoise Preserve Council	1/21/2010	X	X									X	X				X				
M. Beck	1/17/2010									X											
M. Boggs	1/21/2010		X	X	X				X		X										
M. Decker	1/20/2010			X						X											
M. Gire	1/24/2010								X												
M. Grossglass	12/8/2009								X												
M. J. Connor PH.D Western Watershed Project	1/21/2010		X		X					X	X		X					X			
M. J. Connor PH.D Western Watershed Project	12/23/2009	X	X		X	X	X		X		X	X	X					X			
M. Lloyd	1/19/2010										X		X								
M. Luebs-Goedecke	1/15/2010		X										X								

SCOPING COMMENTS MATRIX
JANUARY 5TH AND 6TH, 2010 SCOPING MEETINGS

NAME	DATE	PROCESS/FAST TRACK/LNP	ALTERNATIVES	AIR / HEALTH	BIOLOGY / BOTANY/RES	CLIMATE CHANGE	CULTURAL / NATIVE AMERICAN	ECONOMIC/SOCIOECONOMIC	OTHER_CONSIDERATIONS/CUMULATIVE IMPACT	TRAFFIC/ACCESS	WATER/HYDROLOGY	VISUAL/VRM/AESTHETICS	WILDLIFE/T&E/HABITAT	LIGHTING/PUBLIC UTILITIES	DESIGN	FLOODING	RECREATION/OHV	SOIL/GEOLOGY	HAZMAT	NOISE	ADD TO MAILING
Off-Road Business Association Inc	1/18/2010			X		X															
P. Dejohn	2/5/2010			X				X	X												
P. LePome	1/15/2010																				
R. Bransfield, USFWS, Ventura office	12/23/2009		X		X																
R Kelso	12/15/2009		X																		
R. Thompson, P.E.	1/21/2010								X												
S. Ellis	12/30/2009		X																		
S. Steele	1/14/2010																				
T. Budlong	11/29/2009 - 12/15/2009	X	X						X												
A. McPherson - U.S. EPA	11/30/2009	X	X	X	X		X	X	X	X	X		X			X		X	X		
T. Middlemiss, Kerncrest Chapter Nat'l Audubon Society	12/15/2009 & 1/12/10		X								X		X								
V Mitchell	1/5/2010-1/10/2010-1/11/2010		X								X	X		X	X			X			X
Charles Hattendorf	1/19/2010			X			X				X	X		X							
Daniel G. Burnett	1/20/2010		X	X						X	X										

Identified Scoping Concerns and Issues

A. Resource Areas and Cumulative Impacts

Purpose and Need

- Project description should not be narrowly defined to rule out feasible alternatives

Air Resources (Air sheds)

- Greenhouse gas emissions/climate change impacts on plants, wildlife, and habitat adaptation
- Planning for species adaptation due to climate change
- Discussion of how projected impacts could be exacerbated by climate change such as water supply and reliability
- Quantify and disclose anticipated climate change benefits of solar energy
- Discussion of trenching/grading/filling and effects on carbon sequestration of the natural desert

Soils Resources

- Baseline conditions should be described and if the site is disturbed or impaired
- Impacts to desert soils
- Site area is prone to flooding; analysis must address how this may change
- Increased siltation during flooding and dust (see public health as well)
- Disturbance of soils in desert locations can lead to the introduction of invasive weeds
- Preparation of a drainage, erosion, and sediment control plan

Water Resources (Surface and Ground water)

- Effects of additional groundwater pumping in conjunction with other groundwater issues
- Groundwater impacts
- A description of the water rights permitting process and the status of water rights in the basin, including an analysis of whether the water has been over allocated
- An analysis of water reduction alternatives and alternative water sources
- Mitigation options require careful preparation and monitoring
- Water supply impacts related to dust control, fire prevention and containment, vegetation management, sanitation, equipment maintenance, construction, and human consumption

Biological Resources

- If there are threatened or endangered species present, recommend BLM consult with USFWS and prepare a Biological Opinion under Section 7 of the ESA
- Impacts to all known species, not just special status, should be analyzed to assure ecosystem level protection—permanent loss of 4,000 acres of habitat and associated species is significant and cannot be mitigated
- Define and discuss the condition of threatened species in terms or recovery or decline and how use of this site affects these circumstances
- Eliminate all grazing in the area and add fencing to exclude Off-Highway Vehicle (OHV) trails and use
- Maximize options to protect habitat and minimize habitat loss and fragmentation
- Impacts associated with constructing fences
- Seasonal surveys should be performed for sensitive plant and animal species
- The proposed site is too important to the desert tortoise survival; alternative site is required
- The potential impact to the Mohave ground squirrel at this location cannot be mitigated
- Acquisition of lands for conservation should be part of mitigation strategy
- Mitigation should be 5:1 ratio for habitat removed
- Adaptive management should be considered in program design
- Mitigation should consider the removal of grazing land in habitat designated areas
- Impacts regarding habitat fragmentation and loss of connectivity
- Impact on washes
- Assess if ravens or other predators will be attracted to mitigation sites.

Vegetation Resources (Vegetative communities, priority and special status species)

- Identify all petitioned and listed threatened and endangered species and critical habitat that might occur within the Project area
- Include a full floral inventory of all species encountered on-site
- Seasonal surveys should be performed for sensitive plant species—lack of fall surveys may under represent onsite plants
- If transplantation is to be a part of the mitigation strategy, a detailed plan must be included as part of the EIS/SA
- Assess project impacts affecting plant taxa occurring within the project area that are considered rare within California but more common elsewhere
- Impacts to existing plant communities

Wildlife Resources (Priority species, special status species)

- Desert tortoise; high population density translocation proposed results in high mortality; portion of site designated as critical habitat for the MGS (Mohave Ground Squirrel).
- Impacts to the following species:
  - Burrowing owl
  - Mojave Fringe Toed Lizard
  - Desert Kit Fox
- Impacts to wildlife movement corridors
- Preserve large landscape-level migration areas

Cultural Resources

- Have archaeological sites been evaluated pursuant to the National Register of Historic Places criteria?
- Site has significant Native American history
- Evaluate impacts affecting sacred sites and sacredness.
- Evaluate potential impacts on archeological, cultural, and historical resources in the vicinity of the Project, including, but not limited to: (1) Native American resources, burial sites, and artifacts; and (2) historical mining operations and related artifacts.

Visual Resources

- Visual impacts to wilderness areas; increased light pollution on desert night sky
- Avoid impacts affecting visually sensitive areas
- Analyze the project's aesthetic and visual impacts that could affect desert star gazing and Native American practices

Land Use/Special Designations (ACECs, WAs, WSAs, etc.)

- Applicant implies that biological resources within project area are not sensitive because not located within Areas of Critical Concern (ACEC) or Desert Wildlife Management Area (DWMA), but many areas outside such designated areas do contain significant biological resources
- Use private land not public lands
- Describe reasonably foreseeable future land use and associated impacts resulting from additional power supply

Public Health and Safety

- Evaluate the effects of valley fever from disturbed soils.
- Describe the HTF, potential remediation if spilled, remediation plans and offsite disposal

Noise/Vibration

- Consider wildlife as sensitive receptors
- Dry cooling process noise/vibration impacts on wildlife

Recreation (RMAs, facilities, LTVAs, dispersed recreation opportunities, etc.)

- Evaluation should include impacts regarding OHV use, camping, photography, hiking, wildlife viewing, and rock hounding.
- Evaluation should include number of users, value of affected land for recreational purposes, and need to locate and acquire replacement venues for lands lost
- Indirect impacts caused by displacing recreational users
- Cumulative loss of land available for OHV recreation

Social and Economic Setting

- Evaluation of economic impacts due to construction, implementation, and operation.
- Economic impacts regarding loss of commerce due to recreational use losses.

Environmental Justice (minority and low-income communities)

- Evaluation whether diminished recreational access would be placed disproportionately on minorities and low-income communities.

Cumulative Impacts

- Identify impacts from other projects occurring in the vicinity, including solar, wind, geothermal, roads, transit, housing, OHV use, military maneuvers, and other development
- Include reasonably foreseeable projects; include all the solar and wind applications within vicinity of Ridgecrest
- Identify cumulative impacts of the addition of numerous renewable energy projects on the desert
- Include discussion of cumulative impacts to ground water supply
- Analyze the potential for development and population growth to occur in those areas that receive the generated electricity
- Describe the reasonably foreseeable future land use and associated impacts that will result from the additional power supply; i.e., recreation, grazing, OHV.
- Examine the potential for ecosystem fragmentation associated with the cumulative effects of large-scale industrial development occurring in the California Desert areas
- Analyze the project's cumulative impacts affecting biological resources
- The cumulative impacts analysis should address species migration needs and other ecological processes that maybe caused by global climate change

B. Alternative Development and/or Alternative Design Criteria

Comments in this category will be considered in the development of alternatives or can be addressed through design criteria in the alternative descriptions.

- Project description should not be narrowly defined to rule out feasible alternatives
- Describe how each alternative was developed, how it addresses each project objective, and how it would be implemented
- The preferred alternative should consider conjunctive use of disturbed private land in combination with adjacent lower value federal land
- Consider reduced project size
- Alternatives should include: sites not under BLM jurisdiction such as fallowed alfalfa fields north of the city ;
- Alternatives should describe rationale used to determine whether impacts of an alternative are significant or not
- Local high winds in the valley will affect design and cooler temperatures at the site will likely require more energy to keep the HTF warm and fluid in the winter months
- Consider reconfiguration alternatives proposed by F&WS to minimize impacts to wildlife movement and sensitive biological resources and washes.
- Consider cost and efficiency of energy for different technologies
- Consider alternative technologies that require significantly less water
- Consider the no-action alternative

C. Issues or Concerns Outside the Scope of the EIS

Comments in this category are outside the scope of analysis and will not be addressed in the EIS. Rationale for considering these comments out-of-scope is included.

- Consider development wherein solar and wind is focused first on lands which have lower resource value due to fragmentation, type conversion, edge effects, and other factors
- Consider abandoning the “fast track” approach because it does not allow enough time for an adequate analysis of impacts affecting natural, historical and cultural resource on and around the project site

BLM’S DISCRETIONARY ACTIONS (FOR BLM AND NEPA PURPOSES ONLY)

BLM is required to process ROW applications and to make a decision to either deny the ROW, grant the ROW as requested, or grant a modified ROW. It is a discretionary decision to grant a ROW or a modified ROW.

BLM'S PREFERRED ALTERNATIVE (FOR BLM AND NEPA PURPOSES ONLY)

BLM's objective in selecting a preferred alternative is to meet the purpose and need of the project, including the proposed project generating capacity, while appropriately mitigating environmental impacts. Currently, BLM has identified the February 2, 2010 amended application as the preferred alternative because it avoids El Paso Wash, the surrounding floodplain, and related high quality habitat. This reduces impacts to Mohave ground squirrel habitat compared with the original proposed project. The preferred alternative incorporates avoidance minimization measures and meets BLM's purpose and need to make a decision about the ROW application, while also allowing the development of 250 MW of renewable energy. Section 211 of the Energy Policy Act of 2005 mandates that up to 10,000 MW of non-hydropower renewable energy projects be approved on public lands by 2015. The preferred alternative's impacts to biological resources requires further review. As BLM and CEC continue their joint review, analysis of both public and agency comment will be considered in the selection of the final preferred alternative that will be presented in the SSA/FEIS. A Notice of Availability (NOA) of the FEIS will be published in the Federal Register when the FEIS is completed; the BLM will issue a Record of Decision (ROD) no earlier than 30 days after the FEIS is published.

The environmentally preferred alternative is the no action alternative. This alternative would not allow the development of renewable energy and would not have impacts on resources. However, it also would not provide the positive impacts of developing renewable energy related to climate change and global warming.

SUMMARY OF ENVIRONMENTAL IMPACTS AND RELATED MITIGATION (FOR ENERGY COMMISSION AND CEQA PURPOSES ONLY)

With the exception of the technical areas identified below, CEC staff believes that as currently proposed, including the applicant's and the staff's proposed mitigation measures incorporated into staff's proposed conditions of certification, the proposed RSPP would comply with all applicable laws, ordinances, regulations, and standards (LORS).

For a more detailed review of potential impacts and LORS conformance, see staff's technical analyses in each chapter of the SA/DPA/DEIS. The status of each technical area is summarized in **Executive Summary Table 1** below and the subsequent text.

Executive Summary Table 1

Technical Area	Complies with LORS	Impacts Mitigated
Air Quality	Yes	Yes
Biological Resources	***No***	***No***
Cultural Resources	Yes	Yes
Efficiency	Yes	Yes
Facility Design	Yes	Yes
Geology & Paleontology	Yes	Yes
Hazardous Materials	Yes	Yes
Land Use	Yes	Yes
Noise and Vibration	Yes	Yes
Public Health	Yes	Yes
Reliability	Yes	Yes
Socioeconomic Resources	Yes	Yes
Soil & Water Resources	Yes	Yes
Traffic & Transportation	Yes	Yes
Transmission Line Safety/Nuisance	Yes	Yes
Transmission System Engineering	***Undetermined***	***Undetermined***
Visual Resources	Yes	***No***
Waste Management	Yes	Yes
Worker Safety and Fire Protection	Yes	Yes

ENERGY COMMISSION STAFF'S CONCLUSIONS (FOR ENERGY COMMISSION AND CEQA PURPOSES ONLY)

Biological Resources

Energy Commission biological resources staff believe the Ridgecrest Solar Power Plant (RSPP) is proposed to be constructed on land featuring unique habitat for sensitive species and biological resources. The project site supports one of the highest concentrations of desert tortoise (DT) in the western United States and represents an important geographic area which supports connectivity and genetic linkage between populations of endangered Mohave ground squirrel (MGS). The unique qualities of the site that support high concentrations of DT and MGS genetic linkage are irreplaceable and cannot be fully mitigated. Because construction of the project would permanently destroy this important biological resource, staff, based on an extensive analysis of the

project, cannot recommend that the RSPP be approved. Staff believes this site should be protected because of its importance to the DT population and its unique and critical benefits to the MGS.

Despite staff's conclusions regarding the site specific biological resources, in the event the Commission approves the project, staff has included a number of Conditions of Certification in an effort to maximize preservations of biological resources. Staff does not believe these measures are sufficient to fully mitigate the significant impacts to the project site under CEQA, but the conditions will provide the fullest practicable mitigation.

Transmission System Engineering

Generally staff relies on the California ISO Phase I /System Impact Study to determine whether or not the proposed generation project will likely comply with reliability and to identify the transmission facilities required for reliable interconnection. Due to the number of generators that have chosen not to participate in the Phase II study, the Transition Cluster projects the Phase I Study previously analyzed, no longer provides an accurate forecast of impacts of the RSPP on the SCE transmission grid. Therefore, the transmission upgrades identified in the Phase I Study are not reasonably foreseeable consequences of the proposed generating project. Relying on available information, staff is unable to identify any likely indirect project transmission impacts. Upon completion of the Phase II Study and the execution of the LGIA, the impacts of the RSPP on grid reliability will be identified. In order to ensure compliance with reliability LORS, Condition of Certification TSE-5 requires the submittal of the Phase II Study and the executed LGIA prior to the start of construction of transmission facilities.

Visual Resources

Energy Commission visual resources staff have analyzed visual resource-related information pertaining to the proposed Solar Millennium Ridgecrest Solar Power Project (RSPP) and conclude that the proposed project would result in a substantial adverse impact to existing scenic resource values as seen from several viewing areas and Key Observation Points in the project vicinity including:

- U.S. 395 in the vicinity of, and on approach to, the project area;
- Brown Road in the vicinity of, and on approach to, the project area;
- Various BLM recreational access roads in the vicinity of the project area;
- Nearby residences;
- The Railroad Bed Bike Trail in the vicinity of the project area; and
- The elevated hill immediately west of the south development area.

Energy Commission staff concludes that these visual impacts would be significant in terms of three of the four criteria of California Environmental Quality Act (CEQA) Appendix G, and could not be mitigated to less than significant levels and would thus; result in significant and unavoidable impacts under CEQA.

If the Energy Commission approves the project, Energy Commission staff recommends that all of the Energy Commission staff's proposed conditions of certification be adopted

in order to minimize impacts to the greatest extent feasible. Conditions of certification referred to herein serve the purpose of both the Energy Commission's conditions of certification for purposes of CEQA and BLM's Mitigation Measures for purposes of the National Environmental Policy Act (NEPA).

For the other technical areas, except for Visual Resources, staff finds that incorporation of the recommended Conditions of Certification would mitigate all significant impacts to less than significant levels.

REFERENCES

CEC 2010s - California Energy Commission/Public Advisers Office (tn 55905). Public Adviser's Event Advertising Form. Submitted to CEC/Docket Unit on 3/16/2010

CEC 2009i - California Energy Commission/T.O Brien (tn 54327). Notice of Public Workshop, dated 11/30/2009. Submitted to CEC/Docket Unit on 12/2/2009.

CEC 2009j - California Energy Commission/J. Boyd (tn 54344). Notice of Energy Commission Information Hearing Environmental Scoping Meeting, dated 12/3/2009. Submitted to CEC/Docket Unit on 12/3/2009.

CEC 2009n - California Energy Commission/T. O'Brien (tn 54626). Supplemental Notice of Public Workshops, dated 12/29/2009. Submitted to CEC/Docket Unit on 12/30/2009.

A. INTRODUCTION

Eric K. Solorio

A.1 PERMITTING AGENCIES AUTHORITIES, RESPONSIBILITIES AND PROCESSES

The California Energy Commission (CEC) and the Bureau of Land Management (BLM) have prepared this joint, detailed analysis and statement known as a Staff Assessment/Draft Plan Amendment/Draft Environmental Impact Statement (SA/DPA/DEIS). The Draft Plan Amendment pertains to the BLM's California Desert Conservation Area Plan of 1980 as Amended. The analysis and statement are commonly referred to as a "joint, environmental document" because the SA/DPA/DEIS addresses the requirements of the California Environmental Quality Act (CEQA) and also the National Environmental Policy Act (NEPA). CEQA is a statute that requires state (CEC) and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. NEPA requires federal agencies (BLM) to integrate environmental values into their decision making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions.

For clarity, staff emphasizes to the reader that this "joint, environmental document", is being used by the CEC and also the BLM, in separate and distinctly different licensing, permitting and or authorization processes. Overall, both the BLM and the CEC will rely on the SA/DPA/DEIS document in very similar ways (i.e. considering the proposed project's impacts on the environment).

Because the BLM and the CEC, respectively, will each rely upon this document to comply with different environmental regulations, there are certain portions of the document titled "CEQA purposes only" or "NEPA purposes only" or use other similar language. The CEQA only portions are identified for the benefit of the CEC's environmental review process while the NEPA only portions are identified for the benefit of the BLM's environmental review process. The balance of the document is for the benefit of both agencies respective, environmental reviews.

The authors of this SA/DPA/DEIS are CEC staff, hereafter referred to as "staff". Prior to drafting the joint document, the BLM and the CEC conducted multiple site visits, in order to examine the physical characteristics of the proposed project site. Both agencies also conducted joint review of the AFC, POD and related information regarding the proposed project. The BLM and the CEC also organized, noticed and held five public meetings and workshops to discuss the proposed project. The BLM has also reviewed the administrative draft of the SA/DPA/DEIS and provided written comments to the authors for incorporation into the SA/DPA/DEIS.

A.1.1 ENERGY COMMISSION'S AUTHORITY AND RESPONSIBILITIES

The Energy Commission has the authority to certify the construction, modification, and operation of thermal electric power plants 50 megawatts (MW) or larger. The Energy Commission certification is in lieu of any permit required by state, regional, or local

agencies; and federal agencies to the extent permitted by federal law (Pub. Resources Code, § 25500). The Energy Commission must review thermal power plant Applications for Certification (AFC) to assess potential environmental impacts including potential impacts to public health and safety, potential measures to mitigate those impacts, and compliance with applicable governmental laws or standards (Pub. Resources Code, § 25519 and § 25523(d)).

The Energy Commission's siting regulations require staff to independently review the AFC and assess whether all of the potential environmental impacts have been properly identified, and whether additional mitigation or other more effective mitigation measures are necessary, feasible, and available (Cal. Code Regs., tit. 20, § 1742 and § 1742.5(a)).

In addition, staff must assess the completeness and adequacy of the measures proposed by the applicant to ensure compliance with health and safety standards, and the reliability of power plant operations (Cal. Code Regs., tit. 20, § 1743(b)). Staff is required to develop a compliance plan to ensure that applicable laws, ordinances, regulations, and standards (LORS) are met (Cal. Code Regs., tit. 20, § 1744(b)).

Staff conducts its environmental analysis in accordance with the requirements of CEQA. No additional environmental impact report (EIR) is required because the Energy Commission's site certification program and production of a Staff Assessment (SA), has been certified by the California Resources Agency as meeting all requirements of a certified regulatory program (Pub. Resources Code, § 21080.5 and Cal. Code Regs., tit. 14, § 15251 (j)). The Energy Commission is the CEQA lead agency.

A.1.2. ENERGY COMMISSION'S SITE CERTIFICATION PROCESS

Upon the Energy Commission receiving a complete Application for Certification (AFC), Commission staff begins preparing an SA. The analyses contained in a SA are based upon information from the: 1) AFC, 2) responses to data requests, 3) supplementary information from local, state, and federal agencies, interested organizations, and individuals, 4) existing documents and publications, 5) independent research, and 6) comments received at public workshops. The analyses for most technical areas include discussions of proposed conditions of certification. Each proposed condition of certification is followed by a proposed means of verification that the condition of certification has been met. The SA presents staff's conclusions about potential environmental impacts and conformity with LORS, as well as proposed conditions that apply to the design, construction, operation, and closure of the facility.

Upon completion of the SA, it is published and made available to the applicant, interveners, public, agencies and interested parties. Following publication of the SA, staff provides a public comment period to resolve issues between the parties and to narrow the scope of disputed issues that would likely be presented at evidentiary hearings held by the Energy Commission. During the comment period, staff will conduct additional public workshops to discuss its conclusions, proposed mitigation, and proposed compliance-monitoring requirements. Based on dialogue at the workshops and written comments from agencies and the general public, staff may chose to refine its analysis, correct minor errors, and or finalize conditions of certification to reflect

areas where agreements have been reached with the parties. If necessary, staff will then publish an Errata to the Staff Assessment which corrects any minor errors in the SA, elaborates on any details to proposed mitigation measures and addresses the comments received. When producing a joint environmental document, staff will publish its Errata simultaneously with and as part of the Final Environmental Impact Statement. The final document for this review will be titled Staff Assessment; Errata/Proposed Plan Amendment/Final Environmental Impact Statement (SAE/PPA/FEIS).

For the Energy Commission's purposes in considering the RSPP, the SAE/PPA/FEIS is not the decision document for the Commission's proceedings nor does it contain "findings" of the Energy Commission related to environmental impacts or the project's compliance with local/state/federal legal requirements. The SAE/PPA/FEIS will be entered into the evidentiary record and serve as Energy Commission staff's testimony in evidentiary hearings to be held by the Committee of two Commissioners along with a hearing officer, who are overseeing this case. The Committee will hold evidentiary hearings and will consider all the evidence entered into the record including evidence presented by staff, the applicant, all parties, government agencies and public comments, prior to proposing its decision. At the public hearings, all parties will be afforded an opportunity to present evidence and to rebut the testimony of other parties, thereby creating a hearing record on which a decision on the project can be based. The hearing before the Committee also allows all parties to argue their positions on disputed matters, if any, and it provides a forum for the Committee to receive comments from the public and other governmental agencies. It is important to distinguish that the Commission's hearing process is completely separate from the BLM's process. As such, evidence presented at the Commission's hearings is not evidence, facts or findings that is before the BLM.

Following the evidentiary hearings, the Committee's recommendation to the full Energy Commission on whether or not to approve, modify or deny the proposed project will be contained in a document entitled the Presiding Member's Proposed Decision (PMPD). Following publication, the PMPD is circulated for 30 days, in order to receive written public and agency comments. At the conclusion of the comment period, the Committee may prepare a revised PMPD. The final step is presentation of the PMPD by the hearing officer to the full Commission for consideration and issuance of an order granting or denying of a license to construct and operate the proposed facility.

A.1.3 BUREAU OF LAND MANAGEMENT'S AUTHORITY, RESPONSIBILITIES, AND PURPOSE AND NEED

A.1.3.1 Bureau Of Land Management's Authority and Responsibilities

Applications to construct and operate commercial solar energy facilities on public lands, managed by the BLM, are processed as right-of-way (ROW) authorizations under Title V of the Federal Land Policy and Management Act (FLPMA) of 1976 [43 United States Code (U.S.C.) 1701 et seq.], and Title 43, Part 2804 of the Code of Federal Regulations (CFR). Applications submitted to the BLM for commercial solar energy development projects use Form SF-299. Additional authorities consistent with BLM for processing such applications (SF-299), include the following:

- The Energy Policy Act of 2005 (Epact), which says "It is the sense of Congress that the Secretary of the Interior should, before the end of the 10-year period beginning on the date of enactment of this Act [August 8, 2005] seek to have approved non-hydropower renewable energy projects located on the public lands with a generation capacity of at least 10,0000 megawatts of electricity."; and
- Secretarial Order 3285, dated March 11, 2009, which "establishes the development of renewable energy as a priority for the Department of the Interior".

In processing the ROW applications and considering taking related actions to change land use designations, the BLM is required under the NEPA to conduct a comprehensive environmental review of the proposed project. For the RSPP, this NEPA review will be documented in the form of an SA/DPA/DEIS and a subsequent SAE/PPA/FEIS.

A.1.3.2 BLM Land Use Plan Conformance

The principal land use plan affecting this proposed project is the U.S. Bureau of Land Management's (BLM) California Desert Conservation Area (CDCA) Plan of 1980, as amended, and the West Mojave Desert Management Plan (WEMO), which amends the CDCA Plan for those specific areas of the Mojave Desert. In the CDCA Plan, the location of the proposed facility includes land that is unclassified and small amount of classified as Multiple-Use Class L (Limited Use). The Plan states that solar power facilities may be allowed within Limited Use areas after the NEPA requirements are met by considering the environmental impacts and reasonable alternatives to the action. The majority of the Project is located in unclassified BLM-administered land. The BLM manages these parcels on a case-by-case basis.

This DEIS acts as the mechanism for complying with those NEPA requirements. Because solar power facilities are an allowable use of the land as it is classified in the CDCA Plan, the proposed action does not conflict with the Plan. However, Chapter 3, "Energy Production and Utility Corridors Element" of the Plan states that "Sites associated with power generation or transmission not identified in the Plan will be considered through the Plan Amendment process." Because the proposed facility is not currently identified within the CDCA Plan, the plan would require an amendment to authorize the proposed project.

As specified in Chapter 7, Plan Amendment Process, there are three categories of Plan Amendments, including:

- Category 1, for proposed changes that will not result in significant environmental impact or analysis through an Environmental Impact Statement;
- Category 2, for proposed changes that would require a significant change in the location or extent of a multiple-use class designation; and
- Category 3, to accommodate a request for a specific use or activity that will require analysis beyond the Plan Amendment Decision.

Based on these criteria, approval of the proposed project would require a Category 3 amendment.

The Implementation section of the Energy Production and Utility Corridors Element of the CDCA Plan lists a number of Category 3 amendments that have been approved since adoption of the Plan in 1980. An additional amendment is proposed to be added to this section of the Plan, and would read "Permission granted to construct solar energy facility (proposed Ridgecrest Solar Power Project (RSPP)." a.1.3.3 Bureau of Land Management's right-of-way grant process.

Under federal law, the BLM is responsible for processing requests for rights-of-way to construct systems for generation, transmission, and distribution of electric energy on the public lands. In response to Solar Millennium's application for a ROW grant (CACA 049016) on public land together with a Plan of Development (POD) to develop the RSPP, the BLM and CEC generated this SA/DPA/DEIS to evaluate the potential environmental impacts of the proposed action, the No Action alternative, and other alternative actions that may meet BLM's purpose and need. The following outlines the BLM's public comment timing and process:

1. The Notice of Availability (NOA) publication in the Federal Register will begin the 90-day public comment period on the SA/DPA/DEIS

2. Following completion of the comment period, BLM will review and develop responses to comments that were submitted by the public and other agencies. The responses to the comments will be incorporated into a joint SAE/PPA/FEIS, which will also include identifying the BLM's preferred project alternative. A Notice of Availability (NOA) of the joint SAE/PPA/FEIS will be published in the Federal Register when the SAE/PPA/FEIS becomes available for public review.

3. The SAE/PPA/FEIS will be available for public review for 30-days before the BLM issues a Record of Decision (ROD). The Decision is appealable to the Interior Board of Land Appeals upon issuance of the ROD.

A.1.3.4 BLM's Purpose and Need for the Proposed action

NEPA guidance published by the Council on Environmental Quality (CEQ) states that environmental impact statements' Purpose and Need section "shall briefly specify the underlying purpose and need to which the agency is responding in proposing the

alternatives including the proposed action" (40 CFR §1502.13). The following discussion sets forth the purpose of, and need for, the project as required under NEPA.

Solar Millennium, LLC, has submitted an amended application to apply for a ROW authorization to construct and operate a parabolic trough, solar thermal, generating facility with a capacity of 250 megawatts. The project would connect to the existing Southern California Edison 230-kilovolt (kV) Inyokern/Kramer Junction transmission line. About a mile and half long portion of this 230 kV transmission line and about a mile and a half long portion of a 115 kV line would be realigned to avoid the project area. The amended application requests an approximately 3,995-acre ROW that would contain two solar fields, a power block, construction areas, a dry-cooling tower, steel transmission towers with associated transmission lines, access roads, three covered water tanks, an underground water pipeline, a water treatment facility, an electrical switchyard, a land treatment unit for bioremediation of any soil that may be contaminated by heat transfer fluid, an office, a warehouse, a parking lot, and facility perimeter fencing. The application is for a project that would be located approximately five miles southwest of the city of Ridgecrest in Kern County, California.

The BLM's purpose and need is to respond to Solar Millennium, LLC's application will be consistent under FLPMA for a ROW grant to construct, operate and decommission a solar generation facility and associated infrastructure in compliance with FLPMA, BLM ROW regulations, and other applicable federal laws. BLM's review of Solar Millennium, LLC's application is also consistent with the following laws and directives pertaining to renewable energy resources:

- Section 211 of the Energy Policy Act of 2005, enacted in August 2005 states, "It is the sense of Congress that the Secretary of the Interior should, before the end of the 10-year period beginning on the date of enactment of this Act [August 8, 2005] seek to have approved non-hydropower renewable energy projects located on the public lands with a generation capacity of at least 10,0000 megawatts of electricity."Instruction Memorandum 2007-097, dated April 4, 2007, Solar Energy Development Policy establishes BLM policy to ensure the timely and efficient processing of energy ROWs for solar power on the public lands.
- Secretarial Order 3283 Enhancing Renewable Energy Development on the Public Lands signed January 16, 2009. This order facilitates the Department of the Interior's efforts to achieve the goals established in Sec. 211 of the Energy Policy Act of 2005.
- Secretarial Order 3285 Renewable Energy Development by the Department of the Interior, signed March 11, 2009. The order establishes the development of renewable energy as a priority for the Department of the Interior and establishes a Departmental Task Force on Energy and Climate Change.

The decision BLM makes is whether or not to grant a ROW and if so, under what terms and conditions, and whether to amend the CDCA land use plan. The SA/DPA/DEIS will be used to analyze the impacts of these decisions.

Modifying the existing route network is a part of the purpose and need for this project. The purpose and need for this project also includes compliance with 43 CFR 8342.1

which establishes criteria to consider when making route designations. The designations should be based on the protection of the resources of the public lands, promotion of the safety of the users of the public land, and to minimize the conflicts among the various users of the public lands. They also must be in accordance with the following criteria:

- Areas and trails shall be located to minimize the damage to soil, watershed, vegetation, air, or other resources of the public lands, and to prevent impairment of wilderness suitability.
- Areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife or significant disruption of wildlife habitats. Special attention would be given to protect endangered or threatened species and their habitats.
- Areas and trails shall be located to minimize conflict between OHV use and other existing or proposed recreational uses of the same or neighboring public lands, and to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors.
- Areas and trails would not be located in officially designated wilderness areas or primitive areas. Areas and trails would be located in natural areas only if the authorized officer determines that vehicle use in such locations would not adversely affect their natural, esthetic, scenic, or other values for which such areas are established.

A.1.4 BLM STATUTORY SECTIONS

This section discusses the following topics that are required to be addressed by environmental impact statements and reports by federal and/or California statutes, regulations, or policy:

- Relationship Between Short-Term Uses of the Environment and the Maintenance and
- Enhancement of Long-term Productivity
- Irreversible and Irretrievable Commitment of Resources
- Growth-Inducing Effects of the Proposed Action
- Energy Consumption and Conservation

A.1.4.1 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Consideration of energy development permits on BLM managed lands is a trade-off between a permitted short-term use of the desert environment in exchange for other uses, including conservation and habit uses that would be effective in the longer term.

In the short term, the development alternatives allow commercial energy generation use of desert lands. New disturbance would occur on the development land. This use is incompatible with habitat conservation on the same land.

In the long term, despite these uses, the previous establishment of a habitat conservation area, including tortoise DWMAs and other conservation areas, would ensure that desert ecosystems would be maintained and enhanced with nearly 98 percent of the 2.2 million acre WEMO planning area maintained in an undisturbed condition. Additionally, an acquisition program to acquire and enhance the protection of private lands would be established with the required mitigation.

Closure of off highway vehicle routes through the project area, will be off-set by creation of alternate routes around the project area to allow appropriate access to sites visited by the public. These new routes would be maintained, however, thus minimizing losses of recreation and commercial access. This would be accomplished by the design of a network that provided appropriate access in a manner that avoided sensitive resource sites. Access would continue to be provided for a variety of activities, including equestrian staging areas, recreational touring, rock hounding, mineral exploration, and other legitimate uses.

At the end of the term of the right of way, the land would be reclaimed and returned to its prior condition and use, returning to long term productivity.

A.1.4.2 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Authorized take of habitat would result in the permanent loss of wildlife and plant habitat. Once new ground disturbance occurs, the natural habitat eliminated by this would no longer be available to sensitive wildlife and plant species. This could include desert tortoise habitat. Direct take of individuals could also occur. Given the large scale of the conservation areas on other BLM managed lands, these disturbances are not likely to threaten the survival and recovery of sensitive species. Designation of conservation areas and previous closure of routes within those areas enhanced ecosystem conservation for the land within the West Mojave Plan.

All undertakings that involve ground disturbing activities would require site-specific cultural analysis that may include surveys, recording of historic and prehistoric sites, and determinations of eligibility of sites to the National Register of Historic Places. Potential impacts to Native American values would be analyzed. Mitigation measures would be identified and implemented if necessary. Avoidance of impacts to cultural resources is the preferred mitigation measure, but is not always possible or feasible. A decision to mitigate impacts to cultural resources by data recovery, instead of avoidance and consequent removal of cultural resources from the area constitutes a residual impact to the site. Sites would rarely, if ever, be completely excavated. Mitigation by data recovery results in a steady loss of archaeological sites, and reduces opportunities for interpretation in their natural context.

Parts of allotments no longer available for grazing use would be lost for the reasonably foreseeable future. The amount of land removed from the allotment would not result in a loss of livestock production.

In processing the application for this renewable energy project, BLM has made no irreversible or irretrievable commitment of resources.

A.1.4.3 GROWTH-INDUCING EFFECTS OF THE PROPOSED ACTION

Population growth in the West Mojave is projected to range between 1.59% and 2.21% per year for the 30-year term of the project. Adoption of streamlined procedures for complying with the California and federal endangered species acts increases the likelihood that growth rates will approximate the latter figure. This is based upon the assumption that applicants for discretionary development permits will have a higher incentive to pursue high desert projects due to the reduction and/or elimination of costs associated with obtaining those permits, and (more significantly) the elimination of delays currently inherent in the permit approval process. This growth would be focused in the vicinity of currently urbanized areas, including incorporated cities, rather than in more remote desert regions.

This individual project is not expected to have a significant growth-inducing effect on the development of BLM-administered public lands. As more energy development projects are authorized the State of California and the United States will be closer to meeting their renewable energy goals and thus reducing the demand for future projects.

A.1.4.4 ENERGY CONSUMPTION AND CONSERVATION

Any development project would result in a direct change to the regional level of energy development and a minimal change to the regional level of energy conservation and consumption.

A.1.5 U.S. DEPARTMENT OF ENERGY (DOE), LOAN GUARANTEE PROGRAM (LGP) OFFICE'S PURPOSE AND NEED STATEMENT

Solar Millennium has also applied to the United States (US) Department of Energy (DOE) for a loan guarantee pursuant to Title XVII of the EPAct. Title XVII of EPAct authorizes the United States Secretary of Energy to make loan guarantees for a variety of types of projects, including those that "avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases, and employ new or significantly improved technologies as compared to commercial technologies in service in the United States at the time the guarantee is issued." The two principal goals of the loan guarantee program are to encourage commercial use in the United States of new or significantly improved energy-related technologies and to achieve substantial environmental benefits. The purpose and need for action by DOE is to comply with their mandate under EPAct by selecting eligible projects that meet the goals of the Act.

Should DOE enter into negotiation of a possible loan guarantee with the applicant, DOE would become a cooperating agency in developing the FEIS. The need includes consideration for this or other funding available through the DOE. Should DOE accept the application as suitable for this funding, DOE may adopt this EIS, or become a cooperating agency in developing the FEIS. If so, this SA/FEIS may be used by DOE to meet the NEPA requirements in making a determination of funding.

A.1.6 U.S. FISH AND WILDLIFE SERVICE'S AUTHORITY AND RESPONSIBILITIES

The U.S. Fish and Wildlife Service (USFWS) is charged with protection of threatened and endangered species under the Federal Endangered Species Act (ESA), 16 U.S.C. 1531. ESA requires federal agencies to consult with the USFWS or the National Oceanic and Atmospheric Administration (NOAA) when a federal action is likely to adversely affect listed species or critical habitat. Consultation is initiated by the lead federal agency (BLM) through the preparation and submission a Biological Assessment (BA) to USFWS/NOAA which describes the proposed project, its effects on the specie(s) and its habitat, and related avoidance and minimization measures.

Upon receipt of the BA, the USFWS/NOAA will begin formal consultation with the BLM to discuss the proposed action. Following consultation, the USFWS/NOAA will then issue a Biological Opinion (BO). The BO may find the BLM's proposed action will result in "jeopardy" to the listed species, as a whole. If so then the proposed action cannot be taken. Alternatively, if the USFWS/NOAA concludes the proposed action will not result in "jeopardy" to the listed species, as a whole, then the BO will authorize the "incidental take" of the listed species[1], and contain specific avoidance and minimization measures which must be implemented if the proposed action is approved by the BLM. The BO must be obtained from the USFWS and considered by the BLM, before the BLM issues a Record of Decision.

A.1.7 KERN COUNTY AIR POLLUTION CONTROL DISTRICT'S AUTHORITY AND RESPONSIBILITIES

The project site is located in the Mojave Desert Air Basin[2] and is under the jurisdiction of the Kern County Air Pollution Control District (KCAPCD). Based upon the authorities in 40 Code of Federal Regulations (CFR) Part 52 and 40 CFR Part 60, the District is responsible for issuing the federal New Source Review (NSR) permit and has been delegated enforcement of the applicable New Source Performance Standard (Subpart IIII).

A.1.8 CALIFORNIA DEPARTMENT OF TRANSPORTATION (CALTRANS)

Caltrans has jurisdiction over encroachments to its transportation facilities and related easements and rights-of way. Regarding the proposed RSPP, CalTrans has authority to consider granting an encroachment permit for the RSPP to cross under US Route 395 with a water line, and also granting a right-of-way and related encroachment permit for a potential new access from US Route 395 to the project site.

[1] The BO would not authorize take of listed plant species. For purposes of this document the BO would potentially authorize the incidental take of the Desert Tortoise.

[2] The Mojave Desert Air Basin lies inland east of the San Joaquin Valley Air Basin to the west and north and east of the South Coast Air Basin. The desert portions of Kern, San Bernardino, Riverside, and Los Angeles counties are within its boundaries.

A.1.9 KERN COUNTY, CALIFORNIA

The county of Kern has jurisdiction to issue building permits to the RSPP. Building permits issued by the county are considered ministerial, in nature. The county also has jurisdiction to issue discretionary approvals for any easements, rights-of-way and or encroachment permits where county facilities are concerned.

A.2 ORGANIZATION OF THE STAFF ASSESSMENT/ DRAFT PLAN AMENDMENT/DRAFT ENVIRONMENTAL IMPACT STATEMENT (SA/DPA/DEIS)

The SA/DPA/DEIS contains an Executive Summary, Introduction, Project Description, and Project Alternatives. The environmental, engineering, and public health and safety analysis of the proposed project is contained in a discussion of 20 technical areas. Each technical area is addressed in a separate chapter. These chapters are followed by a discussion of facility closure, project construction and operation compliance monitoring plans, and a list of CEC and BLM staff that assisted in preparing and reviewing this report.

Each of the 20 technical area assessments includes a discussion of:

- Laws, ordinances, regulations, and standards (LORS);
- The regional and site-specific setting;
- Project specific and cumulative impacts;
- Mitigation measures;
- Closure requirements;
- Conclusions and recommendations; and
- Conditions of certification for both construction and operation (if applicable).

B. THE PROPOSED PROJECT AND ALTERNATIVES

B.1 DESCRIPTION OF THE PROPOSED PROJECT AND ALTERNATIVES

Testimony of Eric K. Solorio

B.1.1 INTRODUCTION

This section provides a description of the proposed project and three (3) project alternatives being considered[1] by the California Energy Commission (CEC) and the U.S. Bureau of Land Management (BLM). For purposes of describing the proposed project and the project alternatives, it is helpful to first articulate the differences between NEPA and CEQA, with respect to how each set of regulations evaluates the proposed project and project alternatives.

Under NEPA, both the proposed project ***and*** the project alternatives are each analyzed at the same level. Both the proposed project and the project alternatives are compared to; and considered alternatives to each other. As such, the proposed project and the project alternatives are hereafter referred to using the term "project" or "alternative", interchangeably. A key distinction to be made under a CEQA analysis is that "project alternatives" are normally analyzed at a lesser degree than the proposed project, and alternatives are not evaluated as alternatives to each other, rather the primary comparison is as an alternative to the proposed project.

The common objective of both CEQA and NEPA is to identify the potential impacts on the human environment that would potentially arise if the proposed project is approved – and consider "alternatives" that could otherwise avoid and or minimize some or all of the effects. NEPA and CEQA, respectively, take a slightly different approach to considering alternatives to the proposed project however, both sets of environmental laws have the same overall objective – to inform the decision makers and the public of the environmental effects of a project and ways those effects could otherwise be avoided; minimized and or mitigated.

Because a review under NEPA treats the proposed project and the project alternatives equally, it is necessary herein to describe each project alternative to the same degree. The four alternatives described in this **Section B.1**, range in size from 104 megawatts (MW) up to 250 MW, and are generally identified below:

Alternative #1: **Proposed Project** (250 MW sited on 1,944 acres)
Alternative #2: **Northern Unit Only** (146 MW sited on 1,118 acres)
Alternative #3: **Southern Unit Only** (104 MW sited on 809 acres)
Alternative #4: **Original Proposed Project** (250 MW sited on 1,760 acres)

Please refer to **Project Description Figures 1, 2, 3 and 4** (at the end of this section) which illustrate the proposed project and each alternative. Although Alternatives #1 and

[1] The Energy Commission also considered additional alternatives that are discussed in **Section B.2** of this SA/DEIS document. The BLM also considered but eliminated other project alternatives, discussed in **Section B.2**. The Alternatives described in this **Section B.1** were both carried forward and fully analyzed by the Energy Commission and the Bureau of Land Management.

#4 are the same size (in rated capacity), Alternative #4 was evaluated because it has a different facility footprint; smaller disturbance area, would reduce impacts to the Mohave Ground Squirrel conservation area, and potentially reduce impacts to Desert Tortoise in the northern portion of the ROW. The remaining two alternatives (#2 and #3) are significantly smaller versions of the proposed project. Both alternatives #2 and #3 are being considered because of their independent ability to avoid site specific impacts to the Mohave Ground Squirrel, listed by the State of California, as threatened under California Endangered Species Act (CESA) and the Mojave Desert Tortoise which is federally listed as threatened under the Endangered Species Act of 1973, as amended 16 U.S.C. 1531.

All four of the project alternatives would potentially be sited somewhere within the 3,995-acres the applicant applied for under the February 2, 2010 amended SF-299 application. Each alternative would use the same solar electric technology and therefore have a common description of equipment, systems, processes, resource inputs, operations, closure plans and general location. As such, in order to avoid redundancy, subsection **B.1.2** will present a single, comprehensive project description that identifies the elements that are common to the proposed project and each alternative ("Project"). Following, subsection **B.1.3** will then identify any additional elements that are unique to each alternative. Lastly, there may be additional project features and characteristics, related to each alternative, as described in the various technical analyses that follow.

B.1.2 PROJECT DESCRIPTION COMMON TO ALL FOUR ALTERNATIVES

B.1.2.1 PROJECT(S) LOCATION AND VICINITY

Each of the four alternatives would be developed within the same 3,995-acre ROW area, currently managed by the BLM. The ROW area is located in north eastern Kern County, California, along U.S. Highway 395, just west of the China Lake Boulevard exit. The outer boundary of the ROW area is approximately five miles southwest of the city of Ridgecrest, California. Ridgecrest is at the southwestern boundary of the China Lake Naval Air Weapons Station (NAWS).

B.1.2.2 PROPERTY DESCRIPTION

The ROW area consists entirely of Federal land, described as within sections 13, 14, 23-27, 34 and 35, Township 27 South, Range 39 East and section 2, Township 28 South, Range 39 East, San Bernardino Base and Meridian, Kern County, California. If any of the four alternatives were authorized, the difference between the total 3,995 acres listed in the amended SF-299 ROW application and the total acreage required for construction and operation would be reduced to the total disturbed area required for that particular project.

The following Kern County Assessor's Parcel Number's identify the parcels within the overall ROW boundary:

APN 341-091-08	APN 341-091-10	APN 341-091-11	APN 341-110-01
APN 341-110-02	APN 341-110-03	APN 341-110-05	APN 341-110-06

B.1.2.3 OVERVIEW OF A PARABOLIC TROUGH, POWER PLANT

The proposed project and alternatives would utilize solar parabolic trough technology to generate electricity. With this technology, arrays of parabolic mirrors collect heat energy from the sun and focus the solar radiation on a receiver tube located at the focal point of the parabola where the heat transfer fluid (HTF) is heated to temperatures of 750 degrees Fahrenheit, as it circulates through the receiver tubes. The HTF is then piped through a series of heat exchangers where it releases its stored heat to generate high pressure steam. The steam is then fed to a traditional steam turbine generator where electricity is produced.

The power block would be located north of Brown Road. The power block is composed of its own administration, control, warehouse, maintenance, and lab buildings; the HTF pumping and freeze protection system; solar steam generator (SSG); a propane fired auxiliary boiler; one steam turbine generator (STG); an air-cooled condenser (ACC); generator step-up (GSU) transformer, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system).

In addition to the main power generating facility, there would be a main office building and parking lot, a main warehouse with laydown area, onsite access roads, a tie-in switchyard, and a land treatment unit (LTU) for bioremediation or land farming of HTF-contaminated soil.

The proposed project and alternatives would generate electric power solely via solar energy. Propane will be used to fire an auxiliary boiler overnight to support startup operations until the HTF system is up to operating temperature, at which time the generation of electricity can commence. A second fired heater will be used as needed, mostly during the winter, to prevent freezing of the HTF.

The proposed project and alternatives would require a 5-mile water pipeline from the Indian Wells Valley Water District (IWVWD) existing water tank and a 230-kilovolt (kV) gen-tie transmission line from the turbine generator to the onsite switchyard that will interconnect with Southern California Edison's (SCE) existing 230 kV InyoKern/Kramer Junction transmission line that currently crosses the southwestern portion of the ROW boundary.

B.1.2.4 SOLAR ELECTRIC GENERATING FACILITY DESCRIPTION

The following sections describe the processes, systems, and equipment that constitute the generation facilities. All plant facilities will be designed, constructed and operated in accordance with applicable laws, ordinances, regulations and standards (LORS). All

generating facilities would be located within the fence line of each of the proposed project and alternatives.

The plant will consist of a conventional steam Rankine-cycle power block, a parabolic trough solar field, an HTF and steam generation system, as well as a variety of ancillary facilities (sometimes referred to collectively as “balance-of-plant” [BOP]), such as conventional water treatment, electrical switchgear, administration, warehouse, and maintenance facilities, etc. The electric output of the plant will be provided entirely by solar energy. No electricity will be generated by the use of fossil fuel. A propane-fired HTF heater will be used for freeze protection of the HTF in the solar fields.

B.1.2.4.1 Major Facilities

Overall proposed project facilities include the following major components:

- Solar field(s),
- Access road from Brown Road to onsite office,
- Office and parking,
- LTU for bioremediation/land farming of HTF-contaminated soil,
- Warehouse/maintenance building and laydown area,
- Onsite transmission facilities including switchyard,
- Diversion channels to reroute desert washes,
- Water pipeline,
- SCE transmission corridor relocation area, and
- Power block,
    - SSG, including steam generation heat exchangers,
    - HTF expansion and overflow vessels,
    - One HTF freeze protection heat exchanger,
    - One auxiliary boiler,
    - One STG,
    - One GSU transformer,
    - ACC,
    - One small wet cooling tower for ancillary equipment (no evaporation pond),
    - Reverse osmosis (RO) concentrate/dust control water storage tank,
    - Potable water storage tank,
    - Treated water tank,
    - Water treatment system,
    - Operations and maintenance buildings, and
    - Transmission lines and communication lines exiting the power block.

B.1.2.4.2 Parabolic Trough, Solar Field(s)

The solar field will be a modular, distributed system of solar collector assemblies (SCAs) connected in a series-parallel arrangement via a system of insulated pipes. The collectors will be equipped with a sun tracking mechanism that moves the reflecting collectors toward the sun to the optimum angle for solar energy collection. The collectors will be aligned north-south to track the sun from east to west. HTF will flow from the HTF pumping area in the power block to the cold HTF header that distributes it to the collector loops of SCAs in the solar fields.

Parabolic Trough Collector Loop

Each of the collector loops consist of two adjacent rows of SCAs, each row about 1,300 feet long. The two rows are connected by a crossover pipe. HTF is heated in the loop and enters the hot header, which returns hot HTF from all loops to the power block where the power generating equipment is located.

Solar Collector Assemblies (SCA)

The SCAs will be oriented north-south to rotate east-west to track the sun as they move across the sky throughout the day. The SCAs collect heat by means of linear troughs of parabolic reflectors, which focus sunlight onto a straight line of Heat Collection Elements (HCEs) welded along the focus of the parabolic “trough.” The HCE is mounted on a mechanical support system that includes steel, pylons and bearings. Each SCA includes local measurement instrumentation, a hydraulic drive system, and a controller which independently tracks the sun to maintain mirror focus on the HCEs and protects the HCEs from overheating.

Mirrors

The parabolic mirrors to be used in the proposed project and alternatives are low-iron glass mirrors and are known to be one of the most reliable components in the SCAs. No long-term degradation of the mirrors has been observed, and older mirrors can be brought back to nearly full reflectivity with simple cleaning. Typical life spans of the reflective mirrors are expected to be 30 years or more. The HCEs of the solar plant are composed of a steel tube surrounded by an evacuated glass tube insulator. The steel tube has a coated surface, which enhances its heat transfer properties with a high absorptivity for direct solar radiation, accompanied by low emissivity. Glass to metal seals and metal bellows are incorporated into the HCE to ensure a vacuum-tight enclosure. The enclosure protects the coated surface and reduces heat losses by acting as an insulator.

The glass tube cylinder has anti-reflective coating on both the inner and outer surfaces to reduce reflective losses off the glass tube, thereby increasing the transmissivity. Usually, to maintain the tube’s insulating properties, getters, or scavengers, are installed in the vacuum space to absorb hydrogen and other gases that may permeate into the vacuum cylinder over time.

B.1.2.4.3 Heat Transfer Fluid (HTF) and System

The HTF is a synthetic hydrocarbon liquid mixture of diphenyl ether and biphenyl. Similar formulations are marketed by different manufacturers under the names of Therminol or Dowtherm.

The HTF is classified as a hazardous material by the State of California. It has a crystallizing (i.e., freezing) point of 12 degrees Celsius (°C) (about 54°F). Freeze protection is routinely accomplished by circulating HTF at a very low flow rate through the solar field using hot HTF from the vessel as a source. Performance model results indicate that the HTF heater may be required on very cold nights in the winter.

In addition to the HTF piping in the solar field, the HTF system includes three elements: 1) the HTF heater, 2) the HTF expansion and overflow vessels, and 3) the HTF ullage system. To eliminate the problem of HTF freezing, an HTF heater will be installed and used to ensure system temperature stays above 54°F whenever the unit is offline. An expansion vessel is required to accommodate the volumetric change that occurs when heating the HTF to the operating temperature.

During plant operation, HTF will degrade into components of high and low boilers (substances with high and low boiling points). The low boilers are removed from the process through the ullage system. HTF is removed from the HTF surge tank and flashed, leaving behind high boilers and residual HTF. The flashed vapors are condensed and collected in the ullage system.

A freeze protection system will be used to prevent freezing of the HTF piping systems during cooler winter nights. Since the HTF freezes at a relatively high temperature (54°F), HTF will be routinely circulated at low flow rates throughout the two solar fields using hot HTF from the storage vessel as a source. During winter, a fired HTF heater may be used when weather conditions dictate.

B.1.2.4.4 Propane-fired Auxiliary Boiler

A propane-fired auxiliary boiler with a capacity of 25,000 pounds per hour steam provides steam for maintaining steam cycle equipment vacuum over night and for startup. Sealing steam is used to prevent air from entering the steam turbine while the condenser is under vacuum. This method reduces startup time for the plant compared to relying on solar-generated steam as the sealing steam source. Unlike a gas-fired power plant, a solar thermal plant must wait for the sun to rise in the morning to start generating steam and has a finite time to generate electricity (i.e., the number of sunlight hours). If the plant does not have a secondary source of steam, plant startup is delayed (and thus total daily electrical generation reduced), while solar heat alone generates sealing steam and vacuum is established in the condenser.

Once the plant begins generating electricity for delivery to the electrical grid, the fired auxiliary boiler is no longer needed and is held in stand-by mode until auxiliary heat is again required after plant shutdown. The auxiliary boiler requires approximately 36.7 million British thermal units per hour (MMBtu/hr) of fuel at full load (design load is 34.4 MMBtu/hr).

B.1.2.4.5 Solar Steam Generator System

The SSG system transfers the sensible heat from the HTF to the feedwater. The steam generated in the SSG is piped to a Rankine-cycle reheat steam turbine. Heat exchangers are included as part of the SSG system to preheat and boil the condensate, superheat the steam, and reheat the steam.

B.1.2.4.6 Steam Turbine Generator

As described earlier, steam from the SSG is sent to the STG. The steam expands through the STG turbine blades to drive the steam turbine, which in turn drives the generator, converting mechanical energy to electrical energy. The proposed project's STG is expected to be a three-stage casing type with high pressure, intermediate pressure, and low pressure steam sections.

The STG is equipped with accessories required to provide efficient, safe, and reliable operation, including the following:

- Steam stop and control valves,
- Gland seal system,
- Lubricating and jacking oil systems,
- Thermal insulation, and
- Control instrumentation.

B.1.2.4.7 Transmission System Description

Southern California Edison's (SCE) owns and operates two existing transmission lines previously authorized by the BLM under ROW CARI-968 (The 230 kV, 100-foot width) and ROW CACA-021596 (the 115 kV, 40-foot width) that currently traverse the southwestern edge of the proposed project plant site and are proposed to be re-routed to avoid the solar fields and fences.. SCE applied with the BLM to amend the ROW's to accommodate this project. The amendment will be analyzed in this document. The amendment includes the relocation of the lines, switchyard, and distribution line and telecommunication system.

The proposed project or alternatives will be connected to the SCE transmission system by constructing a single-circuit three-phase onsite 230 kV gen-tie transmission line that will interconnect at a new switchyard located at the northwest corner to the southern solar field and south of Brown Road near The conductor proposed for the gen-tie is 795-thousand circular mils (kcmil) "Drake" conductor capable of carrying 907 amperes (A) at 75°C. SCE utilizes the nominal voltage of 230 kV. The use of 230 kV as the targeted design voltage in this application for certification (AFC) is consistent with the industry use of the 230 kV term to describe the nominal voltage for this class of system.

The circuit will be supported by mono-pole structures at appropriate intervals. The lines will be insulated from the poles using porcelain insulators engineered for safe and reliable operation at a maximum operating voltage of 253-kV (nominal, plus 10 percent). A shield wire will be included on the line to protect against lightning strikes. These pole designs were engineered to provide conceptual design limits for purposes of the electric

and magnetic field (EMF) studies. Final transmission structure design including tangent, angle, dead end, and pull-off structures and associated hardware will be determined during the final engineering of the proposed interconnection.

Transmission Line Route

The proposed gen-tie route, which connects SCE's transmission line to the switchyard is approximately one-mile long and proceeds south across Brown Road then directly west to the proposed 230-kV switchyard. The switchyard will be located due west of the power block and adjacent to the existing SCE transmission lines. Plant site construction will require the relocation of approximately 1 mile of existing overhead 115-kV and 230-kV transmission lines will be rerouted to the west of the southern solar field, resulting in new 1.7-mile rerouted segment. The new gen-tie line will exit a pull-off structure in the power block and head westerly along the south edge of the power block on monopole steel structures. The proposed 230-kV line will be designed to meet the requirements of California Public Utilities Commission General Order 95 (GO-95). During preliminary transmission line design, a conservative approach was taken in the pole design height in order to ensure ground clearance is in accordance with GO-95, but final design will be based on actual field conditions and site requirements.

Transmission Structures

The Project's monopole transmission structures are expected to average approximately 75 feet in height with a maximum height of 120 feet and an average span length of in the range of 400 to 800 feet. Access by vehicle will be required along the proposed Project transmission line route, a section of which crosses a new drainage ditch. Vehicle access for construction and regular operations between the power block and proposed switchyard will require new 15-foot wide unpaved roads.

B.1.2.4.8 Telecommunications and Telemetry

The Project will have telecommunications service from providers who serve the Ridgecrest area. Voice and data communications will be supported by a fiber optic system. This will be augmented with wireless telecom equipment, particularly to support communication with Solar Millennium's staff dispersed throughout the large Project site.

With respect to telemetry, the Project will utilize electronic systems to control equipment and facilities operations over a large site. While detailed information on Project use of the electronic spectrum has yet to be developed, because of the presence of various important Department of Defense (DoD) facilities/activities in the general area, e.g., China Lake NAWS and associated ranges, the project use of the electronic spectrum will not interfere with DoD activities; uses of the electronic spectrum.

B.1.2.4.9 Lighting System

The Project's lighting system will provide operations and maintenance personnel with illumination in normal and emergency conditions. AC lighting will be the primary form of illumination, but DC lighting will be included for activities or emergency egress required during an outage of the plant's AC system. AC convenience outlets will also be provided for portable lamps and tools. The lighting fixtures will be hooded to minimize night time glare in deference to the "dark skies" initiatives that strive to protect views of night skies.

The minimum illumination required to ensure safety and security objectives will be provided and will be oriented to minimize additional illumination in areas not pertinent to the facility.

B.1.2.4.10 Service Air and Instrument Air Systems

The service air system supplies compressed air to hose connections located at intervals throughout the power plant. Compressors deliver compressed air at a regulated pressure to the service air-piping network.

The instrument air system provides dry, filtered air to pneumatic operators and devices throughout the power plant. Air from the service air system is dried, filtered, and pressure regulated prior to delivery to the instrument air-piping network.

B.1.2.4.11 Project Civil/Structural Features

The following subsections describe civil/structural features of the Project. The power plant has been designed in conformance with Uniform Building Code (UBC) and California Building Code (CBC) criteria for Seismic Zone 4, the zone of highest seismic risk. The assumptions on structural and foundation designs outlined below are to be confirmed or modified as appropriate during the detailed design phase of the Project, with final design based on the results of the geotechnical investigation.

SSG System, STG and Associated Equipment

The SSG system, STG, and ACC will be located outdoors and supported on reinforced concrete mat foundations. The STG foundation will include a reinforced concrete pedestal. The GSU transformer will be supported on a reinforced concrete mat foundation. BOP mechanical and electrical equipment will be supported on individual reinforced concrete pads. BOP components/materials include piping, valves, cables, switches, etc., that are not included with major equipment and are generally installed or erected onsite.

Solar Collector Assembly Support Structures

Each SCA will be supported by structures (stands) that connect the parabolic troughs to the drive mechanism. Each array will be supported by multiple individual foundations with a foundation located approximately every 63 feet along the assembly. Foundation design will be based on site-specific geotechnical conditions to ensure that the SCA stands are able to support all loading conditions (including wind loading) at the Project site.

Buildings

The Project will include an office building and warehouse outside the power block. The power block will include a number of buildings including a control building, maintenance shop, water treatment lab, electrical building, and office building. The design and construction of the office building and warehouse will be consistent with normal building standards. Other plant site buildings will include the water treatment building, as well as a number of pre-engineered enclosures for mechanical and electrical equipment. Building columns will be supported on reinforced concrete mat foundations or individual

spread footings and the structures will rest on reinforced concrete slabs. The total footprint area of the buildings outside the power block is 122,000 square feet, and the footprint area of the buildings within the power block is approximately 31,200 square feet.

Water Storage Tanks

There will be three covered water tanks on site: one 1.5 million-gallon potable water storage tank, one 100,000-gallon RO concentrate/dust control storage tank, and one 600,000-gallon treated water storage tank. Water storage tanks will be vertical, cylindrical, field-erected steel tanks supported on foundations consisting of either a reinforced concrete mat or a reinforced concrete ring wall with an interior bearing layer of compacted sand supporting the tank bottom.

Roads, Fencing, and Security

Access to the plant site will vary for each alternative. Please refer to subsection **B.3** and **Project Description Figures 1, 2, 3 and 4** (at the end of this section) for specifics.

Only a small portion of the overall plant site will be paved, primarily the site access road to the main office and power block and portions of the power block (paved parking lot and roads encircling the STG and SSG areas). The remaining portions of the power block will be gravel surfaced. In total, the power block will be approximately 18 acres with approximately six acres of paved area. The solar field(s) will remain unpaved and without a gravel surface in order to prevent rock damage from mirror wash vehicle traffic; an approved dust suppression coating will be used on the dirt roadways within and around the solar field. Roads and parking areas located within the power block area and adjacent to the administration building and warehouse will be paved with asphalt.

The Project solar fields and support facilities perimeter will be secured with a combination of chain link and wind fencing. Chain link metal-fabric security fencing, 8 feet tall, with one-foot barbed wire or razor wire on top will be installed along the north and south sides of the facilities. Thirty-foot tall wind fencing, composed of A-frames and wire mesh, will be installed along the east and west sides of each solar field. Tortoise exclusion fencing will be included. Controlled access gates will be located at the site entrances. As discussed below, the drainage channels will be outside the plant facilities and the security fencing but still within the Project ROW.

Site Drainage and Earthwork

The Project site is located approximately five-miles southwest of Ridgecrest in Kern County, California on the southern edge of Indian Wells Valley north of the El Paso Mountains. The existing topographic conditions of the proposed site show an average slope of approximately two feet in 100 feet (two percent) toward the northwest north of Brown Road and toward the north south of Brown Road.

Cross slopes vary from nearly flat to as much as four percent. Steeper slopes occur at transitions into washes. At present, onsite stormwater runs overland and collects in concentrated flows that eventually confluence with El Paso Wash.

Offsite Drainage

The offsite (outside the plant site) drainage area consists of distinct watersheds totaling approximately 35 square miles, which generally drain from elevated areas two to four miles south of the Project northward to relatively more gradually-sloped areas at the approach to the solar field(s). Natural vegetation within the watersheds can be described as sporadic scrub brush typical of local high desert conditions.

Each of these channels will require minor diversions to direct watershed flow from existing natural channels around the solar fields and back into the same natural channels down-slope of the solar fields. These diversions will not substantially add or subtract flow amounts. They simply route natural drainage around the fields.

Each of the proposed offsite diversion channels is being sized to contain the 100-year, 24-hour storm event as defined in the Kern County Hydrology Manual and will include necessary earth compaction and riprap side-slope protection along key reaches (e.g., directional transitions, natural-to-proposed channel transitions, proposed-to-natural channel transitions, and reaches with significant design velocities).

Onsite Drainage

There are no perennial streams in the Project watershed and the vast majority of the time, the area is dry and devoid of any surface flow anywhere. Water runoff occurs only in response to infrequent intense rain storms. There are numerous small washes which traverse the site and outfall into progressively more defined channels. All of the onsite washes are eventually tributary to El Paso Wash.

Onsite stormwater from the solar fields is drained by a collection of onsite interior channels parallel to the solar collectors that direct stormwater sheet flow from the solar fields to increasing larger interior channels to points of direct discharge into the creeks through best management practice erosion control facilities.

The solar fields will be terraced into multiple relatively flat south-to-north plains that will generally slope east-to-west from nearly level to as steep as two percent. Permeability of natural onsite soils is being considered for estimation of stormwater sheet flow infiltration and modeling of onsite storm runoff. The ground located beneath proposed solar mirrors is currently assumed to maintain permeability of existing soil inasmuch as this area will not be paved.

The predominant onsite soil is classified as “s1024” Wasco-Rosamond-Cajon or U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) hydrologic soils groups A and B, characterized as soil with moderate to excellent permeability. The offsite upland soils to the east and west of the site are classified as hydrologic soils groups C and D, characterized as soil with low levels of permeability.

The onsite interior channels for each field include north-south-oriented swales that will collect and direct stormwater sheet flow to two main westward-sloped channels located at the terraces, to be located approximately 0.25 mile and 0.75 mile north of the

southern limit of each solar field. The channels convey water directly to existing creeks as previously mentioned. Culverts will be provided across the channels for essential onsite roads.

The power block area will have its own detention/water quality basin. The power block will generally drain by sheet flow or swales to the basin. The basin will be designed to mitigate the 25-year storm flow and to provide water quality mitigation. Oil and chemical storage areas within the power block will have their own containment features. The basin will also be designed to retain for a short duration prior to outfall to the nearest downstream channel.

Grading Plan

The preliminary site grading plan is designed to be balanced; no import or export of soil is expected for general earthwork. The grading plan does not contemplate any soil shrinkage or other losses. When the geotechnical investigation report is available for the site, the grading plan will be adjusted to account for any loss in elevation that could occur. Engineered fill will be provided as required for equipment and structure foundations as/if recommended by the geotechnical report. Only soil material approved by the geotechnical engineer will be used for structural fill. Additionally, granular material may need to be imported for the use as road base and possible use below foundations. Grading of the site will commence at the beginning of the construction period and will last over a period of approximately 24 months. Such an extended grading period will require less water on a daily basis for grading operations as well as for dust control over a smaller area.

B.1.2.4.12 Applicant's Proposed Avoidance; Minimization; and Mitigation Measures

In the Application for Certification (09-AFC-9) and related Data Responses, the applicant, Solar Millennium, identified and proposed a number of avoidance, minimization and mitigation measures. Those measures are discussed in detail in the AFC, as well as in the technical analyses contained in this overall document. The measures are listed by technical area and summarized, below:

Air Quality

The applicant has proposed 12 measures to avoid; minimize and or mitigate the project's impacts to air quality. The measures are described in detail in the 09-AFC-9, 5.2-53 through 5.2-57, and are generally described as follows:

- Best Available Control Technology (BACT);
- Construction Dust Control Plan;
- Operations Dust Control Plan;
- Implement Diesel Fueled Engine Controls;
- Use gasoline powered light trucks, equivalent of the Ford F150 model, for facility maintenance, except for mirror washing, welding rigs, or other specific activities which requires a larger vehicle. Only new trucks meeting California on-road vehicle

emission standards will be purchased for use at the site. In addition, only electrical powered all-terrain vehicles or other low-emission vehicles will be used to support the maintenance crew within the facility.

- Restrict operating hours for the auxiliary boiler and HTF heater;
- Restrict flow rate and total dissolved solids (TDS) in the auxiliary cooling tower; and
- Comply with all permit conditions imposed by Kern County Air Pollution Control District (KCAPCD).

Biological Resources

In the AFC, the applicant proposed 51 measures to avoid; minimize and or mitigate the project's impacts to biological resources (flora and fauna); and waters of the state. The measures are described in detail in the 09-AFC-9 pages 5.3-53 through 5.3-63. The applicant also proposed a Habitat Mitigation and Monitoring Plan (SM 2010n). The measures are generally described as follows:

- Provide conservation easement(s) on; and enhance 7,078 acres of lands with habitat that supports Mohave Ground Squirrel, Desert Tortoise and Western Burrowing Owl;
- Implement the Habitat Mitigation and Monitoring Plan;
- Apply approved mitigation bank credits;
- Contribute to an approved In-Lieu fee program established for the purpose of acquiring conservation easement(s), and/or habitat creation-restoration, and/or enhancement;
- Use Best Management Practices (BMPs) in the construction and operation phases;
- Employ a biologist to oversee the BMPs during construction; and
- Educate construction workers and permanent employees to implement BMPs.

Cultural Resources

The applicant has proposed eight (8) measures to avoid; minimize and or mitigate the project's impacts to cultural resources. The measures are described in detail in the 09-AFC-9, 5.4-28 through 5.4-29, and are generally described as follows:

- Retain a qualified Cultural Resources Specialist to prepare and implement a Historic Property Treatment Plan (HPTP) for the affected resources. The Principal Investigator for the HPTP program will meet the minimum Principal Investigator qualifications under the Secretary of Interior's Standards for Archaeology.
- Prepare a mitigation plan in accordance with state and federal guidelines. It is worth noting this appears to reflect the current efforts by the BLM and CEC to develop and adopt a BLM-SHPO-CEC Programmatic Agreement that is expected to reduce the potential impacts of the proposed project on the subject resources to a less than significant level per CEQA standards.
- Provide Worker Environmental Awareness Program training during construction to assist in worker compliance with cultural resource protection procedures. The

training will include photographs of a variety of historic and prehistoric artifacts and will include a description of the specific steps to be taken in the event of an unanticipated discovery of cultural material, including human remains.

Geologic Hazards and Resources

The applicant has proposed two (2) measures to avoid; minimize and or mitigate the project's impacts to geologic resources; and hazards. The measures are described as follows:

- Power plant structures and equipment as well as offsite linear facilities (natural gas, pipeline and transmission line) will be designed in accordance with Seismic Zone 4 requirements.
- Project foundations will be designed in accordance with recommendations (e.g.,
- over excavation and recompaction beneath project structures and paved areas) provided in the Preliminary Geotechnical Investigation Report and as amended by future geotechnical investigations.

Hazardous Materials Handling

The applicant has proposed seven (7) measures to avoid; minimize and or mitigate the project's impacts from hazardous materials handling. The measures are described in detail in the 09-AFC-9, 5.6-23 through 5.6-25, and are generally described as follows:

- Implementing protocols for servicing and refueling construction equipment;
- Proper labeling of hazardous materials;
- The project owner will develop and implement spill response procedures. Personnel working with hazardous materials will be trained in proper handling and emergency response to chemical spills or accidental releases. Additionally, designated personnel will be trained as a facility hazardous materials response team.
- The project owner will develop and implement several programs to address hazardous materials storage and security, emergency response procedures, employee training requirements, hazard recognition fire safety, first-aid and emergency medical procedures, hazardous materials release containment and control procedures, hazard communication training, PPE training, and release reporting requirements.

Land Use

The applicant has proposed two (2) measures to avoid; minimize and or mitigate the project's impacts to land uses. The measures are described as follows:

- Prior to construction, the Applicant will obtain and, provide to the CEC's Compliance Project Manager a copy of the BLM ROW Grant and an amendment to the CDCA to comply with BLM's CDCA Plan and Title 43 CFR Part 2800.
- The Applicant will work with the BLM to reroute existing trail access to minimize impacts to recreational and OHV users in the area.

Noise

The applicant has proposed eight (8) measures to avoid; minimize and or mitigate the project's impacts to ambient noise levels. The measures are described in detail in the 09-AFC-9, 5.8-14 through 5.8-16, and are generally described as follows:

- At least 15 days prior to the start of ground disturbance, the Project owner shall notify all residents within one mile of the site and the linear facilities, by mail or other effective means, of the commencement of Project construction. At the same time, the Project owner shall establish a telephone number for use by the public to report any undesirable noise conditions associated with the construction and operation of the Project.
- The Project owner shall submit to the CPM for review and approval a noise control program. The noise control program shall be used to reduce employee exposure to high noise levels during construction and also to comply with applicable OSHA and Cal/OSHA standards.
- If needed to resolve a noise complaint from a residence in the Project vicinity, the Project owner shall make arrangements with the owner of the residence up to and including retrofitting the dwelling (e.g., sound wall, improved insulation and windows).
- If a traditional, hg-pressure steam blow process is used, the Project owner shall perform the steam blow in such a manner that the noise level is not greater than 110 dBA measured at 100 feet from the property line. The steam blows shall be conducted between 8 A.M. to 5 P.M. unless arranged with the CPM such that offsite impacts would not cause annoyance to receptors. If a low-pressure, continuous steam blow process is proposed, the Project owner shall submit to the CPM a description of the process, with expected noise levels and planned hours of operation.

Paleontological Resources

The applicant has proposed eight (8) measures to avoid; minimize and or mitigate the project's impacts to sensitive paleontological resources. The measures are described in detail in the 09-AFC-9, 5.9-10 through 5.9-12, and are generally described as follows:

- Develop and implement a Paleontological Resource Monitoring and Mitigation Plan (PRMMP). The plan will identify general and specific measures to meet the performance standards described in the AFC which will minimize potential impacts to sensitive paleontological resources.
- Prior to the start of any project-related construction (defined as construction-related vegetation clearing, ground disturbance and preparation, and site excavation activities), the project owner will employ a paleontological resource specialist to implement the PRMMP, prepare and administer a staff training program, and monitor construction-related grading, excavation, trenching, and/or augering in areas with a significant potential for fossil-bearing sediments to occur.

Public Health

The applicant has proposed several measures to avoid; minimize and or mitigate the project's impacts to public health. The measures are described in detail in the 09-AFC-9, 5.10-20 through 5.10-20, and are generally described as follows:

- To control bacteria levels in cooling water, the Project operators will accept a condition of certification to ensure that the potential for bacterial growth is kept to a minimum by establishing and implementing a cooling tower program covering Biocide Use, Biofilm Prevention, and Legionella Monitoring.
- To minimize cooling tower drift from the auxiliary cooling tower, the Project will install a high efficiency drift eliminator and implement a drift eliminator inspection and maintenance program. Drift eliminators on the cooling tower will control misting and significantly reduce non-criteria emissions from the cooling tower by minimizing cooling tower drift, mist, water aerosolization, and emission of contaminants that may be present in the cooling tower make-up water that may become entrained in liquid water droplets.
- The Project owner shall develop and implement a Cooling Water Management Plan that is consistent with either the CEC Staff's Cooling Water Management Program Guidelines or the Cooling Technology Institute's Best Practices for Control of Legionella guidelines.
- Emissions of criteria pollutants will be minimized by applying BACT to the emission sources, which will include the use of propane as fuel in the auxiliary boiler and HTF heater, and low-sulfur diesel fuel in the firewater pump and emergency generator engines.

Socioeconomics

In the area of socioeconomics, there are no environmental justice concerns therefore there are not any avoidance, minimization or mitigation measures proposed by the applicant.

Soils

The applicant has proposed three (3) measures to avoid; minimize and or mitigate the project's impacts to soil resources. The measures are described in detail in the 09-AFC-9, 5.12-9 through 5.12-10, and are generally described as follows:

- Erosion and sedimentation control measures may include but are not limited to: minimizing disturbance; wetting the roads in active construction areas and laydown areas; controlling speed on unpaved surfaces; placing gravel in entrance ways; use of straw bales, silt fences, and earthen berms to control runoff.
- Conduct Project construction grading in compliance with industry best practices and Kern County grading permit requirements.
- Implementation of a Storm Water Pollution Prevention Plans (SWPPP) and a Drainage Erosion Sediment Control Plan (DESCP), which contain Best Management Practices (BMPs), will be implemented to avoid significant runoff and water quality impacts during Project construction and operations. Conduct Project construction activities and operation in accordance with the construction and operation phase

SWPPPs and the DESCP. These documents both will include BMPs to reduce erosion and sedimentation (e.g., use of runoff control measures such as hay bales and silt fences, and regular inspections of drainage control structures).

Traffic and Transportation

The applicant has proposed three (3) measures to avoid; minimize and or mitigate the project's impacts to traffic and transportation resources. The measures are described in detail in the 09-AFC-9, 5.13-19, and are described as follows:

- Develop and implement a construction phase Traffic Management Plan (TMP) in consultation with Caltrans and Kern County for the roadway network potentially affected by construction activities at the plant site and offsite linear facilities.
- Conduct construction activities in accordance with Caltrans and other applicable limitations on vehicle sizes and weights, Construction Excavation Permits obtained from the Kern County, Encroachment Permits from Caltrans, as well as permits and licenses from the California Highway Patrol and Caltrans for the transport of hazardous substances.
- Split the arrival of the workforce in the morning into two parts arriving one hour or more apart when the total number of workers on site will exceed 300.

Transmission Line Safety and Nuisance

In the area of transmission line safety and nuisance, there are not any avoidance; minimization or mitigation measures proposed by the applicant.

Visual Resources

In the area of visual resources, there are not any avoidance, minimization or mitigation measures proposed by the applicant.

Waste Management

The applicant has proposed seven (7) measures to avoid; minimize and or mitigate the project's waste generation. The measures are described in detail in the 09-AFC-9, 5.16-20 through 5.16.23, and are described as follows:

- Implementation of a detailed Construction Waste Management Plan for all wastes generated during project construction. The plan will meet the performance standards described in the AFC.
- A detailed Operation Waste Management Plan and procedures to minimize hazardous and non-hazardous waste generation will be prepared 60 days prior to startup of the facility to assure proper storage, labeling, packaging, record keeping, manifesting, minimization, and disposal of wastes. The plan will meet the performance standards described in the AFC.
- A comprehensive reporting plan will be developed and implemented to ensure spills and releases of hazardous substances, hazardous materials, or hazardous waste are reported, cleaned-up, and remediated, as necessary, in accordance with all

applicable Federal, State, and local requirements. The reporting plan will be incorporated within the Construction Waste Management Plan and the Operation Waste Management Plan.

- Prior to onsite construction activities, construction employees will receive waste training, specifically on the Construction Waste Management Plan to ensure compliance with Federal, State, and local requirements emphasizing the protection of workers, the public, and the environment.
- The project owner will obtain a hazardous waste generator identification number from the DTSC prior to generating any hazardous waste during construction and operations. Hazardous wastes will be collected by a licensed hazardous waste hauler using hazardous waste manifests. Hazardous waste generator reports will be submitted biannually to DTSC. Copies of manifests, reports, waste analyses, exception reports, etc. will be kept on site and available for inspection for at least three years.

Water Resources

In the AFC, the applicant proposed eight (8) measures to avoid; minimize and or mitigate the project's impacts to water resources. The measures are described in detail in the 09-AFC-9 pages 5.17-38 through 5.17-39. The applicant also proposed a Water Offset Plan to mitigate impacts to water resources (SM 2010k). The measures are generally described as follows:

- Implementation of a Storm Water Pollution Prevention Plans (SWPPP) and a Drainage Erosion Sediment Control Plan (DESCP), which contain Best Management Practices (BMPs)
- In accordance with Kern County's Floodplain Management Ordinance and 44 CFR 65, the project owner shall prepare all necessary engineering plans and documents to support a CLOMR application submittal to FEMA. The project shall not commence construction in the Special Flood Hazard Area until the Kern County receives from FEMA a CLOMR.
- The Project owner will record on a monthly basis the amount of groundwater pumped by the Project; including a Notice of Extraction and Diversion of Water consistent with the SWRCB requirements (Water Code Sections 4999 et seq.).
- The project owner will measure groundwater levels on a monthly basis for the proposed water supply wells and those wells that might be affected by proposed project pumping for the first six months following the Project start up, and thereafter on a quarterly basis.
- The project owner proposes to provide a variety of "offsets" to the anticipated annual operational water usage.

Worker Safety

In the AFC, the applicant has identified, proposed and described performance standards for more than 23 separate worker safety programs. Because the applicant has proposed to implement the various worker safety programs and procedures

discussed in the AFC, thus complying with the applicable regulatory requirements to maintain a safe workplace, the applicant has not proposed any “mitigation” measures to address impacts to worker safety.

B.1.3 INDIVIDUAL DESCRIPTIONS OF THE PROPOSED PROJECT AND ALTERNATIVES

The following descriptions identify the elements that are unique to each project alternative. Please refer to the figures at the end of this section that illustrate each project, as further described below.

B.1.3.1 PROPOSED PROJECT (ALTERNATIVE #1)

Please refer to **Project Description Figure 1, Site Plan** to see the major project features of the proposed Project. As compared with the Alternatives described in this section, the elements that are unique to this Project are generally described, as follows:

- A rated capacity of 250 MW;
- Total disturbance area of 1,944;
- Avoidance of El Paso Wash;
- Reduced project footprint in the Mohave Ground Squirrel conservation area;
- Additional disturbance area in the northern portion of the ROW;
- Rerouting several unnamed dry washes around the southern solar field; and the northern solar field;
- Primary access to the site would be from US Route 395, approximately 2-miles north of the Brown Road & US ROUTE 395 intersection;
- Emergency access to site is from Brown Road via a new 24-foot wide paved road. To provide safe ingress and egress, two 1,500-foot long acceleration and two 1,000-foot long deceleration lanes will be built on Brown Road to accommodate eastbound and westbound ingress/egress.
- Annual water demand of 150 acre-feet per year;
- Relocation of approximately 1.6-miles of existing electrical transmission lines;

B.1.3.2 NORTHERN UNIT ONLY (ALTERNATIVE #2)

Please refer to **Project Description Figure 2, Site Plan** to see the major project features of northern unit alternative and are generally described, as follows:

- A rated capacity of 146 MW;
- Total disturbance area of 1,118 acres;
- Avoids relocation of approximately 1.5-miles of existing electrical transmission lines;
- Avoidance of El Paso Wash;
- Avoidance of the Mohave Ground Squirrel conservation area (south of Brown Road);

- Avoidance of waters of the state (dry washes), south of Brown Road;
- Rerouting one minor dry wash around the solar field;
- Access to the site from US ROUTE 395, approximately 2-miles north of the Brown Road & US ROUTE 395 intersection;
- Emergency access to site is from Brown Road;
- Annual water demand of 90 acre-feet per year;

B.1.3.3 SOUTHERN UNIT ONLY (ALTERNATIVE #3)

Please refer to **Project Description Figure 3, Site Plan** to see the major project features of the southern unit that are unique to the alternative and are generally described, as follows:

- A rated capacity of 104 MW;
- Total disturbance area of 809 acres;
- Relocates approximately 1.6-miles of existing electrical transmission lines;
- Avoids El Paso Wash;
- Avoids the majority of Desert Tortoise population and its habitat (most located north of Brown Road);
- Avoids waters of the state (dry washes, north of Brown Road);
- Reroutes one minor dry wash around the solar field;
- Access to the site from Brown Road;
- Annual water demand of 68 acre-feet per year;

B.1.3.4 ORIGINAL PROPOSED PROJECT (ALTERNATIVE #4)

Please refer to **Project Description Figure 4, Site Plan** to see the layout of the major project components. As compared with the Alternatives described in this section, the elements that are unique to this Project are generally described, as follows:

- A rated capacity of 250 MW;
- Total disturbance area of 1,760 acres;
- Relocates approximately 1.6-miles of existing electrical transmission lines;
- Overlays portions of El Paso Wash;
- Reduces disturbance area in the northern portion of ROW;
- Reroutes three minor dry washes around the solar fields;
- Access to the site from Brown Road;
- Annual water demand of 150 acre-feet per year;

B.1.4 PROJECT CONSTRUCTION; SCHEDULE, MANPOWER, AND SEQUENCING

Each project alternative would require a construction period of approximately 28 months. Alternatives #1 and #4 will require an average of 405 employees over the entire 28-month construction period, with manpower requirements peaking at approximately 633 workers in Month 11 of construction. Alternatives #2 and #3 will require an average of 200 employees over the entire 28-month construction period, with manpower requirements peaking at approximately 315 workers in Month 11 of construction.

The construction workforce will consist of a range of laborers, craftsmen, supervisory personnel, support personnel, and management personnel. Major milestones of the planned construction schedule are as follows:

- Begin construction: fourth quarter 2010
- Start of commercial operations: mid-2013

Temporary construction parking areas will be provided within the power plant site adjacent to the laydown area. The plant laydown area will be utilized throughout the build out of the two solar fields. The construction sequence for power plant construction includes the following general steps:

- Site Preparation: This includes detailed construction surveys, mobilization of construction staff, grading, and preparation of drainage features. Grading for the solar field, power block, and drainage channels will be completed during the first 18 months of the construction schedule.
- Linears: This includes the site access road, telecommunication line, transmission line, and water pipeline. The site access road and telecommunication line will be constructed during the first 6 months of the construction schedule in conjunction with plant site preparation activities. The onsite transmission line, telecommunications line, and water line will be constructed during the first 18 months of the construction schedule. The re-alignment of the existing SCE line is proposed to begin in the 18th month and be complete in the 27th month.
- Foundations: This includes excavations for large equipment (STG, SSG, GSU transformer, etc.), footings for the solar field, and ancillary foundations in the power block.
- Major Equipment Installation: Once the foundations are complete the larger equipment will be installed. The solar field components will be assembled in an onsite erection facility and installed on their foundations.
- BOP: With the major equipment in place, the remaining field work will include piping, electrical, and smaller component installations.
- Testing and Commissioning: Testing of subsystems will be conducted as they are completed.

Major equipment will be tested once all supporting subsystems are installed and tested.

B.1.4.1 FIRE PROTECTION

A Construction Fire Protection and Prevention Plan will be developed and followed throughout all phases of construction. The permanent facility fire protection system will be put into use during construction as soon as is practicable. Prior to the availability of this system, fire extinguishers and other portable fire fighting equipment will be available on site. All equipment will be California Occupational Safety and Health Administration (Cal/OSHA) compliant. Locations of portable fire fighting equipment may include portable office spaces, welding areas, flammable chemical areas, and vehicles and other mobile equipment.

B.1.4.2 CONSTRUCTION WATER

To meet Project construction water needs involves providing water for all construction related activities. These activities include:

- Dust control for areas experiencing construction work as well as mobilization and demobilization,
- Dust control for roadways,
- Water for grading activities associated with both cut and fill work,
- Water for soil compaction in the utility and infrastructure trenches,
- Water for soil compaction of the site grading activities,
- Water for soil stockpile sites,
- Water for the various building pads, and
- Water for concrete pours on site.

The predominant use of water will be for grading activities, which will have a steady rate of work each month. The grading schedule for the site has been spread to cover the total construction period. This will mean that water use will be steady and without definable peaks. Construction water will be sourced from IWVWD. Potable water during construction will be brought on site in trucks and held in day tanks.

B.1.4.3 CONSTRUCTION OF TRANSMISSION FACILITIES

The transmission line will be constructed in accordance with the guidelines of the Institute of Electrical and Electronics Engineers Guide 524 “Guide to the Installation of Overhead Transmission Line Conductors” with crews working continuously along the ROW, with construction of the entire transmission line requiring a peak workforce of approximately 20 workers. Transmission line construction will include the installation of tubular steel poles involving the following sequence of activities:

- Marshalling Yards: Staging areas for trailers, office personnel, equipment, material staging, laydown and employee parking for the Project will be established in an approved area.
- Road Work: As needed, dirt roads for access along the transmission line route to provide access to the structure locations. These access roads will be installed in locations that avoid sensitive environmental resources identified in Project environmental surveys.

- Pole Erection: Each pole will be assembled on site and dressed out with insulators and conductor hardware.
- Conductors: From pulling sites, the conductors will be installed, sagged and permanently connected to the insulators.
- Pulling Sites: There will be approximately three pulling sites required to install the conductors.
- Communication System: The overhead ground/fiber optic communications cable will be installed using the same pulling sites as were used for the conductor installation.

The transmission lines for this site will be 230 kV lines and will be placed on steel monopoles up to 120 feet in height. The lines and monopoles will be placed entirely within the Project ROW. The poles have a base width of 5 to 6 feet and a top width of 1 to 2 feet, depending on local conditions. The construction corridor is also entirely within the Project ROW.

The towers will be installed using cranes to place the towers on concrete foundations buried in the ground. The construction footprint at the tower locations is approximately 20 feet x 20 feet. The laydown area is contained within the construction corridor along the full alignment. Fifteen-foot wide access roads will be constructed adjacent to the towers for the full length of the alignment as described above under Transmissions Structures. Pull sites are the same general locations as the tower sites. The pull will originate from the end of the alignment and will progress from tower to tower for the full alignment using pulley rigs and cables.

B.1.5 PROJECT OPERATIONS AND MAINTENANCE

The thermodynamic cycle is illustrated in **Project Description Figure 5**, found at the end of this section. The red lines on the diagram represent HTF piping. Hot HTF flows from top to bottom in the figure, arriving from the solar fields and transferring heat in the superheater and reheater, then to the steam generator, and lastly in the preheater before returning to the solar fields to be heated again. The blue lines represent steam and water piping. Feedwater, the portion of the blue line between the ACC and the preheater, is heated in a series of feedwater heaters by steam turbine extractions at various pressure levels.

The power generation process is described as follows:

Step 1: The power cycle working fluid (water) from the deaerator and feedwater heaters is pumped from low to high pressure and piped to the solar preheater. HTF provides heat to the preheater which heats the feedwater to its saturation temperature.

Step 2: The high pressure saturated water enters the steam generator where it is heated by warmer HTF. The water changes phase (i.e., boils) and exits as saturated steam.

Step 3: The saturated steam flows through to the superheater where hot HTF takes the saturated steam at constant pressure up to higher temperature prior to being fed to the high pressure section of the steam turbine.

Step 4: The superheated steam expands through the high-pressure section of the steam turbine turning the generator to produce electricity.

Step 5: The steam let down from the turbine's high-pressure section is then reheated in a solar reheater which is fed with hot HTF. The reheated steam is then fed to the intermediate pressure section of the steam turbine.

Step 6: The intermediate-pressure steam exhausts into the low-pressure section of the steam turbine. All sections of the STG decrease the temperature and pressure of the steam with the low-pressure section extracting the last available power from the steam.

Step 7: The wet steam from the low-pressure section then enters the ACC where it is cooled at a constant low pressure to become a saturated liquid. The condensed liquid returns to the feedwater heater train and the beginning of the steam cycle to begin the process again.

B.1.5.1 DISTRIBUTED CONTROL SYSTEM (DCS)

The distributed control system (DCS) contains several automation units; controls the HTF and steam loops and all auxiliary plant systems, and determines the appropriate operating sequences for them. It also monitors and records the primary operating parameters and functions as the primary interface for system control. The DCS communicates with all subsystem controls, including electrical system equipment, steam cycle controllers, variable frequency drives, and BOP system controllers via serial data communication. It receives analog and digital inputs/outputs (I/O) from all instruments and equipment not served directly by dedicated local controllers. The DCS controls both the steam and HTF cycles directly, operating rotating equipment via relevant electrical panels. It includes a graphical user interface at an operator console in the main control room.

Day-to-day, the following operation modes are usually passed in the HTF system: warm up, solar field mode (heat transfer from solar field to power block), shutdown, and freeze protection.

Warm Up

Usually in the morning, this mode brings the HTF flow rate and temperatures up to their steady-state operating conditions by positioning all required valves, starting the required numbers of HTF main pumps for establishing a minimum flow within the solar field and tracking the solar field collectors into the sun.

At the beginning of warm up, HTF is circulated through a bypass around the power block heat exchangers until the outlet temperature reaches the residual steam temperature in the heat exchangers. HTF is then circulated through the heat

exchangers and the bypass is closed. As the HTF temperature at the solar field outlet continues to rise, steam pressure builds up in the heat exchangers until the minimum turbine inlet conditions are reached, upon which the turbine can be started and run up to speed. The turbine is synchronized and loaded according to the design specification until its power output matches the full steady-state solar field thermal output.

Solar Field Control Mode

The DCS enters solar field control mode automatically after completing warm-up mode. It regulates the flow by controlling the HTF main pump speeds to maintain the design solar field outlet temperature. Several HTF pumps will generally be operated in parallel, at the speed required to provide the required flow in the field. If the thermal output of the solar fields is higher than the design capacity of the steam generation system, collectors within the solar fields are de-focused to maintain design operating temperatures.

Shutdown

If the minimal thermal input to the turbine required by the operating strategy cannot be met under the prevalent weather conditions, then shutdown is indicated. Operators will track all solar collectors into the stow position, reduce the number of HTF main pumps to a minimum, and stop the HTF flow to the power block heat exchangers.

Freeze Protection

During periods when the solar power generating facility is shutdown, HTF is circulated through the piping in the solar fields at low flow rate. For most of the year, under typical weather conditions, no supplemental heat is required to keep the HTF flowing freely. However, it is anticipated that on colder winter nights supplemental heat will be required to ensure the HTF doesn't freeze in the piping. A propane-fired HTF heater, with a rated capacity of 35 MMBtu/hr, will be provided as part of the HTF system. It is expected the HTF heater will need to operate approximately 100 hours per year to keep the HTF from freezing.

B.1.5.2 ELECTRICAL SYSTEM DESCRIPTION

This section describes the Project's major electrical systems and equipment. All power produced by the Project is expected to be delivered to the SCE transmission grid through interconnection with SCE's 230 kV Inyokern/Kramer Junction transmission line. Descriptions of major electrical systems and equipment provided in the following subsections refer to alternating current (AC) power unless otherwise noted.

Electrical Generation

The STG will generate electricity at 18 kV and will connect to the Project switchyard described in the above paragraph. An oil-filled GSU transformer will step up the voltage to 230 kV.

DC Power Supply System

An uninterruptible power system (UPS) will be provided in the plant. The UPS will service emergency lighting, the DCS, electrical breakers, and relays. This direct current (DC) power system will serve as a temporary bridge to the more robust emergency diesel AC power supply in the event external power is suddenly lost.

Essential Service AC System

A 120 volt essential service AC power distribution system serves critical equipment loads, lighting and alarms, and loads that protect equipment from potential damage in the event of sudden loss of station service. This system is served through an inverter that receives power from the DC power supply system.

B.1.5.3 PLANT AUXILIARY SYSTEMS

The following subsections describe the various power plants auxiliary systems (fuel supply, water supply, water treatment, cooling systems, waste management, etc.) associated with the Project.

Fuel Supply and Use

The auxiliary boiler and HTF heater will be fueled by propane. Propane will be delivered to the site via truck from a local distributor and stored in an 18,000 gallon aboveground tank. The estimated propane usage for normal operations is 8 MMBtu/hr overnight and 34 MMBtu/hr for ½ hour during startup each morning. The estimated peak propane usage is approximately 70 MMBtu/hr when the HTF heater is in use during the winter when the plant is in startup mode, i.e., while the auxiliary boiler is simultaneously operating at capacity.

Water Use

The Project will be dry cooled. The Project's various water uses include water for solar collector mirror washing, makeup for the SSG feedwater, dust control, water for cooling plant ancillary equipment, potable water, and fire protection water. Usage rates will vary during the year and will be higher in the summer months when the peak flow rate could be as much as about 50 percent higher (about 132 gpm). Equipment sizing will be consistent with peak daily rates to ensure adequate design margin.

Water Source and Quality

The water source for the Project is groundwater provided through the IWVWD. Power cycle makeup and other water needs for the Project will be met by treating the water supply. While the proposed Project lies outside the IWVWD service area, it is within about four miles of the District boundary. The Project will be required to provide a new pipeline to bring IWVWD water from the Ridgecrest Heights storage tank to the RSPP. The Project may also be responsible for modifying pumping equipment at the IWVWD Ridgecrest Heights Booster Station ensure adequate pressure and delivery to the Project site (modifications could include the construction of a new pump station). The Project's water demands will amount to about 1.6 percent of the existing IWVWD demand. Quality of water from IWVWD is given the following table.

Water Quality Table (IWVWD Supply)

3Constituent Concentration	
Total Dissolved Solids	mg/L 200 - 700
Specific Conductance	µS/cm 150 - 590
Alkalinity	mg/L as CaCO3 84 - 140
Hardness	mg/L as CaCO3 10 - 190
Chloride	mg/L 24 - 280
Sodium	mg/L 42 - 190
Boron	µg/L 150 - 1,400
pH 7.9 - 8.8	

Source: IWVWD 2007 Annual Water Quality Report

Water Treatment

Water received from IWVWD will meet the requirements of the California Department of Health Services for potable water supplies and will not require further treatment for this purpose. Power cycle makeup, mirror washing water, and cooling of ancillary equipment will require onsite treatment for reduction of dissolved solids, and this treatment varies according to the quality required for each of these uses.

Water will be received via pipeline and stored in a 1.5 million-gallon potable water storage tank. This tank will also serve as storage for firewater supply. Excluding any use for firefighting, this volume of potable water would provide enough storage capacity for five days interruption of water supply to the facility.

The treatment process for reduction of dissolved solids is known as desalination, and can be accomplished by either thermal processes (evaporation/condensation) or membrane processes such as reverse osmosis (RO) or electrodialysis reversal (EDR). Considering the relatively good quality of the source water, it is unlikely that thermal processes would be cost effective. Accordingly, only membrane processes are considered here. Since RO and EDR produce similar product water quality and waste streams, further discussion will reference only RO for simplicity. Selection of the process to be used at the Project will be made during the final design process.

Membrane desalination processes split the feed stream into two streams: 1) a product water stream (permeate) with reduced salinity and 2) a concentrate stream containing the majority of the salts that were in the feed stream. Desalination processes are usually designed to operate with the highest safe recovery (recovery is the fraction of feedwater recovered as permeate) in order to minimize water loss, since the concentrate would normally be considered a waste stream. In this case, it appears that the highest safe recovery is about 93 percent. The permeate stream will be directed to a 600,000-gallon treated water tank storage tank. This tank will provide three days storage for these

uses, which will extend the amount of time available for operation during potable water supply outages. The RO concentrate stream, which will be utilized onsite for dust control, will be directed to a 100,000-gallon storage tank.

In order to provide the demineralized water quality needed for power cycle makeup it will be necessary to provide ion exchange demineralization as a final treatment step after RO. Ion exchange demineralization can be done using either permanently installed equipment or portable demineralizers. Permanently installed equipment requires regeneration on site, which can require storage and disposal of significant quantities of sulfuric acid and sodium
hydroxide (caustic).

Alternatively, portable demineralizers are taken off site for regeneration at the supplier's facility, so no onsite storage of chemicals and disposal of regeneration wastes is required. Offsite regeneration is proposed for the Project. This will eliminate the need to store regeneration chemicals on site and minimize onsite production of hazardous wastes. These demineralizers will be provided as forklift moveable fiberglass "bottles" that will be traded out when exhausted and returned to the supplier for regeneration.

The steam purity specification is based on VGB's "Guidelines for Feed Water, Boiler Water, and Steam Quality for Power Plants/Industrial Plants" R450Le, issued 2004.

It is anticipated that all of the power cycle makeup water will be recycled and reused as feed to the RO system. This will reduce the salinity of the RO feed and improve the RO recovery. Because of the very low total dissolved solids (TDS) of the makeup to the ancillary equipment heat rejection cooling tower, it is expected that blowdown will not be required. Rather, drift (windblown mist) will provide the necessary salt removal. If blowdown is required, it will be recycled to the RO system.

It may be more advantageous to recycle the power cycle makeup water to the ion exchange demineralizer rather than to the RO. This modification will be evaluated during final design.

Solar Mirror Washing Water

To facilitate dust and contaminant removal, water from the primary desalination process, RO water, will be used to spray clean the solar collectors on a weekly or as-needed basis, determined by the reflectivity monitoring program. This mirror washing operation is done at night and involves a water truck spraying treated water on the mirrors in a drive-by fashion. Mirror washing equipment utilizes brushes to reduce the amount of water use. It is expected that the mirrors will be washed weekly in winter and twice weekly from mid- spring through mid-fall. The mirrors are angled down for washing therefore water doesn't accumulate on the mirrors. Wash water falls from the mirrors to the ground and, due to the small volume, soaks in with no appreciable runoff. Remaining rinse water from the washing operation is expected to evaporate on the mirror surface with no appreciable runoff.

Cooling Systems

The power plant includes two cooling systems; 1) the air-cooled steam cycle heat rejection system, and 2) the closed cooling water system for ancillary equipment cooling, each of which is discussed below.

Steam Cycle Heat Rejection System

The cooling system for heat rejection from the steam cycle consists of a forced draft ACC, or dry cooling, system. The dry cooling system receives exhaust steam from the low-pressure section of the STG and condenses it to liquid for return to the SSG.

Auxiliary Cooling Water System

The auxiliary cooling water system uses a wet cooling tower for cooling ancillary plant equipment, including the STG lubrication oil cooler, the STG generator cooler, steam cycle sample coolers, large pumps, etc. The water picks up heat from the various equipment items being cooled and rejects the heat to the cooling tower. This auxiliary cooling system will allow critical equipment such as the generator and HTF pumps to operate at their design ratings during hot summer months when the Project's power output is most valuable. An average of 40 afy will be consumed by the auxiliary cooling water system; the maximum rate of consumption is 63 afy in summer.

B.1.5.4. WASTE GENERATION AND MANAGEMENT

Project wastes will be composed of non-hazardous wastes including solids and liquids and lesser amounts of hazardous wastes and universal wastes. The non-hazardous solid waste will primarily consist of construction and office wastes, as well as liquid and solid wastes from the water treatment system. The non-hazardous solid wastes will be trucked to the nearest Class II or III landfill as discussed in **Section C.13 WASTE MANAGEMENT**. Non-hazardous liquid wastes will consist primarily of domestic sewage, and reusable water streams such as RO system reject water, boiler blowdown, and auxiliary cooling tower blowdown. To manage the non recyclable non-hazardous domestic sewage wastes, a septic tank and leach field will be installed.

Wastewater

The Project will produce two primary wastewater streams: 1.) Non reusable sanitary wastewater produced from administrative centers and operator stations, and 2.) Reusable streams including: blowdown from the small ancillary equipment cooling tower for the ancillary equipment heat rejection system; RO reject water; and boiler blowdown.

As noted above, the power generation cycle will not produce cooling tower blowdown because the plant will be dry cooled. A small auxiliary cooling tower will generate a small amount of blowdown which will be reused on site. Sanitary wastewater production will consist of domestic water use. Maximum domestic water use is expected to be less than 83,000 gallons per month (2,700 gallons per day [gpd]). It is anticipated that the wastewater will be consistent with domestic sanitary wastewater and will have Biological Oxygen Demand and Total Suspended Solids in the range of 150 to 250 milligrams per liter (mg/L).

Wastewater Treatment

Sanitary wastes will be collected for treatment in septic tanks and disposed via leach fields located at the power block as well as at the administration and warehouse areas. Smaller septic systems will be provided for the control room buildings to receive sanitary wastes at those locations. Based on the current estimate of 2,700 gpd of sanitary wastewater production per day, a total leach field area of approximately 5,500 square feet will be required spread out among three locations.

Construction Wastewater

Sanitary wastes produced during construction will be held in chemical toilets and transported off site for disposal by a commercial chemical toilet service. Any other wastewater produced during construction such as equipment rinse water will be collected by the construction contractor in Baker tanks and transported off site for disposal in a manner consistent with applicable regulatory requirements.

Onsite Land Treatment Unit (LTU)

The solar field(s) will share the same LTU to bioremediate or land farm soil contaminated from releases of HTF. The LTU will be designed in accordance with Lahontan Regional Water Quality Control Board (RWQCB) requirements and is expected to comprise an area of about 8 acres. The bioremediation facility will utilize indigenous bacteria to metabolize hydrocarbons contained in non-hazardous HTF-contaminated soil. A combination of nutrients, water, and aeration facilitates the bacterial activity where microbes restore contaminated soil within 2 to 4 months.

The LTU will be constructed with a clay liner at least five feet in thickness in accordance with Title 27 requirements. Unsaturated zone monitoring and/or groundwater monitoring will be used to evaluate liner integrity. Nutrients including nitrogen and phosphorus will be added to the contaminated soil to encourage consumption of the HTF by the indigenous bacteria. The soil will remain in the remediation unit until concentrations are reduced to an average concentration of less than 100 mg/kg HTF. Soil contaminated with HTF levels of between 100 and 1,000 mg/kg will be land farmed at the LTU, meaning that the soil will be aerated but no nutrients will be added.

Other Non-Hazardous Solid Waste

Non-hazardous solid wastes may be generated by construction, operation, and maintenance of the Project which are typical of power generation facilities. These wastes may include scrap metal, plastic, insulation material, glass, paper, empty containers, and other solid wastes. Disposal of these wastes will be accomplished by contracted solid refuse collection and recycling services.

Hazardous Solid and Liquid Waste

Hazardous wastes will also be generated during Project construction and operation. During construction, these wastes may include substances such as paint and paint related wastes (e.g., primer, paint thinner, and other solvents), equipment cleaning wastes, and spent batteries. During Project operation, these wastes may include used oils, hydraulic fluids, greases, filters, spent cleaning solutions, spent batteries, and spent activated carbon.

B.1.5.5 HAZARDOUS MATERIALS MANAGEMENT

There will be a variety of hazardous materials used and stored during construction and operation of the Project, as summarized below. **Section C.4 HAZARDOUS MATERIALS MANAGEMENT**, provides additional data on the hazardous materials that will be used during construction and operation, including quantities, associated hazards and permissible exposure limits, storage methods, and special handling precautions. Hazardous materials that will be used during construction include HTF, gasoline, diesel fuel, oil, lubricants, and small quantities of solvents and paints. All hazardous materials used during construction and operation will be stored on site in storage tanks, vessels and containers that are specifically designed for the characteristics of the materials to be stored; as appropriate, the storage facilities will include the needed secondary containment in case of tank/vessel failure. An aboveground carbon steel tank with secondary containment also will be used to store diesel fuel (300 gallons).

B.1.5.6 FIRE PROTECTION

Fire protection systems are provided to limit personnel injury, property loss, and Project downtime resulting from a fire. The systems include a fire protection water system, foam generators, carbon dioxide (CO2) fire protection systems, and portable fire extinguishers. The location of the Project is such that it will fall under the jurisdiction of the Kern County Fire Department. It is expected that the Project will be classified as an industrial facility under the Kern County Development Standards, and as such, the minimum required fire flow would be 1,500 gpm for four hours. This calls for a minimum fire water storage volume of 360,000 gallons. Firewater will be supplied from the 1.5 million-gallon potable water storage tank located at the power block on the plant site. One electric and one diesel-fueled backup firewater pump, each with a capacity of 1,500 gpm, will deliver water to the fire protection piping network.

The piping network will be configured in a loop so that a piping failure can be quickly isolated with shutoff valves without interrupting water supply to other areas in the loop. Fire hydrants will be placed at intervals throughout the plant site that will be supplied with water from the supply loop. The water supply loop will also supply firewater to a sprinkler deluge system at each unit transformer, HTF expansion tank, and circulating pump area and sprinkler systems at the steam turbine generator and in the administration building.

Fire protection for the solar field will be provided by zoned isolation of the HTF lines in the event of a rupture that results in a fire.

B.1.6 DECOMMISSIONING AND RESTORATION

The project's General Compliance, Conditions of Certification, including the Compliance Monitoring and Closure Plan (Compliance Plan) have been established as required by Public Resources Code Section 25532. Please see Section E**, GENERAL CONDITIONS; COMPLIANCE MONITORING AND CLOSURE PLAN**. The plan provides a means for assuring that the facility is constructed, operated, and closed in compliance with public health and safety, environmental and other applicable regulations, guidelines, and conditions adopted or established by the California Energy

Commission and specified in the written decision on the Application for Certification or otherwise required by law. The Compliance Plan will be integrated with a U.S. Bureau of Land Management (BLM) Compliance Monitoring Plan (hereafter referred to as the Compliance Plan) to assure compliance with the terms and conditions of any approved Right-of-Way (ROW) grant including the approved Plan of Development (POD)

The Compliance Plan is composed of elements that:

- Set forth the duties and responsibilities of BLM's Authorized Officer, the Compliance Project Manager (CPM), the project owner, delegate agencies, and others;
- Set forth the requirements for handling confidential records and maintaining the compliance record;
- State procedures for settling disputes and making post-certification changes;
- State procedures for requesting and approving ROW Grant or POD changes;
- State the requirements for periodic compliance reports and other administrative procedures that are necessary to verify the compliance status for all BLM and Energy Commission approved conditions of certification/mitigation measures;
- Establish requirements for modifications or amendments to facility closure, revegetation, and restoration plans; and
- Specify conditions of certification for each technical area containing the measures required to mitigate any and all potential adverse project impacts associated with construction, operation and closure. Each specific condition of certification also includes a verification provision that describes the method of assuring that the condition has been satisfied.

REFERENCES

SM 2009a - Solar Millenium LLC/J. Eichhammer (tn 53100). AFC for Ridgecrest Solar Power Project, dated 8/31/2009. Submitted to CEC/Docket Unit on 9/1/2009.

SM 2009b - Solar Millennium LLC/N. Tenenbaum (tn 53135). Cover Letter for Submitting Air Quality Modeling Files, dated 9/1/2009. Submitted to CEC/Docket Unit on 9/3/2009.

SM 2009c - Solar Millennium/N. Tenenbaum (tn 53251). Letter Regarding Confidential Cluster Phase I Interconnection Study Title, dated 9/16/2009. Submitted to CEC/Docket Unit on 9/16/2009.

SM 2009d - Solar Millennium (tn 54005). Application for Certification Volume 3 Supplement, dated 10/26/2009. Submitted to CEC/Docket Unit on 10/30/2009.

SM 2009e - Solar Millennium/N. Tenenbaum (tn 54564). Selection of Cultural Resources Evaluation Approach, dated 12/23/2009. Submitted to CEC/Docket Unit on 12/23/2009.

SM 2010a - Solar Millennium/A. Harron (tn 55004). Applicant's Responses to Energy Commission Data Request Set 1 & 2, dated 1/25/2010. Submitted to CEC/Docket Unit on 1/25/2010.

SM 2010b - Solar Millenium/A. Harron (tn 55153). Response to Data Request 58, dated 2/1/2010. Submitted to CEC/Docket Unit on 2/2/2010.

SM 2010c - Solar Millenium LLC/N. Tenenbaum (tn 55162). BLM Plan of Development-4th Update, dated 2/2/2010. Submitted to CEC/Docket Unit on 2/2/2010.

SM 2010d - Solar Millennium/A. Harron (tn 55004). Applicant's Responses to Energy Commission Data Request Set 1 & 2 with Bio Files, dated 1/25/2010. Submitted to CEC/Docket Unit on 1/25/2010.

SM 2010e - Solar Millenium/A. Harron (tn 55153). Response to Data Request 58, dated 2/1/2010. Submitted to CEC/Docket Unit on 2/2/2010.

SM 2010f - Solar Millenium/N. Tenenbaum (tn 55162). Fourth Update of the Plan of Development for the Bureau of Land Management, dated 2/2/2010. Submitted to CEC/Docket Unit on 2/2/2010.

SM 2010g - Solar Millenium/A. Harron (tn 55174). Applicant's Responses to California Energy Commission Data Requests, Data Request 53 & Additional Information, dated 2/3/2010. Submitted to CEC/Docket Unit on 2/4/2010.

SM 2010h - Solar Millennium/A. Harron 55217 Complete Response for Data Request 8, dated 2/5/2010. Submitted to CEC/Docket Unit on 2/5/2010.

SM 2010i - Solar Millennium/A. Harron (tn 55289). "Applicant's Supplemental Data Response Information for Data Requests Biological Resources (DR 62), Cultural Resources (DR 106 to 109), Soils & Water (DR 145, 148, 182-184, 186), Land Use/Recreation/Wilderness (DR 253 to 256), Traffic (DR 195, 197, 199-201, 203) and Noise (DR 263-264), and Air Permit Application for an Emergency Generator", dated 2/10/2010. Submitted to CEC/Docket Unit on 2/10/2010.

SM 2010j - Solar Millenium/A. Harron (tn 55382). Responses to Energy Commission Data Requests for Alternatives & Cultural Resources, dated 2/12/2010. Submitted to CEC/Docket Unit on 2/16/2010.

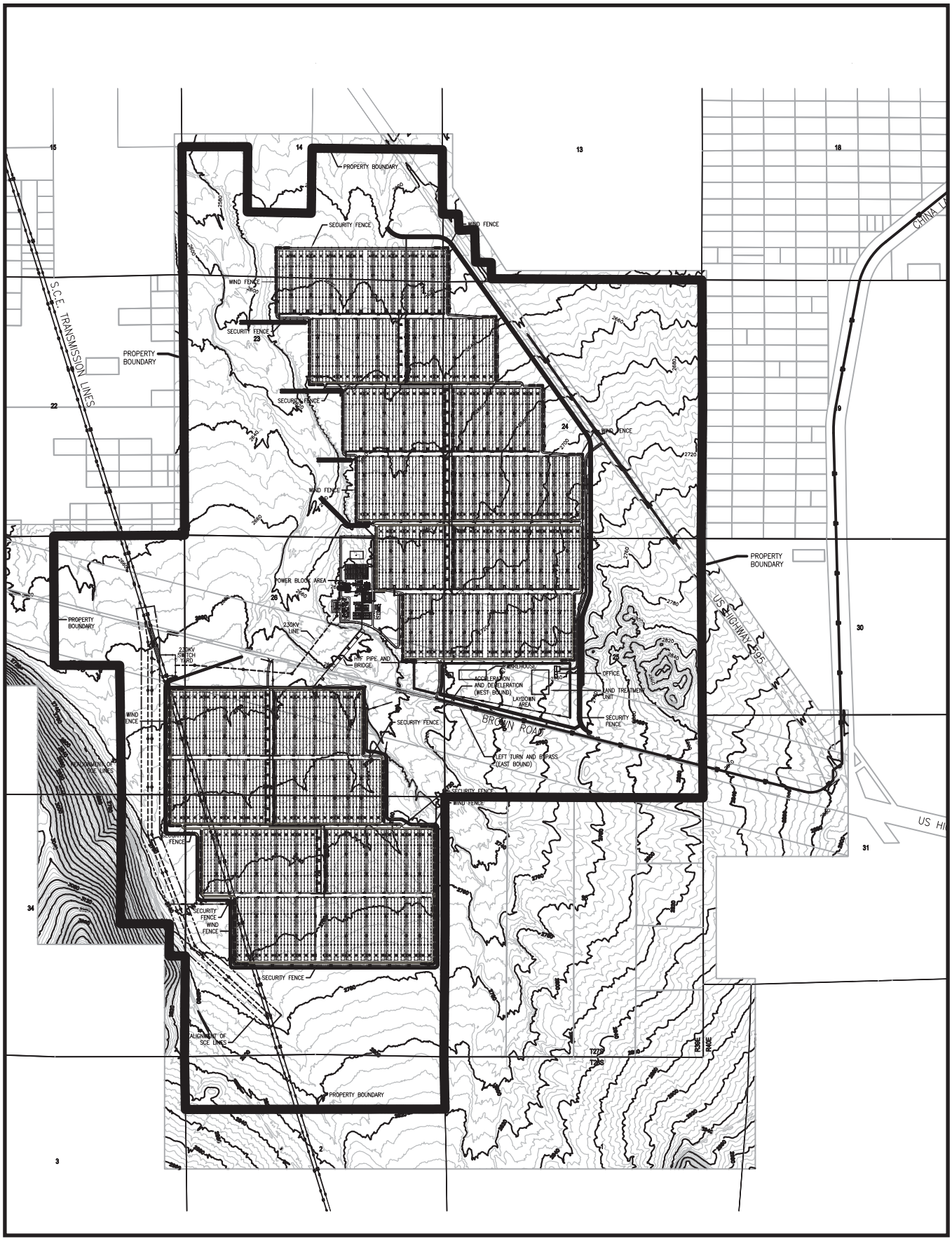
SM 2010k - Solar Millenium/B. Owens (tn 55516). Responses to Energy Commission Data Requests for Cultural Resources and Soils & Water Resources, dated 2/19/2010. Submitted to CEC/Docket Unit on 2/22/2010.

SM 2010l - Solar Millenium/B. Owens (tn 55625). Responses to Energy Commission Data Requests for Biological Resources (DR 61) & Land Use/Recreation/Wilderness (DR 257-261), dated 2/19/2010. Submitted to CEC/Docket Unit on 2/23/2010.

SM 2010m - Solar Millenium/B. Owens (tn 55620). Responses to Energy Commission Data Requests for Soils & Water 175 to 177, 180 to 181, 185, 191 to 192, dated 2/23/2010. Submitted to CEC/Docket Unit on 2/23/2010.

PROJECT DESCRIPTION- FIGURE 1

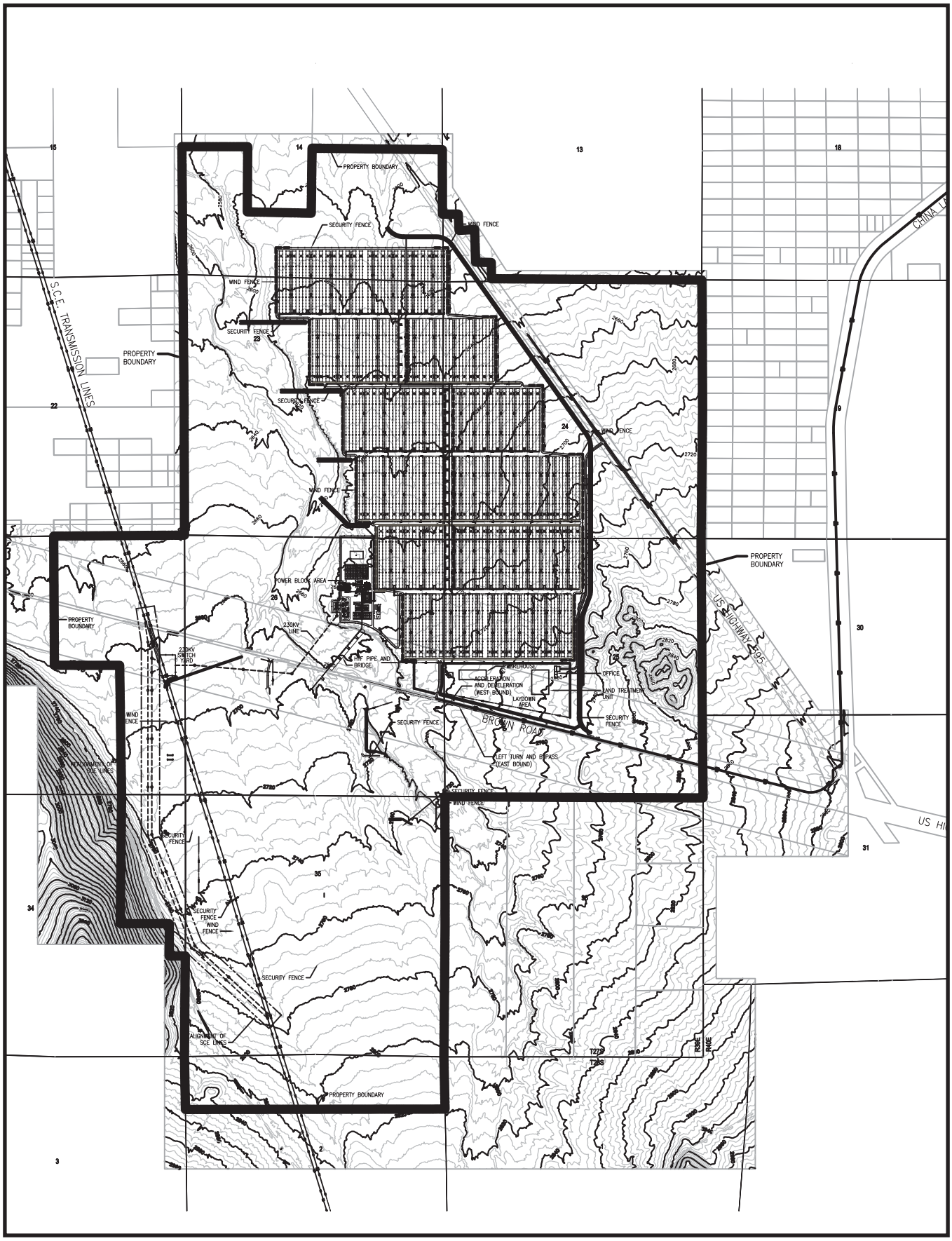
Ridgecrest Solar Power Project - Both Units



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010
Source: AECOM

PROJECT DESCRIPTION- FIGURE 2

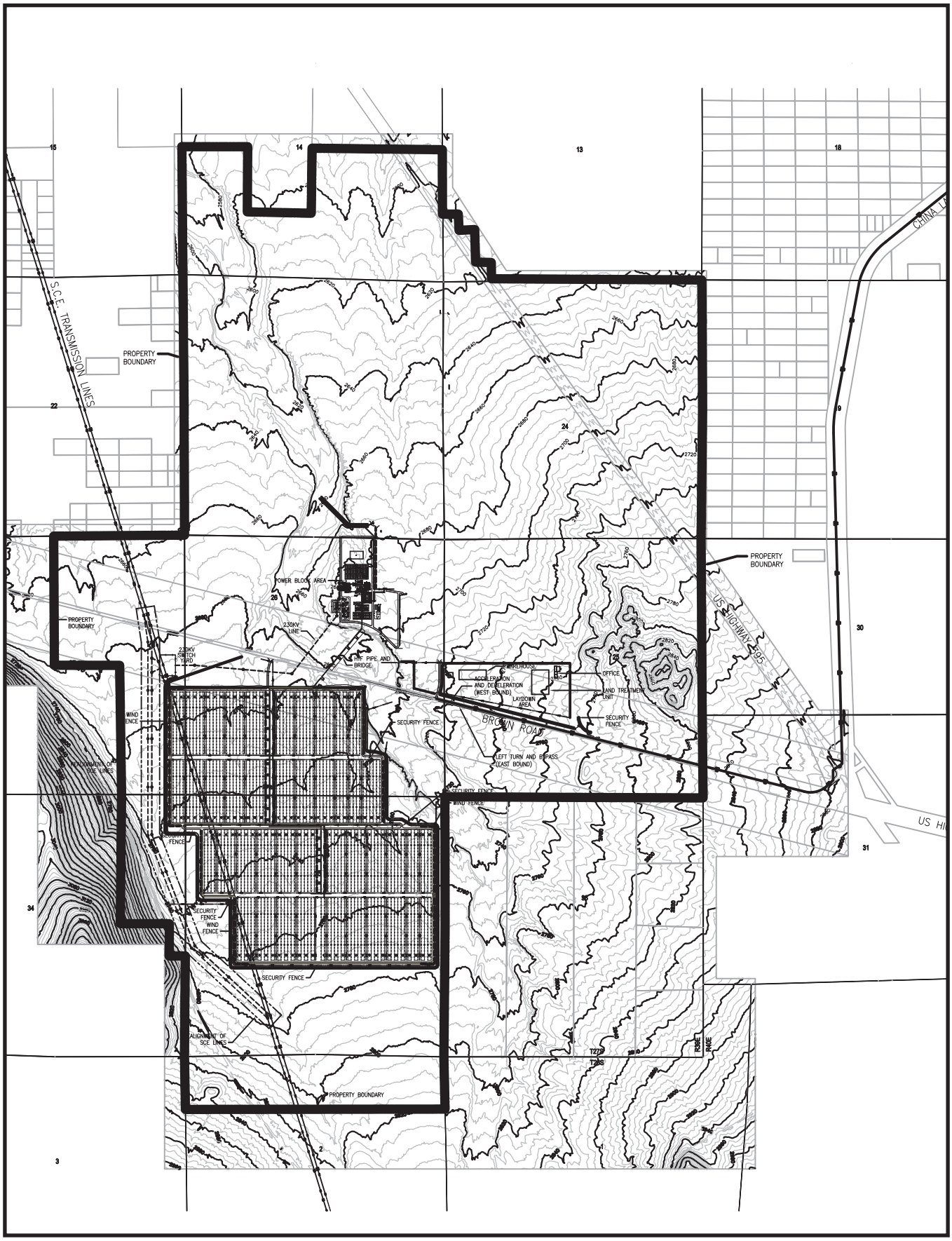
Ridgecrest Solar Power Project - Northern Unit



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010
Source: AECOM

PROJECT DESCRIPTION- FIGURE 3

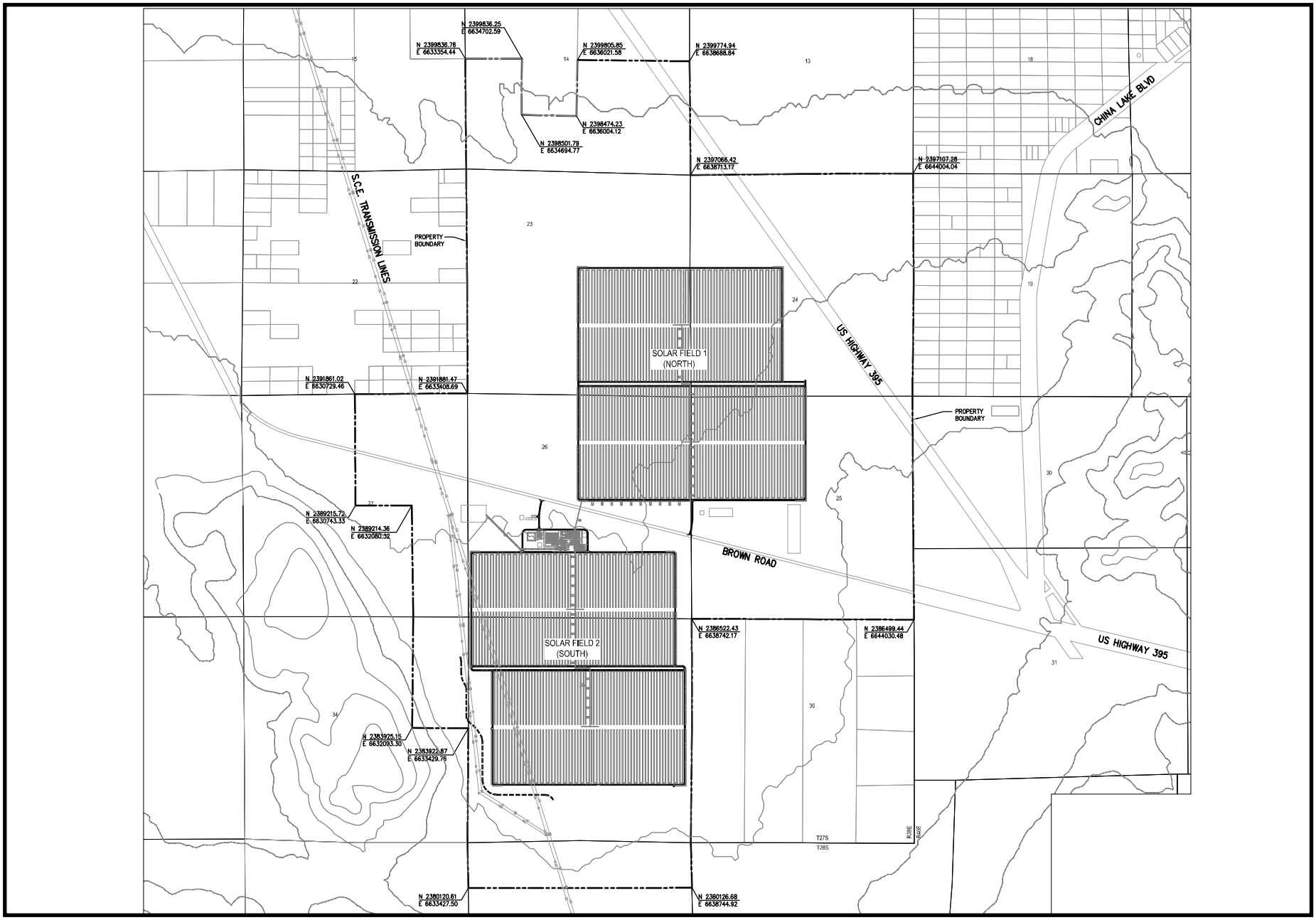
Ridgecrest Solar Power Project - Southern Unit



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010
Source: AECOM

PROJECT DESCRIPTION - FIGURE 4

Ridgecrest Solar Power Project - Original Proposed Project

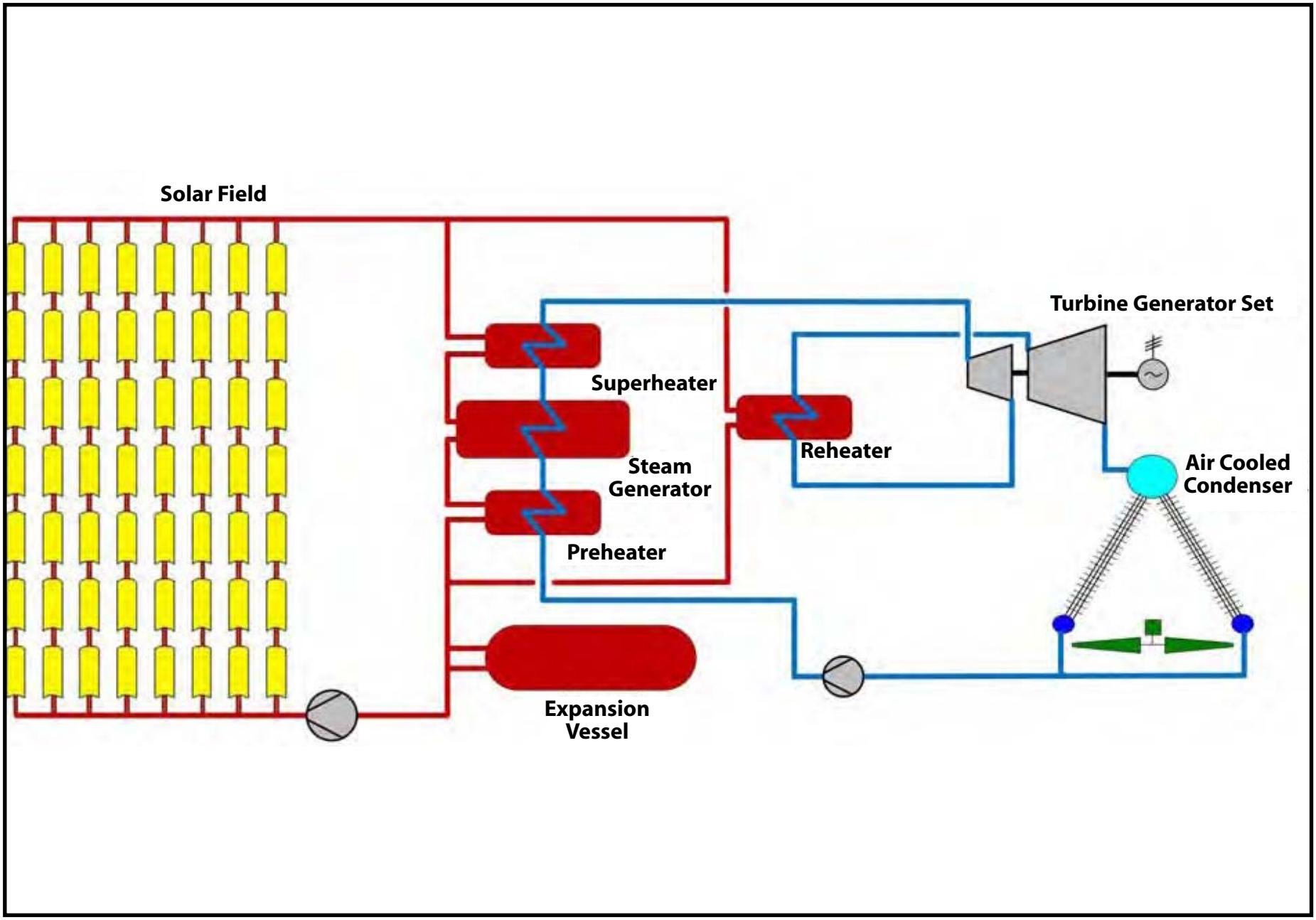


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: AECOM

PROJECT DESCRIPTION - FIGURE 5

Ridgecrest Solar Power Project - Power Generation Process Diagram



SOURCE: AFC, Sept. 2009, Page 2-6

B.2 ALTERNATIVES

Testimony of Suzanne Phinney, D.Env.

B.2.1 SUMMARY OF CONCLUSIONS

In this analysis of the Ridgecrest Solar Power Project, 26 alternatives have been developed and evaluated in addition to the proposed project. These include three modifications of the project at the proposed site, the no project/no action alternative, five alternative site locations, a solar photovoltaic facility at the proposed site, a range of solar and renewable technologies, generation technologies using different fuels, and conservation/demand-side management.

Of the 26 alternatives, four alternatives were determined to be reasonable by the Bureau of Land Management and feasible by the Energy Commission and have the potential to result in reduced impacts in comparison with the proposed project: the Northern Unit Alternative, the Southern Unit Alternative, the Original Proposed Project Alternative, and the No Project/No Action Alternative. The Bureau of Land Management would consider four alternatives including alternatives to issuance of the land use plan amendment.

Of the three modifications at the RSPP site, the Northern Unit Alternative and the Southern Unit Alternative would reduce impacts in comparison to the proposed project but would still result in significant adverse impacts to biological resources that cannot be mitigated. These alternatives would meet most of the project objectives (although reducing the generation capacity), but would not attain the purpose and need for the project. The Original Proposed Project Alternative would meet project objectives and the purpose and need for the project but would increase impacts in comparison to the proposed project.

Energy Commission staff considers the No Project/No Action Alternative to be superior to the proposed project. While it would eliminate the potential for 250 MW of additional solar thermal power created using parabolic trough technology at the Ridgecrest Solar Power Project site and thus not meet project objectives, it would eliminate significant immitigable visual and biological resource impacts associated with the proposed project. New renewable resources may be developed to meet the State's Renewables Portfolio Standard (RPS) requirements in the absence of the Ridgecrest Solar Power Project.

The Garlock Road Alternative site is evaluated in detail by the Energy Commission under the California Environmental Quality Act only. While the impacts of this site would be similar to those of the proposed site in many disciplines, this site would have less severe biological impacts because the Garlock Road site does not contain the unique ecology found on the project site that allows for denser plant growth and high concentrations of desert tortoise. The Garlock Road site does not provide a primary means for Mohave ground squirrel populations to maintain genetic connectivity; however, the site may serve as a connector for wildlife to areas of high quality habitat. The site is potentially available but flooding in the area may affect the feasibility of locating a project at the Garlock Road Alternative site. Transmission interconnection may be difficult because sensitive biological areas occur along the right of way.

Impacts of a solar PV facility at the proposed project site would depend on the degree of grading required; reduced need for grading would reduce impacts to biological resources. However, more land would be required to provide the same power output. Modified fencing, if used, may permit movement of desert tortoises. Less grading would also reduce cultural resource impacts. Impacts to water use during operations would be substantially reduced. Visual impacts would be reduced due to shorter components of a PV facility. Impacts to recreation and wilderness would be similar.

The four other alternative sites (Alabama Hills, Boron, South of California City and Ridgecrest Landfill) would not substantially reduce impacts and the feasibility of developing projects at these locations is reduced because of size limitations, past operations and private ownership.

All offsite alternatives are considered unreasonable by the Bureau of Land Management because, as discussed below, none would accomplish the purpose and need for the proposed action.

Alternative solar thermal technologies (solar power tower, Stirling dish and linear Fresnel) are also evaluated. As compared with the proposed parabolic trough technology, these technologies would not substantially change the severity of visual impacts, biological resources impacts and cultural impacts, though land requirements vary among the technologies. Distributed generation solar photovoltaic facilities (i.e., photovoltaic panels placed on surfaces such as rooftops and parking lots) would likewise require extensive acreage, although they would minimize the need for undisturbed open space. However, increased deployment of distributed solar photovoltaic technology faces challenges in manufacturing capacity, cost, and policy implementation.

Other generation technologies (wind, geothermal, biomass, tidal, wave, natural gas, and nuclear) are also examined as possible alternatives to the project. These technologies would either be infeasible at the scale of the Ridgecrest Solar Power Project, or they would create their own significant adverse impacts in other locations. For example, a natural gas plant would use substantially less land and avoid cultural and biological resources impacts, but it would contribute to greenhouse gas emissions and would not meet the project's renewable generation objective. Construction of new nuclear power plants is currently prohibited under California law and such a facility would require large quantities of cooling water.

Conservation and demand side management programs would likely not meet the state's growing electricity needs that would be served by the Ridgecrest Solar Power Project. In addition, these programs would not provide the renewable energy required to meet the California RPS requirements.

Staff's analysis of renewable energy technology options indicates that contributions from each commercially available renewable technology will be needed to meet California's RPS requirements and to achieve the statewide RPS target for 2020 (between 45,000 gigawatt-hours to almost 75,000 gigawatt-hours according to the 2009 Integrated Energy Policy Report). Wave and tidal technologies are not yet commercially available in the United States. Therefore, the combined contribution of the alternatives

of wind, solar photovoltaic (both distributed and utility-scale), geothermal, and biomass is needed to complement rather than substitute for the Ridgecrest plant's contribution to meeting statewide RPS requirements.

Alternatives Table 1 lists the alternatives retained for analysis in this Staff Assessment/Draft Plan Amendment/Draft Environmental Impact Statement (SA/DPA/DEIS) and those eliminated, and summarizes the rationale for each conclusion.

Alternatives Table 1
Summary of Alternatives Retained and Eliminated

Alternative	Rationale for Retention or Elimination
Alternatives Retained for CEQA and NEPA analysis	
Northern Unit Alternative	Evaluated in the SA/DPA/DEIS because it would reduce impacts to desert washes, cultural resources, recreational uses, and biological resources and would avoid constructing a solar facility in Mohave Ground Squirrel Conservation Area (MGSCA).
Southern Unit Alternative	Evaluated in the SA/DPA/DEIS because it would reduce impacts to desert washes, cultural and biological resources.
Original Proposed Project	Evaluated in the SA/DPA/DEIS because it would reduce the amount of land developed in the MGSCA and would transmit the full 250 MW of power that Solar Millennium has requested.
No Project/No Action Alternative	Required under CEQA and NEPA. Note that additional NEPA No Action Alternatives are described below under Land Use Plan Amendment Alternatives.
Plan Alternatives Evaluated under NEPA	
Authorize RSPP project and approve California Desert Conservation Area (CDCA) Plan amendment	Action required under the CDCA Plan of 1980, as amended.
Authorize a reduced size project within the proposed project's boundaries through a CDCA Land Use Plan amendment (Northern Unit or Southern Unit Alternatives)	A smaller project reduces impacts; site location is an action for which an amendment to the CDCA Plan of 1980, as amended, is required.
Do not approve the right-of-way (ROW) grant and do not amend the CDCA Land Use Plan of 1980, as amended.	The first No Action Alternative: deny the ROW application and does not amend the CDCA Land Use Plan of 1980.
Do not approve the ROW grant and amend the CDCA Land Use Plan of 1980, as amended, to designate the area unsuitable for future solar development.	The second No Action Alternative: deny the ROW application and amend the CDCA Land Use Plan of 1980 to designate the site unsuitable for any future solar development.

Alternative	Rationale for Retention or Elimination
Do not approve the ROW grant and amend the CDCA Land Use Plan of 1980 to designate the area as suitable for future solar development.	The third No Action Alternative: deny the ROW application but amend the CDCA Land Use Plan of 1980 to designate the site as suitable for future solar development.
Alternatives Evaluated under CEQA	
Garlock Road Private Land Alternative	Would place project on disturbed land substantially reducing biological impacts of the RSPP
Solar Photovoltaic Technology – Utility Scale at Project Site	Would substantially reduce water use impacts and would reduce impacts to desert soil and biological habitat/species caused by site grading
Alternatives Eliminated from Detailed Analysis	
Alabama Hills Alternative	Would cause biological and cultural resource impacts and is located within the Alabama Hills National Recreational Area.
Boron Alternative	Proximity to Edwards Air Force Base could impact base operations. Feasibility is uncertain due to current operations on site and potential contamination from past operations.
South of California City Alternative	Would result in a much smaller project since less acreage available. Proximity to Edwards Air Force Base could impact base operations.
Ridgecrest Landfill	Would not allow optimum placement of arrays. Closer proximity to residents and to China Lake Naval Weapons Center could increase dust and glare impacts, respectively.
Stirling Dish Technology Alternative	Proprietary technology would preclude use by applicant. Would not substantially reduce impacts of the RSPP project
Solar Power Tower Technology Alternative	Tower height would increase visual impacts and could affect military operations.
Linear Fresnel Technology Alternative	Proprietary technology would preclude use by applicant. Would reduce area required but create greater visual impacts.
Distributed Solar Technology Alternative	While it will very likely be possible to achieve 250 MW of distributed solar energy over the coming years, the limited numbers of existing facilities make it difficult to conclude with confidence that this much distributed solar will be available within the timeframe required for the RSPP project. Barriers exist related to interconnection with the electric distribution grid. Also, solar PV is one of the components of the renewable energy mix required to meet the California Renewable Portfolio Standard requirements, and additional technologies like solar thermal generation, would also be required.
Wind Energy	While there are substantial wind resources in Kern County, environmental impacts could also be significant so wind would not reduce impacts in comparison to the RSPP Project. Also, wind is one of the components of the renewable energy mix required to meet the California Renewable Portfolio Standard requirements, so additional technologies like solar thermal generation, would also be required.

Alternative	Rationale for Retention or Elimination
Geothermal Energy	Despite the encouragement provided by Renewable Portfolio Standards and American Recovery and Reinvestment Act (ARRA) funding, few new geothermal projects have been proposed in the Indian Wells Valley and no geothermal projects are included on the Renewable Energy Action Team list of projects requesting ARRA funds. The existing Coso geothermal project will be at maximum output in the near future and new geothermal facilities in Inyo County are possible but not approved at this time. Therefore, the development of 250 MW of new geothermal generation capacity within the timeframe required for the RSPP project is considered speculative.
Biomass Energy	Most biomass facilities produce only small amounts of electricity (in the range of 3 to 10 MW) and so could not meet the project objectives related to the California Renewable Portfolio Standard. In addition, between 25 and 84 facilities would be needed to achieve 250 MW of generation, creating substantial adverse impacts.
Tidal Energy	Tidal fence technology is commercially available in Europe. However, it has not been demonstrated and proven at the scale that would be required to replace the proposed project, particularly with Pacific tides. Therefore, the development of 250 MW of tidal energy generation capacity within the timeframe required for the RSPP project is considered speculative.
Wave Energy	Unproven technology at the scale that would be required to replace the proposed project; it may also result in substantial adverse environmental impacts.
Natural Gas	Would not attain the objective of generating renewable power meeting California's renewable energy needs.
Coal	Would not attain the objective of generating renewable power meeting California's renewable energy needs and is not a feasible alternative in California.
Nuclear Energy	The permitting of new nuclear facilities in California is not currently allowable by law.
Conservation and Demand-side Management	Conservation and demand-management alone are not sufficient to address all of California's energy needs, and would not provide the renewable energy required to meet the California Renewable Portfolio Standard requirements.

B.2.2 INTRODUCTION

Solar Millennium, LLC, proposes to build the Ridgecrest Solar Power Project (RSPP) on land managed by the Bureau of Land Management (BLM), which is under the jurisdiction of the federal government. Since the BLM is a federal agency, the RSPP power plant is subject to review under the National Environmental Policy Act (NEPA) in addition to the California Environmental Quality Act (CEQA). The purpose of this

alternatives analysis is to comply with State and Federal environmental laws by providing an analysis of a reasonable range of feasible alternatives which could substantially reduce or avoid any potentially significant adverse impacts of the proposed project. This section summarizes the potentially significant adverse impacts of the proposed project and analyzes different technologies and alternative sites that may reduce or avoid some or all of those significant adverse impacts.

There are four alternatives to the proposed project/action. The four alternatives determined to be feasible by the BLM and the Energy Commission are: the Northern Unit Alternative, the Southern Unit Alternative, the Original Proposed Project Alternative, and the No Project/No Action Alternative. These alternatives are analyzed in further detail within each of the technical sections of this document, and these alternatives and the proposed action may be considered as the preferred alternative by both agencies.

This section analyzes two alternatives that are evaluated under CEQA only, and it discusses and analyzes all alternatives eliminated from consideration by both the Energy Commission and the BLM.

B.2.3 ALTERNATIVES DEVELOPMENT AND SCREENING PROCESS

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Solar Millennium, LLC proposes to build the RSPP facility on federal land within the jurisdiction of the BLM. Since the BLM is a federal agency and the California Energy Commission has State authority to license thermal power plants, the RSPP power plant is subject to review under both NEPA and CEQA.

California Environmental Quality Act Criteria

The *Guidelines for Implementation of the California Environmental Quality Act*, Title 14, California Code of Regulation, section 15126.6(a), provides direction by requiring an evaluation of the comparative merits of "a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project." In addition, the analysis must address the No Project Alternative (Cal. Code Regs., tit. 14, § 15126.6(e)).

The range of alternatives is governed by the "rule of reason" which requires consideration only of those alternatives necessary to permit informed decision making and public participation. CEQA states that an environmental document does not have to consider an alternative of which the effect cannot be reasonably ascertained and of which the implementation is remote and speculative (Cal. Code Regs., tit. 14, § 15125(d)(5)).

National Environmental Policy Act Criteria

NEPA requires that the decision-makers and the public be fully informed of the impacts associated with the proposed action. The intent is to make good decisions based on understanding environmental consequences, and to take actions to protect, restore, and enhance the environment.

Alternatives identified must be consistent with BLM's purpose and need for the action under consideration, which include consideration of the applicant's objectives (both are defined below). CEQ regulation at 40 CFR 1502.14(a) requires that an Environmental Impact Statement (EIS) rigorously explore and objectively evaluate all reasonable alternatives that are practical or feasible from the technical and economic standpoint and from using common sense, rather than simply desirable from the standpoint of the applicant. (CEQ Forty Questions, No. 1A)

Consideration of the No Action Alternative is mandated by NEPA. As with the CEQA No Project Alternative, this is the scenario that would exist if the proposed project were not constructed.

B.2.4 SCREENING METHODOLOGY

To prepare the alternatives analysis, the following methodology was used:

- Develop an understanding of the project, identify the basic objectives of the project, and describe its potentially significant adverse impacts.
- Identify and evaluate technology alternatives to the project such as increased energy efficiency (or demand-side management) and the use of alternative generation technologies (e.g., solar or other renewable or nonrenewable technologies).
- Identify and evaluate alternative locations for consideration by the Energy Commission.
- Evaluate potential alternatives to select those qualified for detailed evaluation.
- Evaluate the impacts of not constructing the project, known as the No Project alternative under CEQA and the No Action alternative under NEPA.

Based on this methodology, each potential alternative was evaluated according the following criteria for its ability to:

- Avoid or substantially lessen one or more of the potential significant adverse effects of the project as described above;
- Meet most or all of the project objectives;
- Be consistent with BLM's purpose and need.

B.2.4.1 APPLICANT'S PROJECT OBJECTIVES AND PURPOSE

Five primary objectives are set forth by Solar Millennium, LLC (SM 2009a):

- Develop a utility-scale solar energy project utilizing parabolic trough technology.
- Construct and operate an environmentally-friendly, economically-sound, and operationally-reliable solar power generation facility that would contribute over 500,000 megawatt hours (MWh) of clean, renewable solar energy per year to the State of California's renewable energy goals.
- Locate the project in an area with high solar insulation (i.e., high intensity solar energy).

- Interconnect directly to the California Independent System Operator (CAISO) grid through the Southern California Edison (SCE) electrical transmission system while minimizing additions to electrical infrastructure (e.g., avoiding lengthy new transmission lines).
- Commence construction in 2010 to qualify for the American Recovery and Reinvestment Act (ARRA) of 2009's Renewable Energy Grant Program.

Additionally, Solar Millennium, LLC states the purpose of the project as:

- Contribute to the achievement of the 20% Renewables Portfolio Standard (RPS) target set by California's governor and legislature.
- Support United States (U.S.) Secretary of the Interior Salazar's Order 3285 making the production, development and delivery of renewable energy top priorities for the U.S.
- Support Governor Schwarzenegger's Executive Order S-14-08 to streamline California's renewable energy project approval process and to increase the State's RPS to 33% renewable power by 2020.
- Sustain and stimulate the economy of Kern County in southern California by helping to ensure an adequate supply of renewable electrical energy, while creating additional construction and operations employment and increased expenditures in many local businesses.
- Generate electricity without significant emissions of greenhouse gases, thereby meeting the statewide reduction goals of Assembly Bill (AB) 32.

B.2.4.2 PROJECT OBJECTIVES OF THE ENERGY COMMISSION (CEQA)

After considering the objectives set out by the applicant, the Energy Commission has identified the following basic project objectives, which are used to evaluate the viability of alternatives in accordance with CEQA requirements:

- To construct and operate a 250 MW utility-scale solar facility in California capable of interconnecting directly to the California Independent System Operator (California ISO) Grid through the Southern California Edison (SCE) electrical transmission system;
- To locate the facility in areas of high solarity with ground slope of less than 5%;
- To contribute to the State of California's renewable energy goals, the National Energy Policy of 2001, and the Energy Policy Act of 2005 (Public Law 109-58, August 8, 2005) which encourage the development of renewable energy resources; and
- To commence construction in 2010 to qualify for the ARRA Renewable Energy Grant Program.
- To locate the facility at a site that would preserve the regions long term natural and cultural resources.

B.2.4.3 BLM PURPOSE AND NEED FOR PROPOSED PROJECT AND PLAN AMENDMENT

Bureau of Land Management

Solar Millennium, LLC has filed an application with BLM for a land use right-of-way (ROW) grant pursuant to the Federal Land Policy and Management Act (FLPMA, 43 USC 1761). Under FLPMA Title V Section 501 (a)(4) (Rights-of-Way), the United States Secretary of the Interior, as delegated to BLM, is authorized to grant ROW on lands under the jurisdiction of the BLM for the purpose of allowing systems for generation, transmission, and distribution of electric energy.

The BLM's purpose and need for the RSPP project is to respond to the Solar Millennium application under Title V of FLMPA for a ROW grant to construct, operate and decommission a solar thermal facility and associated infrastructure in compliance with FLPMA, BLM ROW regulations, and other applicable federal laws. The BLM will decide whether to approve, approve with modification, or deny issuance of a ROW grant to Solar Millennium for the proposed RSPP project. BLM's actions will also include concurrent consideration of amending the California Desert Conservation Area (CDCA) Plan of 1980. The decision the BLM will make is whether or not to grant a ROW and, if so, under what terms and conditions, and whether or not to amend the land use plan.

Solar power facilities are an allowable use of the proposed project area within the CDCA Plan. Chapter 3, “Energy Production and Utility Corridors Element” of the CDCA Plan requires that newly proposed sites associated with power generation or transmission not already identified in the Plan will be considered through the plan amendment process. The proposed RSPP is not currently identified in the proposed power facility and transmission line element within the Plan. As such, a plan amendment is required in order to determine that the site is suitable for solar development.

Federal orders and laws require government agencies to evaluate energy generation projects and facilitate the development of renewable energy sources. The Energy Policy Act of 2005 (EPAct) requires the United States Department of the Interior (DOI), BLM’s parent agency, to approve at least 10,000 MW of renewable energy on public lands by 2015. Executive Order 13212, dated May 18, 2001, mandates that agencies expedite their “review of permits or take other actions as necessary to accelerate the completion of such projects, while maintaining safety, public health, and environmental protections” in the “production and transmission of energy in a safe and environmentally sound manner.”

Secretarial Order 3283, *Enhancing Renewable Energy Development on the Public Lands*, requires the BLM to ensure that processing and permitting of renewable energy projects complies with the requirements of the National Environmental Policy Act, Endangered Species Act, National Historic Preservation Act, and all other laws and regulations; improve efficiencies in the processing of renewable energy applications and consistent application of renewable energy policies; and develop Best Management Practices for renewable energy projects on public lands to ensure the most environmentally responsible development of renewable energy.

Secretarial Order 3285, *Renewable Energy Development by the Department of the Interior* requires the BLM to encourage the development of environmentally responsible renewable energy generation. Both of these Secretarial Orders will be considered in responding to the in responding to the Solar Millennium application for the proposed RSPP project.

Department of Energy

Solar Millennium, LLC has also applied to the United States Department of Energy (DOE) for a loan guarantee pursuant to Title XVII of the EPAct. Title XVII of EPAct authorizes the United States Secretary of Energy to make loan guarantees for a variety of types of projects, including those that "avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases, and employ new or significantly improved technologies as compared to commercial technologies in service in the United States at the time the guarantee is issued." The two principal goals of the loan guarantee program are to encourage commercial use in the United States of new or significantly improved energy-related technologies and to achieve substantial environmental benefits. The purpose and need for action by DOE is to comply with their mandate under EPAct by selecting eligible projects that meet the goals of the Act.

B.2.4.4 SUMMARY DESCRIPTION OF THE PROPOSED PROJECT AND PROJECT IMPACTS

Section B.1 of the Staff Assessment/Draft Plan Amendment/Draft Environmental Impact Statement (SA/DPA/DEIS) provides a detailed description of the proposed project, and a summary is presented here as context for the alternatives analysis. The proposed RSPP project is a nominal 250 MW solar plant located on approximately 2,002 acres within a ROW application of approximately 3,995 acres. The project is divided into two sites, Solar Field #1 and Solar Field #2.

- Solar Field #1 (North) would be located north of Brown Road on approximately 1,118 acres and create 146 MW of solar energy. Solar Field #1 would be the location of the maintenance building, parking area, bioremediation area, power block area and operational power facilities, transmission line, potable and treated water tanks; and auxiliary equipment (i.e., water treatment system and the main office area). These facilities would support both solar fields.
- Solar Field #2 (South) would be located south of Brown Road on approximately 809 acres and create 104 MW of solar energy. The area south of Brown Road would be the location of the switchyard and transmission line interconnection. Solar Field #2 would require the existing 115 and 230kV SCE-owned transmission lines to be re-routed around the project footprint.
- This alternative would amend the CDCA Plan to find the site suitable for solar energy development.

Based on the analysis presented in the technical sections of this SA/DPA/DEIS, the following impacts have been identified as issues of greatest concern for the proposed RSPP project:

- **Biological Resources**: The RSPP site is located on undisturbed high quality desert tortoise (*Gopherus agassizii*) and Mohave ground squirrel (*Spermophilus*

mohavensis) habitat; in addition, the site supports a diversity of mammals, birds, and reptiles, including additional special-status wildlife species. Grading on the site would result in the destruction of unique habitat that supports an unusually high concentration of desert tortoise in a region with generally low desert tortoise concentration. Direct impacts to other special-status animal species and possibly special-status plant species may also occur. Mohave ground squirrel population connectivity would also be at risk as the project would contribute to isolation of Mohave ground squirrel populations north and south of the project. The large population of desert tortoises would require translocation which is generally accompanied by high mortality rates. Solar Field#2 would eliminate land within the MGSCA. Because effective, feasible mitigation measures could not be identified by staff, impacts to desert tortoise and Mohave ground squirrel are considered to be unavoidable.

- **Cultural Resources**: Due to the relatively undisturbed nature of the area, the frequency of identified cultural resources on or adjacent to the proposed project site, and the historic tribal use of the area, the RSPP project would create impacts to numerous cultural resources. The installation of solar trough arrays and associated facilities over the 2,002-acre project site would affect 17 treated-as-eligible to the National and California Registers of Historic Places archaeological sites and numerous isolated artifacts including 4 historic resources and 13 prehistoric cultural resources. Since the nature of parabolic trough technology does not allow for reduced ground disturbance or flexibility of the location of the solar loops, the construction of the project would lead to the whole and partial destruction of these resources and an unknown number of possible buried cultural resources. Construction of the project would impair tribal use of historic lands. The El Paso Mountain sacred lands are listed in Native American Heritage Commission's database of sacred lands. The project would also encroach on the national register listed Last Chance Canyon Archaeological District.
- **Water Resources:** The project proposes using high quality groundwater from the Indian Wells Valley Water District wells located within the Indian Wells Valley Groundwater Basin for site construction and plant operations. Water use by the project may exacerbate the continuing overdraft in the basin. The RSPP project would impact the El Paso wash by a proposed culvert installation at Brown Road, a HTF pipe bridge and the proposed 230 kV transmission line that would cross over the wash, in addition to nine drainage channel tie-ins constructed to convey storm water off the site to its natural flow toward El Paso wash. The southern field would intercept an ephemeral wash; the project proposes to re-route this wash. These proposed changes to the El Paso wash and ephemeral washes have the potential to disrupt the hydrological and biological functions and processes of the washes.
- **Visual Resources**: The RSPP project would introduce an industrial character to an area that is currently free from such. Although Hwy 395 is not a designated Scenic Highway and the Indian Wells Valley does not have similar scenic designation, the RSPP project would substantially degrade the existing visual character and quality of the site and its surroundings, which is considered to have moderate-to-high visual sensitivity and viewing characteristics. Because effective, feasible mitigation measures for a project of this scale could not be identified by staff, these impacts are considered to be unavoidable.

- **Traffic and Transportation**: The proposed intersection at Brown Road and Highway 395 has a collision rate 2.8 times higher than statewide average. Construction traffic using this access point would pose a potential risk. CalTrans is currently evaluating future improvements to Highway 395 which may or may not be consistent with the proposed use of the site. A new access point north of the current access may be necessary.
- **Land Use**: The RSPP project footprint would encompass approximately 2,000 acres of public land and could eliminate other BLM authorized land uses, including off-highway vehicle (OHV) activity, and use of the land for camping, hiking and astrological viewing.

The alternatives analysis focuses on the consideration of these impacts, along with other environmental and engineering impacts, and the extent to which they could be reduced or eliminated by alternatives to the proposed project.

B.2.5 SUMMARY OF SCOPING AND SCREENING RESULTS FOR ALTERNATIVES

The public scoping comment period allowed the public and regulatory agencies an opportunity to comment on the scope of the SA/DPA/DEIS, comment on the alternatives considered, and identify issues that should be addressed in the SA/DPA/DEIS. The discussion below presents the key issues identified from the written and oral comments received during the scoping process on the RSPP project. The specific issues raised during the public scoping process are:

- Consider a reduced project size;
- Consider reconfiguration alternatives to minimize impacts to wildlife movement and sensitive biological resources and washes;
- Consider sites outside the Mohave Ground Squirrel Conservation Area and prime desert tortoise habitat;
- Consider conjunctive use of disturbed land in combination with adjacent lower value federal land;
- Consider sites not under BLM jurisdiction such as fallowed alfalfa fields north of the City of Ridgecrest, in the Fremont Valley and California City and agricultural land near Garlock;
- Consider property surrounding the Ridgecrest Landfill;
- Consider alternative technologies that use less water;
- Consider distributed generation.

Scoping comments are also listed Executive Summary of this SA/DPA/DEIS and in the BLM's Final Scoping Report.

B.2.6 ALTERNATIVES EVALUATED UNDER NEPA AND CEQA

Section B.2.1 describes the requirements for evaluation of alternatives under NEPA and CEQA. This section describes the four alternatives to the proposed project that are retained for analysis: the Northern Unit Alternative, the Southern Unit Alternative, the Original Proposed Project Alternative, and the No Project/No Action Alternative. The proposed project and the retained alternatives are evaluated under both NEPA and CEQA in Sections C and D (Environmental and Engineering Analysis). Conclusions regarding the NEPA and CEQA alternatives are presented in the Section C and D evaluations, and are summarized for major issue areas in Section B.2.4, above.

B.2.6.1 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would essentially be Solar Field#1 (north of Brown Road) of the proposed project. The boundaries of this alternative are shown in **Alternatives Figure 1** (all figures are presented at the end of this section). The Northern Unit Alternative would consist of 167 solar collector array loops with a net generating capacity of approximately 146 MW occupying approximately 1,135 acres of land. This alternative would retain 58% of the proposed solar array loops and would affect 58% of the land of the proposed 250 MW project.

Similar to the proposed project, the Northern Unit Alternative would transmit power to the grid through the planned Southern California Edison (SCE) 230-kV substation to be located near the proposed project site. The power block covering approximately 18 acres, would remain north of Brown Road, as proposed by the project and would include all operational power facilities, structures, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system).

The proposed 3,900 foot transmission line alignment would connect to the proposed switchyard (3.2 acres) adjacent to the existing SCE 230-kV transmission line, west of the proposed project. In addition, the site would require access roads, a parking lot, bio-remediation unit and main office building (3 acres) all of which are proposed north of Brown Road within the proposed project footprint. The proposed 16.3 acre water line would remain at the location as proposed by the project. The Northern Unit Alternative would not require the relocation of the two existing SCE transmission lines.

The Northern Unit Alternative is evaluated in this SA/DPA/DEIS because it would lessen some of the impacts of the project. Additionally, the Northern Unit Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals, while reducing impacts to the desert environment. A limited acreage alternative was suggested in scoping comments.

Under the Northern Unit Alternative, the Energy Commission and BLM would approve only the 146 MW facility and not the 250 MW project that is proposed.

This alternative would amend the CDCA Plan to find the site suitable for solar energy development.

B.2.6.2 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would essentially be Solar Field#2 (south of Brown Road) of the proposed project. The boundaries of this alternative are shown in **Alternatives Figure 2**. The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of approximately 104 MW occupying approximately 908 acres of land. This alternative would retain 42% of the proposed solar array loops and would affect 42% of the land of the proposed 250 MW project.

Similar to the proposed project, the Southern Unit Alternative would transmit power to the grid through the planned SCE 230-kV substation to be located near the proposed project site. The power block, spanning approximately 18 acres, would remain north of Brown Road, as proposed by the project and would include all operational power facilities, structures, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system).

The proposed 3,900-foot transmission line alignment would connect to the proposed switchyard (3.2 acres) adjacent to the existing SCE 230-kV transmission line, west of the proposed project. In addition, the site would require access roads, a parking lot, bio-remediation unit and main office building (3 acres) all of which are proposed north of Brown Road. The proposed 16.3 acre water line would remain at the location as proposed by the project. Similar to the proposed project, the Southern Unit Alternative would require the relocation of the two existing SCE transmission lines; this realignment would require approximately 58.2 acres.

The Southern Unit Alternative is evaluated in this SA/DPA/DEIS because it would reduce some impacts of the project. Additionally, the Southern Unit Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals, while minimizing impacts to the desert environment. A limited acreage alternative was suggested in scoping comments.

Under the Southern Unit Alternative, the Energy Commission and BLM would approve only the 104 MW facility and not the 250 MW project that is proposed.

This alternative would amend the CDCA Plan to find the site suitable for solar energy development.

B.2.6.3 ORIGINAL PROPOSED PROJECT

The Original Proposed Project Alternative would be a 250 MW solar facility as originally proposed by Solar Millennium. This alternative is analyzed because it would reduce the amount of land developed within the Mojave Ground Squirrel Conservation Area and it could transmit the full 250 MW of power that Solar Millennium has requested.

The Original Proposed Project Alternative would consist of 278 solar array loops with a net generating capacity of approximately 250 MW occupying approximately 1,760 acres of land. This alternative would occupy approximately 755 acres north of Brown Road and approximately 685 acres south of Brown Road. A shorter transmission interconnection – 1,250 feet as compared to the proposed project interconnection of 3,900 feet – would be needed.

The boundaries of Original Proposed Alternative are shown in **Alternatives Figure 3**. This project footprint contains two desert ephemeral washes that would require redirection and smaller dry desert washes also traverse the site. In addition this site is the location of prime desert tortoise and Mojave ground squirrel habitat.

Similar to the proposed project, the Original Proposed Project Alternative would transmit power to the grid through the planned SCE 230-kV substation located near the proposed project site and would require infrastructure including main office building (3 acres), power block, water line, transmission line, switch yard, access roads, parking area, bio-remediation unit and maintenance building. The off-site water line covers approximately 18 acres and would be in the same location as the proposed project. The bioremediation unit would be located north of Brown Road, and the power block and ancillary facilities would be located south of Brown Road on approximately 18 acres in addition to the transmission line and switch-yard (5.5 acres). The Original Proposed Project Alternative would require the relocation of the two existing SCE transmission lines. However, the proposed realignment would be reduced in length by 550 feet as compared to the proposed project.

The Original Proposed Alternative is evaluated in this SA/DPA/DEIS because it reduces land developed with the MGSCA. Additionally, the Original Proposed Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals.

This alternative would amend the CDCA Plan to find the site suitable for solar energy development.

B.2.6.4 NO PROJECT/NO ACTION ALTERNATIVE

CEQA No Project Alternative

The No Project Alternative under CEQA defines the scenario that would exist if the proposed RSPP project were not constructed. The CEQA Guidelines state that "the purpose of describing and analyzing a 'no project' alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project" (Cal. Code Regs., tit. 14 § 15126.6(i)). The No Project analysis in this SA/DPA/DEIS considers existing conditions and "what would be reasonably expected to occur in the foreseeable future if the project were not approved…" (Cal. Code Regs, tit. 14 § 15126.6(e)(2)).

If the No Project Alternative were selected, the construction and operational impacts of the RSPP project would not occur. There would be no grading of the site, no loss of resources or disturbance of approximately 2,002 acres of desert habitat, and no installation of power generation and transmission equipment. The No Project Alternative would also eliminate contributions to cumulative impacts on a number of resources and environmental parameters in Kern County and in the Mojave Desert as a whole.

In the absence of the RSPP project, other power plants, both renewable and non-renewable, may be constructed to serve the demand for electricity and to meet RPS requirements. The impacts of other utility-scale solar projects are expected to be less

than those of the proposed project because of the very large population of desert tortoises at the RSPP site and the location of MGSCA land within the RSPP site.

If the proposed project were not built, California would not benefit from the reduction in greenhouse gases that this facility would provide, and SCE would not receive the 250 MW contribution to its renewable state-mandated energy portfolio.

NEPA No Action Alternatives

Under NEPA, the No Action Alternative is used as a benchmark of existing conditions by which the public and decision makers can compare the environmental effects of the proposed action and the alternatives. Like the No Project Alternative described above, under the No Action Alternative, the impacts of the RSPP project would not occur.

BLM's alternatives related to the No Action Alternative and the Plan amendment are the following:

- **No Action on project but amend the CDCA plan to classify the area as suitable for future solar development.** The RSPP project is not approved (project denied), and no ROW grant is issued to Solar Millennium, but the CDCA plan is amended to classify the project area as suitable for large scale solar energy development under a future project .
- **No Action on project and amend the CDCA plan to classify the area as unsuitable for future solar development.** The RSPP project is not approved (project denied) and no ROW grant is issued to Solar Millennium, and the CDCA plan is amended to classify the project area as unsuitable for large scale renewable energy development.
- **No Action on project application and on land use plan amendment**. The RSPP project is not approved (denied), no ROW grant is issued, and no CDCA Plan amendment is approved.

Each of these No Action Alternatives is addressed under each resource element of Sections C and D.

B.2.7 CEQA ONLY ALTERNATIVES RETAINED

Two alternatives are evaluated by the Energy Commission under CEQA only. The alternative site evaluated in this section, the Garlock Road Alternative, is located on private lands. The second alternative is a solar photovoltaic facility located at the proposed project site.

The Energy Commission does not have the authority to approve an alternative or require Solar Millennium, LLC to move the proposed project to another location, even if it identifies an alternative site that meets the project objectives and avoids or substantially lessens one or more of the significant adverse effects of the project. Implementation of an alternative site would require the applicant to submit a new Application for Certification (AFC), including revised engineering and environmental analyses. This more rigorous AFC-level analysis of any of the alternative sites could reveal environmental impacts; nonconformity with laws, ordinances, regulations, and

standards; or potential mitigation requirements that were not identified during the more general alternatives analysis presented herein. Preparation and review of a new AFC for the RSPP on an alternative site would require substantial additional time.

Alternatives sites for the RSPP were suggested in scoping comments as means to reduce the project impacts to biological and cultural resources. The Garlock Road Alternative and photovoltaic technology were suggested by scoping comments, and numerous scoping comments suggested consideration of a private/disturbed land alternative.

Of the two alternatives considered for the analysis in this SA/DPA/DEIS, Garlock Road Alternative and Photovoltaic Technology Alternative at the Proposed Site, the Garlock Road Alternative is illustrated on **Alternatives Figure 4** at the end of this section. Images that show potential photovoltaic technologies are illustrated at the end of this section in **Alternatives Figure 5**.

B.2.7.1 SITE SELECTION CRITERIA

The following site selection criteria identified in the RSPP AFC were used to choose the proposed site (SM 2009a):

- The facility should be located in an area of long hours of sunlight (low cloudiness) and insolation should be at a level of 7 kilowatt-hours per square meter per day;
- The site should be relatively flat with a grade of no more than 2%;
- The site should be large enough to include a 250 MW solar power plant, and large enough to site outside of desert washes, to the greatest extent possible;
- The site should not be highly pristine or biologically sensitive (e.g., not a wilderness area, Area of Critical Environmental Concern [ACEC] or a Desert Wildlife Management Area [DWMA]). The site should not be located in a military base or park;
- Land must be available for sale or lease/ROW and landowner must be willing to negotiate a long-term option agreement so that site control does not require a large capital investment until license is obtained;
- The project must be located within 10 miles of a California ISO - interconnected transmission line with capacity rating of 230kV or higher.
- The site should have ease of access and close proximity to access roads;
- The site should be close enough to areas with large construction labor pools within daily commuting range;
- The site should be located on property currently available at a reasonable cost.

The site criteria do not state a minimum acreage required for a 250 MW parabolic trough system facility. Within the 3,995 acres for which RSPP has requested a ROW grant from BLM, approximately 1,944 acres would be graded for the project, including access roads and infrastructure (SM 2010a). Similar acreage would be required for a 250 MW facility at the Garlock site. More acreage would be required for a 250 MW PV facility at the RSPP site.

Other Sites on BLM Land

The BLM has received a large number of utility-scale solar energy project proposals for BLM-administered lands throughout California. The BLM processes solar energy ROW grant applications under its Solar Energy Development Policy (Instructional Memorandum No. 2007-097) and addresses environmental concerns for the utility-scale energy projects on a case-by-case basis. An alternative site on BLM land where there is a pending application for another renewable project is not considered as a viable alternative.

The BLM and DOE are preparing a Programmatic Environmental Impact Statement (PEIS) on solar energy development in six states in the western U.S. (Arizona, California, Colorado, New Mexico, Nevada, and Utah) (USDOE 2008). As part of that PEIS, the BLM and DOE identified 24 tracts of BLM-administered land for in-depth study for solar development, some or all of which may be found appropriate for designation as solar energy zones in the future. The public scoping period on the solar energy zone maps ended in September 2009. The Draft PEIS is anticipated to be published in 2010.

B.2.7.2 GARLOCK ROAD ALTERNATIVE

Multiple scoping comments requested that an alternative site be considered on disturbed land, thereby lessening the potential project impacts to the desert environment. In order to avoid impacting active agricultural land, no longer productive land or land that would not be economically viable for agriculture was considered. This land must also achieve most of the site selection criteria defined by RSPP and provided earlier in this section.

Alternatives Figure 4 shows the Garlock Road Alternative site. The site is located south of the intersection of Garlock Road and Redrock-Randsburg Road, Kern County; both are two-lane paved roads, connecting Highway 395 near Johannesburg to Highway 14 south of Red Rock Canyon State Park. The site lies in Fremont Valley boarded by the El Paso Mountains on the north and Rand Mountains on the southeast, and drains to Koehn Dry Lake to the southwest. Railroad tracks run by the north of the site along the south side of Redrock-Randsburg Road; it is unclear whether the tracks are operable.

This alternative is comprised of 11 separate parcels totaling approximately 2,146 acres. The parcels range in size from 80 to 480 acres. Six parcels encompassing 1,523 acres are owned by one land owner who has indicated that this land may be available for sale. As stated above, approximately 1,944 acres of the proposed site location would be graded for the RSPP project, including access roads, and infrastructure.

An approximately 8-mile transmission interconnection would be required to connect the site to SCE's Kramer-Inyoken 230-kV transmission line, which runs near Highway 395. The transmission interconnection route would follow Garlock Road to the east on the south side of the road and interconnect to the existing line at the transmission line's point of crossing with Garlock Road; additional private party and BLM parcel crossings would be required. A CDCA Plan amendment from BLM and easement acquisition from private land owners would be required. Alternatively, the Garlock Road Alternative could

interconnect with a Los Angeles Department of Water & Power (LADWP) 230-kV line along the east side of Highway 14; this route would be approximately 25 miles.

Due to the remote location, interconnection to a natural gas pipeline could be lengthy. Trucking and storing propane onsite has been proposed for other projects in the vicinity (i.e. Beacon Solar Energy Project and the RSPP project) and would likely be used for a project at the Garlock Road site.

Environmental Assessment of the Garlock Road Alternative

Air Quality

Environmental Setting

Each local air quality district in California establishes its own significance criteria for environmental review of projects based on the specific conditions within each air basin. Like the proposed RSPP project, the Garlock Road Alternative site is in the Mojave Desert Air Basin, regulated by the Kern County Air Pollution Control District (KCAPCD). The pollutants of concern for Kern County are particulate matter that is 10 microns or less in diameter (PM10) and ozone (O3) (Kern County 2007). More specific information regarding the Mojave Desert Air Basin and KCAPCD can be found in the **AIR QUALITY** section of this SA/DPA/DEIS.

Environmental Impacts

Air quality impacts would principally consist of: exhaust emissions (*e.g.,* ozone precursors, NOx and VOC) from on-site, off-road and gasoline-powered construction equipment; other criteria pollutants, such as CO and PM10; and toxic diesel particulate matter emissions) and fugitive particulate matter (dust) from travel on unpaved surfaces. These emissions are described in the **AIR QUALITY** section of the SA/DPA/DEIS for the proposed project and would be essentially the same at any site.

Exhaust emissions would also be caused by workers commuting to and from the work sites, from trucks hauling equipment and supplies to the sites, and crew trucks (e.g., derrick trucks, bucket trucks, pickups). Exhaust emissions from heavy-duty diesel and gasoline-powered construction equipment and fugitive particulate matter (dust) would be essentially the same at any site. If workers were still to come from the Ridgecrest area, they would have to travel over 20 miles on mostly two-lane highway to reach the Garlock Road site. The site is over 25 miles from both California City and Mojave, and 60 miles from Lancaster.

Emissions from the Garlock Road Alternative would need to be controlled to satisfy the air permitting requirements of the KCAPCD. As such, construction and operation of a 250 MW project at Garlock Road Alternative site would be subject to permit requirements, and would require mitigation, similar to that of the proposed RSPP project, to avoid significant air quality impacts. Appropriate mitigation at the Garlock Road Alternative site would likely involve similar, locally-oriented recommendations such as the conditions of certification presented in the **AIR QUALITY** section of this SA/DPA/DEIS to reduce ozone and PM10 impacts.

Comparison to Proposed Project

The construction and operation emissions resulting from building a 250 MW solar power plant at Garlock Road Alternative site would be similar to those of the RSPP project at the Ridgecrest City region. Like the proposed project, the Garlock Road Alternative is non-attainment for PM10 and O3. It is likely that construction and operation NOx, VOC and PM emissions and fugitive dust would require mitigation. Assuming implementation of similar conditions of certification, operational emissions from the Garlock Road Alternative site would be similar to those of the proposed RSPP project site.

Biological Resources

The Garlock Road Alternative site is located in an open space area of Kern County. The primary land cover at the site is disturbed habitat, characterized by inactive agriculture land. Two washes are located onsite; one borders the northern edge of the site and the other skirts the northwestern most corner of the site. The Garlock Road Alternative site is surrounded to the north, east and south by the Rand Mountains Management Area (RMMA).

The site is surrounded largely by undisturbed, native vegetation communities. The Desert Tortoise Research Natural Area (DTNA) is located south and east of Koehn Lake, approximately three miles southwest of the Garlock Road Alternative site. Both the RMMA and the DTNA are critical habitat locations for the desert tortoise. In addition, a portion of the RMMA is designated as an ACEC (BLM 1980) and surrounds the site to the east, north and south. Most of the RMMA occurs within the Fremont-Kramer Desert Wildlife Management Area (DWMA). Although disturbed private land, some maps appear to show the site within the boundaries of the Mohave Ground Squirrel Conservation Area and the Fremont-Kramer DWMA; it is suspected that this is due to the scale of the maps, and it is only the surrounding BLM land that is included.

A reconnaissance survey of the alternative site was conducted in December, 2009. Since the Garlock Alternative site is exclusively private land, access was restricted to the entire site. The site was viewed by staff with binoculars from vantage points at surrounding locations where legal access could be made. In addition, staff conducted aerial photograph interpretation of locations that could not be visually observed from a distance. Reconnaissance surveys included comparing and photographing representative samples of vegetation communities throughout the RSPP site and the Garlock Road Alternative site. Vegetation community types and plant and animal species (or sign) observed were noted, as well as potentially jurisdictional features. Sensitive species with potential to occur on each alternative were determined by a habitat-based analysis and by consulting the California Natural Diversity Database (CNDDB).

The majority of the Garlock Road Alternative site is inactive agriculture comprised of fallow fields. The field reconnaissance surveys identified five vegetation communities on the Garlock Road Alternative site: disturbed habitat, disturbed desert saltbush scrub, disturbed stabilized desert dunes, desert saltbush scrub, and developed. Each vegetation community and associated acreages are described below.

Disturbed habitat accounts for 1,317 acres of the Garlock Alternative site. Disturbed habitat occurs in the central and westerns portions of the site, these areas have been subjected to the most intensive agricultural practices on the site. This cover type is dominated by species such as mustard (*Sisymbrium* sp), thistle (*Salsola* sp.), Mediterranean grass (*Schismus* sp.), and filaree (*Erodium* sp.).

Disturbed stabilized desert dunes occur in the eastern portion of the Garlock Road Alternative site and covers 572 acres of the proposed project site. Old farming equipment was observed at this location. The primary vegetation cover is dominated by annual, herbaceous plant species such as Mediterranean grass and filaree with a few scattered thistle and desert saltbush (*Atripklex polycarpa*).

Disturbed desert saltbush scrub and **desert saltbush scrub** covers 355 acres at the Garlock Road Alternative site. Disturbed desert saltbush scrub is dominated by desert saltbush in addition; substantial plant cover occurs in this vegetation community and is composed of species such as filaree, Mediterranean grass, mustard, thistle and scalebroom (*Lepidospartum squamatum*). Desert saltbush scrub occurs in the northeastern portion of the site. This vegetation community is dominated by desert saltbush and also supports some thistle, Mediterranean grass, and filaree.

Developed areas account for 3.8 acres within the Garlock Road Alternative site. This cover type occurs near the central portion of the site and consists of abandon buildings.

Alternatives Table 2 lists the sensitive species found in CNDDB records within five miles of the Garlock Road Alternative site. No critical habitat occurs on the site.

Alternatives Table 2
California Natural Diversity Database Records for Special Status Species Within 5 Miles of the Garlock Road Alternative

Common Name / *Scientific Name*	Status State/Fed/CNPS/BLM	Occurrence Within 5 Miles of Garlock Road Alternative Site
Red Rock poppy *Eschscholzia minutiflora* ssp. *twisselmannii*	--/--/List 1B.2/S	Reported in seven locations 0.8 mile to 4.8 miles from the site.
Charlotte's phacelia *Phacelia nashiana*	--/--/List 1B.2/S, WEMO	Reported in seven locations 1.4 miles to 4.1 miles from the site.
Desert tortoise *Gopherus agassizii*	ST/FT/--/WEMO	Large polygon (1,700 square mile area) includes the site.
Burrowing owl *Athene cunicularia*	SSC/--/--/S	Reported in one location four miles south of site.
Western snowy plover *Charadrius alexandrinus nivosus*	SSC/FT/--/--	Reported around Koehn Lake approximately 1.4 miles southeast of the site.
Prairie falcon *Falco mexicanus*	Formerly SSC but no longer is of special status.	Reported in six locations north and west of the site, including in the northern portion of the site.
Loggerhead shrike *Lanius ludovicianus*	SSC/--/--/WEMO	Reported in one location 1.5 miles west of the site.
Le Conte's thrasher *Toxostoma lecontei*	SSC/--/--/S, WEMO	Reported in two locations 0.5 mile north of the site and one mile west of the site.
Mohave ground squirrel *Spermophilus mohavensis*	ST/--/--/WEMO	Reported in three locations 1.2 miles, 3.4 miles, and 3.75 miles east of the site.
San Joaquin kit fox *Vulpes macrotis mutica*	ST/FE/--/--	Reported approximately three miles east of the site.

Source: CDFG 2009.

Status Codes:

Federal FE = Federally listed endangered: species in danger of extinction throughout a significant portion of its range
FT = Federally listed, threatened: species likely to become endangered within the foreseeable future

State SE = State listed, endangered
ST = State listed as threatened
SSC = Species of Special Concern

California Native Plant Society
List 1B - Rare, threatened, or endangered in California and elsewhere
List 2 - Rare, threatened, or endangered in California but more common elsewhere
List 3 - Plants which need more information
List 4 - Limited distribution – a watch list
0.1 - Seriously threatened in California (high degree/immediacy of threat)
0.2 - Fairly threatened in California (moderate degree/immediacy of threat)
0.3 - Not very threatened in California (low degree/immediacy of threats or no current threats known)

BLM -Bureau of Land Management
S = Sensitive

BLM Manual § 6840 defines sensitive species as "…those species that are (1) under status review by the FWS/NMFS; or (2) whose numbers are declining so rapidly that federal listing may become necessary, or (3) with typically small and widely dispersed populations; or (4) those inhabiting ecological refugia or other specialized or unique habitats." <www.blm.gov/ca/pdfs/pa_pdfs/biology_pdfs/SensitiveAnimals.pdf>

WEMO = Special-status species considered in analysis of the West Mojave Plan (BLM 20005)

Following are descriptions of the sensitive species in the vicinity of this alternative site (SM, 2009a, CDFG 2010).

- **Red Rock poppy** is an annual herb that occurs in desert washes, flats and slopes predominantly in an area known as the Summit Range (Rand Mountain range) and the El Paso Mountains (Clark and Faull 1991). All known occurrences of the Red Rock poppy occur within the West Mojave Planning Area.
- **Charlotte's phacelia** is an annual herb that occurs on sandy to rocky granite slopes within Joshua tree woodland, Mojave desert scrub habitat and pinyon and juniper woodland. .
- **Desert tortoise** is most often found in association with creosote bush, Joshua tree woodland, and saltbush scrub with adequate annual forbs for foraging.
- **Burrowing owl** is a year-long resident of open, dry grassland and desert habitats. It is also found as a resident in grass, forb, and open shrub stages of pinyon-juniper and ponderosa pine habitats as well as agricultural lands. .
- **Western snowy plover** occurs at inland shores of salt ponds and alkali or brackish inland lakes.
- **Prairie falcon** nests in cliffs and escarpments; forages in adjacent dry, open terrain or uplands and marshes.
- **Loggerhead shrike** prefers open habitats with scattered shrubs, trees, posts, fences, utility lines or other perches.
- **Le Conte's thrasher** is a yearlong resident of desert flats, washes and alluvial fans with sandy and/or alkaline soil and scattered shrubs.
- **Mohave ground squirrel** is endemic to the west Mojave desert and occurs in a variety of habitats including saltbush, alkali desert, and creosote bush scrub at elevations from 1,800 to 5,000 feet.
- **San Joaquin kit fox** occurs in open desert, areas of desert scrub, grasslands, and sandy dunes and in areas with sandy and loamy soil.

No special status plant or animal species were reported on the Garlock Road Alternative site. During the reconnaissance survey, access to this site was restricted to public roads, making it difficult to look for animal sign.

The Garlock Road Alternative site would be located largely on disturbed land and the overall potential for special status plant species to occur is low. In addition, desert tortoise is expected to be low because in some areas the substrate may be too sandy to support burrowing (e.g., disturbed stabilized dunes) and/or the vegetation has been too altered to provide necessary forage and shelter (e.g., disturbed habitat). Tortoise could occur immediately offsite in surrounding Mojave creosote bush scrub habitat that surrounds the eastern, southern and northern portions of the site. Mojave creosote bush scrub habitat is appropriate habitat for the desert tortoise, in addition to desert saltbush scrub and disturbed desert saltbush scrub which lies adjacent to the Garlock Road Alternative site.

The largely disturbed nature of the Garlock Road Alternative site would limit wildlife use of the site for foraging, sheltering, breeding, or dispersal. However, since the site occurs in the center of Fremont Valley, wildlife may cross the site to travel between the mountains to the north and south or between the upper elevations in the valley to the east and to Koehn Lake to the west. Thus this site could potentially serve as a connector to areas of high quality habitat. Desert tortoise critical habitat is to the north, east and south of the Garlock Road Alternative site.

Environmental Impacts - Construction

Approximately 2,146 acres of fallow agricultural land would be permanently lost as a result of vegetation clearing, grading, and construction of the solar facilities, potentially affecting special status animal species. Few, if any, impacts to listed or sensitive plant species would be expected because the site has been previously impacted by agriculture operations and is mostly disturbed. The only special status species with moderate potential to occur on the Garlock Road Alternative site are not listed species.

Additional impacts would occur due to the construction of linear facilities associated with the project facilities at the Garlock Road Alternative site, including access roads and a transmission line of approximately eight miles.

Impacts/Mitigation to Wildlife

Building a solar facility at the Garlock Road Alternative site would primarily impact fallow agricultural lands. Impacting agricultural lands would potentially have an adverse effect on listed and sensitive wildlife species and their habitats either directly or through habitat modifications. Some special status wildlife species have moderate potential to occur on the site including western burrowing owl, northern harrier, loggerhead shrike, desert kit fox, and pallid bat. The Garlock Road Alternative site could provide foraging habitat for all of these species and breeding habitat for the western burrowing owl and desert kit fox. All of this habitat would be directly and permanently impacted during construction.

The desert tortoise has been reported within a 1,700 square mile area that includes the Garlock Road Alternative site. However, the potential for the tortoise to occur onsite is low, given the lack of suitable habitat onsite. The tortoise could occur immediately offsite in surrounding Mojave creosote bush scrub habitat and desert tortoise critical habitat. Increased construction truck traffic along both Garlock Road and Redrock-Randsburg Road could increase vehicle-related tortoise mortality. Construction of the proposed project at the Garlock Road Alternative site could result in the spread of invasive plant species to adjacent tortoise habitat, thereby degrading its quality. Additional impacts to vegetation communities, and possibly special status species could occur due to the construction of linear facilities. The transmission line would also border, and encroach upon the Rand Mountain Management Area ACEC and construction of the transmission line could affect tortoise adjacent to Garlock Road.

Burrowing Owl

Although the CNDDB database does not show any record of the burrowing owl at the Garlock Road Alternative site, it has been observed nearby and could move onto the

alternative site at any time. Burrowing owl survival can be adversely affected by human disturbance and foraging habitat loss, even when impacts to individual owls and burrows are avoided.

Migratory/Special Status Bird Species

The Garlock Road Alternative site provides foraging, cover, and/or breeding habitat for migratory birds, including special-status bird species that may be present at the site. Project construction and operation could impact nesting birds in violation of the Migratory Bird Treaty Act. Preconstruction surveys and avoidance of nesting birds could reduce such impacts.

Spread of Noxious Weeds

Construction of a solar facility at the Garlock Road Alternative site could result in the introduction and dispersal of invasive or exotic weeds to adjacent native habitats. The permanent and temporary earth disturbance adjacent to native habitats increases the potential for exotic, invasive plant species to establish and disperse into native plant communities, which leads to community and habitat degradation. A weed reduction program could potentially reduce and mitigate impacts.

Noise

Noise from construction activities could temporarily discourage wildlife from foraging and nesting immediately adjacent to the alternative site. Many bird species rely on vocalization during the breeding season to attract a mate within their territory. Noise levels from certain construction, operations, and demolition activities could reduce the reproductive success of nesting birds.

Operational Impacts

Since there is the potential for wildlife movement to occur across the site, development and fencing of the Garlock Road Alternative site would impact wildlife that use the site as a connector to surrounding areas of higher quality habitat. The resultant fragmentation that could occur if the RSPP project is built at the Garlock Road Alternative site could lead to reduced reproductive success, increased adverse edge effects on adjoining lands, and overall reduction in the area's carrying capacity to support wildlife species. Any wildlife residing on this site would potentially be displaced, injured, or killed during project activities. Animal species in the project area could fall into construction trenches, be crushed by construction vehicles or equipment, or be harmed by project personnel. In addition, construction activities may attract predators or crush animal burrows or nests.

Operation of the transmission line could result in increased avian mortality due to collision with new transmission lines. Mitigation could include installing the transmission line in accordance with the Avian Powerline Interaction Committee (APLIC) Guidelines designed to minimize avian-power line interactions.

Comparison to Proposed Project

Overall, development of a solar project at the Garlock Road Alternative site would likely impact fewer biological resources compared to the proposed RSPP site since

development of the Garlock Road Alternative site would occur predominately on disturbed land that lacks the unique ecological characteristics and high concentration of desert tortoise found at the proposed site.

In contrast, development of the RSPP site would occur entirely on land supporting native vegetation communities. The entire southern portion of the proposed RSPP project falls within the Mohave Ground Squirrel Conservation Area. Mohave ground squirrel would not be expected at the Garlock Road Alternative site given the nature of the site. The RSPP site is known to support five special status species (desert tortoise, Mohave ground squirrel, western burrowing owl, loggerhead shrike and Le Conte's thrasher) one of which, the desert tortoise, is state and federally listed. In addition, the Mohave ground squirrel is state listed. The Garlock Road Alternative site has the potential to support all of the animal species that are present on the RSPP site except Le Conte's thrasher because the habitat is not appropriate for the species.

The Garlock Road Alternative has fewer on-site biological constraints than the proposed RSPP site, since it is mainly fallow agriculture land. The siting of a transmission line along Garlock Road would encroach upon the RMMA ACEC but impacts to tortoise would be temporary and mitigable. Increased truck traffic along Garlock and Redrock-Ransburg Roads during construction could temporarily increase vehicle-related tortoise mortality.

Cultural Resources

Environmental Setting

The Garlock Road Alternative is located on agriculture land, in Kern County, California. The alternative site is located in the western Mojave Desert approximately 1.2 miles south of the site of Garlock, a former railroad station situated in the eastern Fremont Valley approximately 22 miles northeast of California City. One-half mile to the southwest is the eastern edge of Koehn Dry Lake. The California desert has been inhabited for at least 8,000 to 12,000 years and perhaps as much as 16,000 years (Rosenthal et al. 2007, p.151). Prehistoric settlement was often centered around lakes, now the dry playas characteristic of the Mojave Desert and Great Basin. The lakes and the marsh environments along the lake shores supported abundant plant and animal species that provided food, fiber, medicine, tool materials, clothing, and ritual objects required for daily life (Schaefer and Laylander 2007). In the immediate vicinity of the Garlock Road Alternative, archaeological remains at Koehn Dry Lake, and further southwest at Cantil have revealed significant habitation during the late Holocene (Sutton et al. 2007).

From 8,000 to 6,000 years before present, climatic change caused the lakes to dry, and food gathering and land use patterns began that continued into the historic period, including the use of a greater variety of habitats, plants, and animals (Sutton et al. 2007). The bow and arrow may have appeared around 2,000 years ago as shown by a shift in projectile point form and size, and the arrival of bow-and-arrow technology is thought to be reflected by the late prehistoric introduction of the Desert Side-Notched and Cottonwood Triangular points found through the California desert (Sutton et al. 2007). Evidence from CA-KER-875 at Koehn suggests that the late prehistoric was

marked by gradual desiccation as reflected in the prehistoric use of juniper as fuel at Koehn Lake, a tree that is no longer present in the immediate region (Sutton et al. 2007, p.241).

The first documented exploration of the Mojave Desert by nonindigenous people occurred in 1770s by Francisco Garces, a Spanish Franciscan priest looking for a route from Arizona to Northern California. Much of the history of this region occurred through its use as a corridor, one used by fur trappers and caravans. California was annexed in 1848, the same year that gold was discovered, leading to an influx of prospectors. Roads were established to transport goods, people, livestock, food, and ore between the Mojave Desert and Los Angeles, and the western Mojave Desert began to have a large mining industry.

Railroad surveys began in 1853; the San Pedro, Los Angeles, and Salt Lake Line, predecessor to the Union Pacific through the Mojave Desert, was completed in 1905, and the Tonopah and Tidewater finished its line from Ludlow to Beatty, Nevada, in 1907. In 1914, a road was completed to parallel the tracks of the Atlantic & Pacific Railroad, which was the precursor to U.S. 66 (National Trails Highway).

Military bases were established in the desert in association to World War II, including Naval Air Weapons Station – China Lake and Fort Irwin.

Evidence from aerial photographs indicates that the entire Garlock Road Alternative site has been under irrigated cultivation for some time. The area lacks characteristic desert scrub of areas less subject to disturbance. In addition, the presence of radial irrigation systems suggests agricultural use after circa 1960. The radial irrigation method was invented and developed in Nebraska during the late 1940s. Until the late 1950s the method was largely restricted to the upper Midwest (http://en.wikipedia.org/wiki/Irrigation#Center_pivot_irrigation).

A records search for the Garlock Road Alternative site was conducted on January 15, 2010 by staff at the Southern San Joaquin Valley Information Center of the California Historical Resources Information System. The records search was carried out at the request of AECOM of San Diego, California. The research included a one-mile buffer surrounding the GRA site. The record search reveals that the region around the GRA is primarily unsurveyed and recorded archaeological remains are infrequent. A summary of the records search results was prepared by AECOM staff in February 2010 (SM 2010j).

The records search identified three prior studies within or adjoining the Garlock Road Alternative site and five previously recorded sites within one mile. The reports include Wilke (1983), Ridgeway and Garfinkel (1984) and Richards (2003). Sites in the Garlock Road Alternative search area include P-15-191 (a bedrock milling station and trail), P-15-882 (temporary camp site), P-15-3366 (Mojave-Owenyo Southern Pacific line), P-15-12174 (milling stone scatter), and P-15-13303 (CA-KER-7499H, a historic dump). All recorded resources are located north or west of the Garlock Road site. Surveyed land within the buffer area is too limited to estimate site density. Two linear surveys are

mapped to the north and east, one of which located an historic can dump (P-15-13303) adjacent to the northeastern corner of the Garlock Road site (Ridgeway and Garfinkel 1983).

During research in preparation of the present document, historic maps of the project region were consulted and one potential historical resource in the western portion of the Garlock Road Alternative site was identified. The 1915 edition of the United States Geological Survey *Searles Lake* 1:250,000 scale one-degree quadrangle appears to locate Garlock west and south of the present site. A location presently mapped as “Old Garlock” by the National Geospatial Intelligence Agency, is cited from the Saltdale 1:50,000 USGS quadrangle dated 1947 (USGS 2010). The modern site of Garlock is 3.2 miles northeast of the location of “Old Garlock.” This historical change suggests that there may be a potential for historical archaeological resources within the northwest portion of the Garlock Road Alternative site.

The available information on the occurrence of both prehistoric and historic archaeological sites is too scant to estimate probabilities for encountering resources within the Garlock Road site. Satellite imagery accessed via Google Earth suggests that one or more ancient beach lines may have traversed what is now the southwestern portion of the site. These lines, if they are indeed shore lines from ancient beaches may indicate a potential for prehistoric sites with the Garlock Road Alternative area.

On February 28, 2010 a windshield survey of the Garlock Road Alternative site was made by personnel of PAR Environmental Services, Inc. The visit found that access to the site is limited with poor roads and limited visual access. The site presently exhibits at least four and possibly seven structures. These appear to be mostly modern structures but based upon satellite imagery available on Google Earth, one older structure may be present at the location of Old Garlock in the northwest corner of the Garlock Road Alternative site.

Environmental Impacts

The construction and operation of a solar facility on the site of the Garlock Road Alternative would appear to have the potential to affect the site of Old Garlock, and possibly one historic archaeological site (CA-KER-7499H), an historic can dump that may extend into the Garlock Road Alternative area. Vertical disturbances may extend as much as four meters (13 feet).

The potential to affect prehistoric resources by constructing the Garlock Road Alternative is indeterminate. Because of the history of agricultural use of the entire site there is little potential for intact prehistoric or historic surface manifestations. As noted previously satellite imagery indicates that 100% of the site has been subjected to surface alterations related to agricultural operations. Typical agricultural tilling patterns and implements affect soil profiles to depths of four to 12 inches. Deeper plowing and ripping, to break up hardpan formations for example, may extend to depths of four feet or more. The location of the alternative makes it possible that buried resources associated with Middle and Late Holocene high-shore lines of Koehn Lake may be present, particularly in the southern and western portions of the area. Geoarchaeological studies conducted for the Beacon Solar Energy project 12 to13 miles southwest of the Garlock Road Alternative site found Holocene period

archaeological materials at depths of up to nearly four meters in some landforms. The investigators found that in general site accumulation tended to correlate with surfaces that reflect climatically stable, well watered periods with extended pooling periods on the playas (Young 2009).

One historical property, the site of Old Garlock, may be present within the Garlock Road Alternative site; however without access to the location, this cannot be verified. The resolution of this issue would require further study.

Built environment, besides Old Garlock, includes several structures around the Garlock Road Alternative including quarters for ranch staff and shelters for hay or other ranch products. These appear less than 50 years of age.

Comparison to Proposed Project

The development of a solar facility on the site of the Garlock Road Alternative would most likely have cultural resource impacts of less extent than the RSPP site, based upon the available survey data. The extensive surface disturbance suggests that additional effects to archaeological resources may be limited. The lack of proximity to other known properties implies that visual impacts may also be limited.
In contrast, the proposed RSPP site has no built environment issues. However, the RSPP site's ground surface has not been subjected to agricultural use. Isolated resources and archaeological sites identified within the RSPP site retain spatial patterning, material culture attributes and relative contextual data. As such, the resource base at the RSPP site allows for interpretation regarding general patterns of prehistoric and historic land use in the area through time and across the landscape and contains significant resources that appear to be lacking in the Garlock Road Alternative site.

Hazardous Materials

Environmental Setting

The topography of the Garlock Road Alternative site is essentially flat, with surrounding mountainous terrain the west and north. The nearest known population centers are roughly nine miles east of the Garlock site (Johannesburg and Randsburg), the town of Garlock is less than two miles north of the proposed site, but is considered a ghost town. There are isolated structures on the site, as well as in and around the town of Garlock, but it is unclear if they are occupied.

Access to the Garlock Road Alternative site from the east or north would likely be via SR 395 to the Garlock Road exit and from the south or southwest would likely be SR 14 to the Redrock-Randsburg Road junction. Transport would likely travel west onto Garlock Rd or north on Redrock-Randsburg Road to arrive at the site

Environmental Impacts

Hazardous materials use at the Garlock Road Alternative site, including the quantities handled during transportation and disposal, would be the same as those of the proposed RSPP project. As stated in the **HAZARDOUS MATERIALS** section in this SA/EIS, hazardous materials used during the construction phase of the RSPP would include gasoline, diesel fuel, motor oil, lubricants, welding gases (e.g., acetylene,

oxygen and argon), and small amounts of solvents and paint. Similar materials and quantities would be expected at the Garlock Road Alternative. Similar to the RSPP project, it is expected that propane would be stored onsite, given the remote location of the Garlock site.

Hazardous materials used during operations would include the solar heat transfer fluid (Therminol VP-1™, a synthetic hydrocarbon), propane, compressed gases (acetylene, argon and oxygen), diesel fuel, mineral insulating oil, and lube oil. Similar quantities to the RSPP project would be expected. None of these materials would pose a significant potential for off-site impacts as a result of the quantities on site, their relative toxicity, their physical states, and/or their environmental mobility given conditions of certification stipulated in the **HAZARDOUS MATERIALS** section of the SA/DPA/DEIS. Transportation of hazardous materials to the Garlock Road Alternative site could require passing near residences located in the towns of Johannesburg and Randsburg. The transportation would be primarily on SR 395 and Garlock Road and would avoid smaller roads with residences.

Comparison to Proposed Project

The hazardous materials used at the Garlock Road Alternative site would be the same as those used at the proposed RSPP site. The proposed site has four sensitive subgroups within a three-mile radius with the nearest residential receptor located approximately 3,200 feet west of the northwestern boundary of the Northern solar field. The nearest known sensitive receptor (school) at the Garlock site is nine miles east of the site. The Garlock Road Alternative would not require that heat transfer fluid (HTF) be moved across a public road. For the RSPP project, the HTF lines would be aboveground within the two solar fields but would be underground as the lines approach Brown Road. With adoption of the proposed conditions of certification, similar to the RSPP project, the Garlock Road Alternative would comply with all applicable LORS and result in no significant impacts to the public.

Land Use

Environmental Setting

The Garlock Road Alternative comprises approximately 2,100 acres of private fallow agricultural land near Garlock (ghost town), southwest of Ridgecrest, Kern County. The Garlock Road Alternative site occurs in the bottom Fremont Valley and slopes gently to the southwest toward Koehn Lake (dry). Elevation at the site ranges from 1,960 to 2,200 feet above mean sea level. There are a few isolated structures/residences onsite, as well as a handful of residences in the town of Garlock to the north of the site. It is unknown if they are occupied. The proposed location of Beacon Solar Energy Project is roughly 12 miles southwest of the Garlock site; this proposed project is a 250 MW solar parabolic trough facility proposed on 2,012 acres. In addition, the Honda Proving Center, a 7.5 mile automotive testing track, is located approximately nine miles southwest of the Garlock site, near the town of Cantil. A Southern Pacific Railroad line runs north of the Garlock site in a southwest to northeast direction.

Agriculture

The Garlock Road Alternative site has a Kern County General Plan land Use designation of A and A1 (Exclusive and Limited Agriculture) (Kern County 2010) and consists almost primarily of historic agricultural operations and fallow agricultural fields. The site is surrounded largely by undisturbed, native vegetation communities. Parts of the site are seismic and flooding hazards zones (Kern County 2010).
The California Department of Conservation (CDOC) has designated this land as primarily Vacant or Disturbed Land followed by Grazing Land (CDOC 2008). The United States Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS) provides information on designation of soils in areas with agricultural lands (USDA 2009). Because none of the site has been surveyed by the NRCS, the California Agricultural Land Evaluation and Site Assessment (LESA) Model could not be used to assess impacts to agriculture from use of the Garlock Road Alternative site.

Sensitive Land Uses

It is unclear if the existing structures on the Garlock site are inhabited; the western portion of the site is zoned Limited Agriculture-Mobile Home Combining (Kern County 2010) and would allow habitation. If a project were located on the Garlock Road site, existing structures would be removed. The towns of Johannesburg and Randsburg are located approximately nine miles east of the Garlock Road site. There are three schools located in Johannesburg with one school roughly nine miles southwest of the site. The transmission line interconnection would run east, following Garlock Road to the immediate south until the interconnection point just west of Goler Road. Staff's site visit on January 5, 2010 indicated there were a few isolated structures along this stretch of Garlock Road, but it is unclear if they are occupied.

Transmission Interconnection

As stated above, the Garlock Road Alternative site would require approximately eight miles of new 230 kV transmission line to reach the existing SCE 230 kV line adjacent to Highway 395. The transmission line would follow Garlock Road to the immediate south and interconnect just west of Goler Road, where the existing 230 kV line crosses Garlock Road. The existing SCE 230 kV transmission line is within the area covered by the CDCA Plan. The Energy Production and Utility Corridor Element of the CDCA Plan established a network of joint-use planning corridors intended to meet the projected utility service needs at the time the Plan was written. The transmission line would be developed mainly within the Garlock Road right of way (ROW), with a small segment would occur along the Redrock-Randsburg Road ROW. The transmission line would cross both private and BLM land (including the RMMA ACEC). This area is not within the CDCA planning area designated utility corridor N; therefore a Plan Amendment could be required for this transmission line interconnection, in addition to easement acquisition where the transmission line would cross private land.

Environmental Impacts

Consistent with the desire to use disturbed lands for large solar projects, the Garlock Road Alternative site is located on inactive agriculture lands. The Garlock Road Alternative site is not considered Prime Farmland or Farmland of Statewide Importance (CDOC 2008). According to the Kern County GP, designations A and A1 permit solar

fields in excess of one acre as a conditional use. Although DOC and USDA have not designated this site as Farmland, it could be considered Farmland of Local Significance. The Energy Element of the Kern County General Plan states that one of the County's Goals is to encourage solar development in the desert and valley on previously disturbed lands and to discourage developed on undisturbed land, thus supporting State and federal protected plant and wildlife species. Because the alternative would avoid any actively farmed areas, the conversion of the previously farmed land to an industrial use would not be considered significant.

In order to rezone the Garlock Road site to an electric generating facility, the project would need to comply with local development regulations. Chapter 19.12 of the Kern County Zoning Ordinances requires a Conditional Use Permit and environmental review for such a conversion (Kern County 2009). Several of the parcels also have non-renewal Williamson Act contracts. Conversion from farmland is allowed when the nine-year non-renewal contract expires; termination of the contract prior to expiration requires cancellation procedures (CDOC 2008).

Construction activities (i.e., heavy construction equipment on temporary and permanent access roads and moving building materials to and from construction staging areas) for the alternative would create temporary disturbance to remote areas. Conditions of certification to reduce noise and air quality impacts are presented in the **NOISE AND VIBRATION** and **AIR QUALITY** sections of this SA/DPA/DEIS for the proposed RSPP site. Similar conditions of certification would be expected for a project at the Garlock Road site. Because construction disturbances would be temporary, the impacts would be less than significant.

Comparison to Proposed Project

Use of the Garlock Road Alternative site would eliminate most impacts to BLM land since the site is privately owned; however, the transmission line interconnection would require a CDCA plan amendment since it would be located on BLM land, similar to the Plan amendment that would be required for the proposed RSPP project. The transmission line ROW acquisition would likely be more difficult for the Garlock Road Alternative site. The use of the Garlock Road site would allow continuation of OHV activity, camping and astrological viewing at the RSPP site.

The Garlock Road Alternative site would convert up to 2,200 acres of vacant and fallow agriculture land to industrial use (i.e., renewable energy production), while the RSPP project would convert undisturbed desert habitat to industrial use. The proposed RSPP site is designated Non-Agriculture and Natural Vegetation by the CDOC (2008).

Sensitive receptors are located at a further distance (nine miles) as compared to the RSPP site (three miles).

The Garlock Road site would have fewer land use impacts than the proposed RSPP site.

Recreation and Wilderness

Environmental Setting

The Garlock Road Alternative site would be located on fallow agricultural land that is zoned Agriculture (Kern County 2010). No recreational land is located on the Garlock Road alternative site; however, the Rand Mountains Management Area (RMMA) and the Western Rand Mountains ACEC surround the site to the north, east and south. This area is known as the BLM Rand Mountains Fremont Valley Management Area (BLM 2008). The Fremont Kramer DWMA surrounds the site to the north, east and north. South and east of Koehn Lake is the Desert Tortoise Research Natural Area. Within the RMMA are several designated off-road vehicle (ORV) routes, and campgrounds. The El Paso Mountains are located west of the proposed site and include a number of off road trails (e.g., Last Chance Canyon, Mesquite Canyon, and Goler Canyon). Red Rock Canyon State Park is a 27,000 acre park within the El Paso Mountain range and is located approximately five miles west of the Garlock Alternative site. There are two preserves within the park: Hagen Canyon Natural Preserve and Red Cliffs Natural Preserve.

Environmental Impacts

A solar facility at the Garlock Road site would not directly impact land use nor would it displace any existing recreation uses. No designated ORV trails run through the Garlock Road Alternative site. A solar project at the Garlock Road site would be visible from the southeast portion of the Red Rock Canyon State Park. Some proportion of recreational users may ultimately prefer to visit other areas due to the changed viewshed presented by a 250 MW solar facility at the Garlock Road Alternative site.

Comparison to Proposed Project

Recreational lands are located adjacent to the Garlock Road Alternative site, but the site itself does not support recreational uses. Within the RSPP project site, northwest of the intersection of U.S. Highway 395 and Brown Road is the location of a rocky knoll that is used as a recreational destination for picnics and ORV use (SM 2009a). Scoping comments indicate that the RSPP site is utilized by RV clubs as a yearly family gathering location, with anywhere from 50 to 90 families attending the outings (PUBLIC 2010k). The categorization of the RSPP site as “multi-use land”, its location within the El Paso Mountains region of the West Mojave Off-Road Vehicle Designation Project, and its designation as a Limited Use Area for ORV (SM 2009a), suggest that recreational impacts at the proposed Ridgecrest City site would be greater than at the Garlock Road Alternative site.

Noise and Vibration

Environmental Setting

A solar project at the Garlock Road site would add a dominant noise source in a remote area; the nearest large noise generators are near Cantil to the southwest and Randsburg/Johannesburg to the east. Existing onsite structures would likely be removed prior to development, leaving few residential receptors, if any at all. Existing ambient noise sources could come from vehicles traveling along Garlock Road and

Redrock Randsburg Road and ORV users. Nearby sensitive receptors are nine miles to the east in the towns of Johannesburg and Randsburg and nine miles south in the town of Cantil.

Environmental Impacts

As discussed in the **NOISE AND VIBRATION** section of this SA/DPA/DEIS, the construction of the RSPP plant would create noise or unwanted sound and would be the same if the project were built at the Garlock Road Alternative site. The character and loudness of this noise, the times of day or night at which it is produced, and the proximity of the facility to sensitive receptors combine to determine whether the facility would meet applicable noise control laws and ordinances and whether it would cause significant adverse environmental impacts. The Garlock Road site could possibly be heard by users of the BLM Rand Mountains Fremont Valley Management Area, which surrounds the site the north, east, and south. No other noise or vibration impacts would be expected.

Comparison to Proposed Project

Building a 250 MW solar facility at the RSPP site would create a slightly greater impact than at the Garlock Road Alternative site because of the closer proximity to a greater number of sensitive receptors (residences).

Public Health and Safety

Environmental Setting

The Garlock Road Alternative site is located in an isolated area primarily dedicated as open space and wilderness. There are no community facilities with sensitive receptors, such as schools, hospitals or playgrounds within three miles of the Garlock Alternative site. A few isolated structures within the town of Garlock and along Garlock Road and Redrock-Randsburg Road may be occupied.

Environmental Impacts

While the meteorological conditions and topography at the site differ from the RSPP proposed site, it is expected that the results of air dispersion modeling and a human health risk assessment for the Garlock Road Alternative site would be similar to that of the proposed site. The cancer risk and hazard indices are much below the level of significance at the point of maximum impact, so the project would be unlikely to pose a significant risk to public health at the Garlock Road Alternative site.

Public comments on the proposed RSPP project have expressed concerns about the potential for windblown dust from the project affecting nearby receptors. Valley fever (Coccidioidomycosis) is a fungal disease that occurs in southwestern US, northern Mexico and some places in Central and South America. The fungus that causes the disease (*Coccidioides immitis*) is normally soil-dwelling, unless the soil is disturbed, at which time the fungal spores become airborne and can infect a host if inhaled. The fungus only occurs in the top few inches of soil. Kern County has experienced more cases of Valley Fever and Valley Fever-related deaths than any other county in the United States (CHCF 1997). Dust storms, high winds and secondary dust creating activities like soil disturbing activities that occur on previous undisturbed soils (e.g.,

earth moving, earth tilling and OHV use) are all known causes of Valley Fever transmission. Both the RSPP project site and the Garlock Road Alternative site would require grading of the land. However, the Garlock Road site is already disturbed and there are few nearby receptors.

Comparison to Proposed Project

Given the proximity of sensitive receptors within a three mile radius of the RSPP site and the potential for winds to carry Valley Fever to receptors, public health and safety impacts would be reduced at the Garlock Road Alternative site.

Socioeconomics and Environmental Justice

Environmental Setting

Like the proposed RSPP site, the Garlock Road Alternative site is located in Kern County. The demographic characteristics of Kern County are described in the **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE** section of the SA/DPA/DEIS.

Environmental Impacts

Because of the limited population in the towns of Johannesburg, Randsburg and Cantil, construction workers would most likely be from larger nearby cities such as Ridgecrest and California City and locations beyond. Given the limited housing in the towns of Johannesburg/Randsburg and Cantil, workers could most likely commute to the Garlock Road site from Ridgecrest (27 miles north) and California City (26 miles south). An option would be to construct temporary housing in the immediate area of the Garlock Road Alternative site. However, temporary housing would encroach on BLM land, would increase construction impacts and would require provision of additional services such as electricity, water, waste removal, and food. Because it is unlikely that construction workers would relocate to the city of Johannesburg/Randsburg, the Garlock Road Alternative would not cause a significant adverse socioeconomic impact on the area's housing, schools, police, emergency services, hospitals, and utilities.

There would be no adverse socioeconomic impacts because most of the construction and operation workforce is within the regional labor market area, and construction activities would be short-term. Benefits from the 250 MW RSPP project, should it be built at the Garlock Road Alternative site, are likely to be similar to the benefits from the RSPP project in the Ridgecrest City region. These include increases in sales taxes, employment, and income for Kern County.

Comparison to Proposed Project

Constructing the 250 MW RSPP project at the RSPP site would result in fewer miles travelled by local workers commuting to the site, since the city of Ridgecrest is roughly five miles northeast of the proposed RSPP site. A longer commute would be expected for workers from California City. Overall, the socioeconomic impacts of the RSPP project at the Garlock Road Alternative site would be similar to building and operating the project at the proposed RSPP site.

Soil and Water Resources

Environmental Setting

The Garlock Road Alternative site is located within the Koehn sub-basin of the Fremont Valley Groundwater Basin. The Koehn sub-basin is bounded by the California City sub-basin to the southeast, the Chaffee sub-basin to the south and the Oak Creek sub-basin to the southwest (BS 2008a, Figure 5.17-1). The physical boundaries of the Koehn groundwater sub-basin include the Randsburg-Mojave Fault and Rand Mountains to the south; the El Paso Mountains to the north; the Sierra Nevada Mountains to the west; and the confluence of the El Paso and Rand Mountains to the northeast (Weir et al. 1965, Bloyd 1967, DWR 1968, Moyle *et.al.*1985, DWR 2003).

Large scale alfalfa farming began within the Koehn sub-basin in the mid-1950s and extended through the mid 1980s. During this time, groundwater pumping lowered the water table several hundred feet, which formed a large groundwater depression and caused land subsidence within the sub-basin. Due to the lowered groundwater elevation, pumping costs increased to a point that farming was no longer profitable and most farming operations ceased (BS 2008a). Depth to groundwater varies throughout the sub-basin and ranges from more than 300 feet deep away from Koehn Lake to as shallow as approximately 14 feet deep in the immediate vicinity of the lake.

Groundwater quality in the Koehn sub-basin also varies spatially in relationship to the lake. Beneath Koehn Lake, the Total Dissolved Solids (TDS) concentration of the groundwater is as high as 100,000 mg/L (Dockter 1979, DWR 2003); TDS concentrations at the upstream Garlock site would be slightly decreased. However, TDS levels have limited agricultural activities at the Garlock site.

It is highly unlikely that groundwater at the Garlock Road site would be suitable for domestic use, which requires a TDS level below 1000 mg/l, with a recommended limit below 500 mg/l (Cal. Code Regs., tit. 22, §§ 64431, 64449). When TDS levels are suitable for domestic use, the Energy Commission and the State Water Resources Control Board (SWRCB) require consideration of alternate water sources.

Soils in the Garlock Alternative site are primarily Rosamond, Gila, and Cajon. The Rosamond series consists of deep, well drained soils. The Gila series consists of very deep well drained soils. The Cajon series consists of very deep, somewhat excessively drained soils (Helix 2010).

The surrounding communities of Randsburg, Johannesburg and Red Mountain are served by the Rand Communities Water District (RCWD). As of 2004, the District provided service to approximately 280 residents in Kern and San Bernardino Counties. The District operates one primary well, one secondary well, and three booster stations (Kern County 2004).

The northwestern portion of the Garlock Road Alternative site falls within a flood zone designated by the Federal Emergency Management Agency DFIRM (Digital Flood Insurance Rate Map); parcels 154-131-09 and 154-150-06 are affected (Kern County 2010). Use of these parcels would likely require engineering measures to reduce the

risk of flooding. In addition, both Garlock Road and Redrock-Randsburg Road are subject to flooding, and closures may affect site access.

Environmental Impacts

Soil Erosion Potential by Wind and Water

As discussed in the **SOILS AND WATER** section of this SA/DPA/DEIS, construction activities can lead to adverse impacts to soil resources including increased soil erosion, soil compaction, loss of soil productivity, and disturbance of soils crucial for supporting vegetation and water-dependent habitats. Activities that expose and disturb the soil leave soil particles vulnerable to detachment by wind and water. Soil erosion results in the loss of topsoil and increased sediment loading to nearby receiving waters. Although primary access to the site would be from existing roads, construction of the solar trough array at the Garlock Road site would require construction of new local access roads. The volume of earth movement required at the Garlock Road Alternative site is expected to be less since the site is relatively flat and was previously graded for agricultural uses.

The Garlock Road Alternative site is crossed by desert washes as is the proposed RSPP site, and could have erosion-related impacts from placement of solar trough arrays within and adjacent to drainage ways. Engineering controls would likely be required to reduce flooding potential. Soil erosion impacts would be relatively minor and likely mitigated by the Storm Water Pollution Prevention Plan (SWPPP), and Drainage Erosion and Sediment Control Plan (DESCP) that would be required. Due to the flat terrain and existing disturbed condition of this site, the SWPPP and DESCP would likely be sufficient to mitigate soil erosion impacts to a level less than significant.

Water Supply

The specific source of water supply for the project is unknown. The groundwater basin in the area has lowered over time and is not expected to support a 250 MW solar facility at the Garlock Road site without extensive pretreatment requirements if water were even available to a project at the site. California City and the Rosamond Community Services District have both proposed supplying recycled tertiary-treated water for the Beacon Solar Energy Project (BSEP), located near the community of Cantil just southwest of Koehn Dry Lake. If these recycled water supplies are developed, they could be also considered for the Garlock Road Site. Pipelines (perhaps in conjunction with those used for the BSEP) would be required to transport water from the wastewater treatment facilities to the site. Approximate pipeline distances would be 26 miles from California City and 48 miles from Rosamond. A water line extension from the BESP facility would be approximately 12 miles long.

Wastewater/Storm Water Quality

Storm water runoff from the site during construction and operation could have similar impacts as identified for the RSPP project. Site construction would require a SWPPP which would specify Best Management Practices (BMPs) to minimize or eliminate water contamination. Water quality impacts would likely not be significant.

Sanitary waste disposal could be through existing wastewater infrastructure if already on site, or through trucking and disposal at an approved offsite location. No adverse impact is anticipated.

Comparison to Proposed Project

The RSPP project proposes to use dry-cooling that would use approximately 150 acre-feet of groundwater per year. If the RSPP project were built at the Garlock Road Alternative site, it is anticipated that dry cooling would also be used and groundwater consumption would be similar.

Although onsite wells exist at the Garlock Road Alternative site, the TDS levels that occur in the groundwater under Koehn Lake, the historic agriculture operations onsite and historic gold mining operations that occurred in the immediate vicinity, it is likely that the well water would require extensive treatment to reach potable standards. Use of reclaimed water from either California City (26 miles) or the Rosamond Community Services District (48 miles) may be required for project operation. The proposed RSPP would install a 16.3 mile water pipeline to convey groundwater water to the site; this water would be supplied by the Indian Wells Valley Water District. Use of water from the Indian Wells Valley Water District would cause greater long-term impacts to water supply. The RSPP project would require engineered drainage channels to convey and redirect storm water as would a project at the Garlock Road Alternative site. Overall, impacts to soil and water resources at the Garlock Road Alternative site are expected to be slightly less than at the RSPP site.

Traffic and Transportation

Environmental Setting

The Garlock Road alternative site is just south of the intersection of Garlock Road and Redrock-Randsburg Road. The Redrock-Randsburg Road connects SR14 (by Cantil) to SR 395 (just north of Johannesburg). Garlock Road connects to Highway 395 just east of Rand (approximately four miles north of Johannesburg). Redrock-Randsburg and Garlock Roads are both two-lane paved roads with at-grade, stop sign controlled intersections with SRs 14 (4 lanes, undivided) and 395 (two lanes). At the intersection with Redrock-Randsburg Road, SR 395 has a northbound left turn lane and southbound right turn lane. There are no turn lanes on SR 395 at its intersection with Garlock Road or on Highway 14 at its intersection with Redrock-Randsburg Road. Garlock Road and Redrock-Randsburg Road are considered part of the northern truck route for California City (California City 2009).

Kern County's annual traffic counts (from 2005 to 2007) averaged 783 on Garlock Road north of Redrock-Randsburg Road, 1,023 on Garlock Road south of its intersection with SRs 395, and 157 on Redrock Randsburg Road east of Garlock Road (Kern County 2010a).

Transportation facilities serving the Garlock area would be similar to the proposed site. Inyokern Airport, just west of Ridgecrest, provides the nearest commercial airport service. Other airports in the region include California City Municipal Airport, Trona Airport, Mojave Air and Space Port, Edwards Air Force Base, and China Lake NAWS.

Kern Regional Transit's Mojave Ridgecrest Express offers limited Monday-Wednesday-Friday bus service between Mojave, California City, Inyokern, and Ridgecrest and between Inyokern, Mojave, and Lancaster. There is no bus service to the Garlock site. Union Pacific Railroad's Lone Pine Branch (from Mojave to Trona) passes by the site; it is unclear whether the tracks are operable. The nearest railroad siding for offloading materials or equipment is located in Mojave, 35 miles to the southwest.

Ridgecrest would likely be the largest source or workers employed to construct the project at this alternative site; workers would commute approximately 24 miles south on SR 395 and west on Garlock Road to reach the site. The construction workforce would also be drawn from the regional area, including Barstow (90 miles), Boron (53 miles), California City (26 miles), Mojave (35 miles), and Tehachapi (49 miles).

Rough unpaved roads, including Arciero-Randsburg Ranch Road, access the site; upgrades would l be required.

Environmental Impacts

During the 28 month construction period, up to 633 workers per day would commute to the site. If all workers commuted in automobiles with only one occupant per vehicle, there could be a peak of 1,266 one-way worker commute trips per day. Construction would also generate approximately 100 one-way truck trips per day, with a peak of 140 one-way truck trips during foundation construction (month 8). The applicant estimates a total operation phase workforce of 84 workers. Peak hour weekday traffic would be less than 60 vehicles even if every employee commutes alone in their own vehicle (SM 2009a p. 5.13-13 to 5.13-15). Construction traffic would likely impact traffic conditions at the intersections of Highway 14 and Highway 395. No turning lanes currently exist at Highway 395 and road improvements may be necessary. Increased vehicle traffic on Garlock Road and Redrock-Randsburg Road would occur. The potential flooding of these two roads could impact the ability of truck and passenger vehicles to access the Garlock Road site.

Similar to the proposed project, there is the potential for highly distracting diffuse glare from the project to affect nearby motorists.

Comparison to Proposed Project

Impacts to traffic and transportation at the Garlock Road Alternative site would likely be similar to those at the proposed RSPP site. Construction of the Garlock Road Alternative site would likely require improvements at the Garlock Road/Redrock-Ransburg intersection and at SR 395 while the RSPP site would require improvements to SR 395.

Transmission Line Safety and Nuisance

Environmental Setting

The Garlock Road Alternative site would require approximately eight miles of a new 230 kV transmission interconnection, compared to approximately 2.5 miles of new (0.75 mile) and rerouted (1.7 mile) transmission lines at the proposed RSPP project site. An existing 230 kV SCE transmission line is located six miles east of the Garlock Road

Alternative site; however utilizing this path would cause the transmission line to be located entirely on BLM land and on sensitive land (Fremont-Kramer DWMA, RMMA, Mohave Ground Squirrel Conservation Area and Western Rand Mountain ACEC). Instead the transmission interconnection to SCE's Kramer-Inyokern 230-kV transmission line would follow Garlock Road to the east on the south side of the road and interconnect to the existing line at its point of crossing with Garlock Road; additional private party and BLM parcel crossings would be required. A CDCA Plan amendment from BLM and easement acquisition from private land owners would be required.

Environmental Impacts

Similar to the proposed project, this alternative would be unlikely to cause transmission line safety hazards or nuisances with implementation of conditions of certification such as those described in the **TRANSMISSION LINE SAFETY AND NUISANCE** section of the SA/DPA/DEIS. The potential for nuisance shocks would be minimized through grounding and other field-reducing measures that would be implemented in keeping with current standard industry practices, and the potential for hazardous shocks would be minimized through compliance with the height and clearance requirements of CPUC's General Order 95. Compliance with Title 14, California Code of Regulations, Section 1250, would minimize fire hazards, while the use of low-corona line design, together with appropriate corona-minimizing construction practices, would minimize the potential for corona noise and its related interference with radio-frequency communication in the area around the route.

The public health effects of any related field exposures cannot be characterized with certainty. The only conclusion to be reached with certainty is that the proposed lines' design and operational plan would be adequate to ensure that the generated electric and magnetic fields are managed to an extent the CPUC considers appropriate.

Comparison to Proposed Project

The Garlock Road Alternative site would require a longer transmission line interconnection to the SCE transmission system, a CDCA Plan amendment and private land easement acquisition. The electric and magnetic fields would be managed to an extent the CPUC considers appropriate and only a limited number of structures/potential residences are located along the transmission line route. Because of the greater distance and the need for new transmission line structures, the potential impact associated with transmission lines would be greater for the Garlock Road Alternative than for the proposed site.

Visual Resources

Environmental Setting

The Fremont Valley is a flat, low-lying desert area surrounded by the mountains to the west, east and north. The Red Rock Canyon State Park is located west of the site where the southernmost tip of the Sierra Nevada converges with the El Paso Range. The park encompasses 16,600 acres of scenic desert cliffs, buttes and rock formations. Miles of public trails wind through the park. SR 14, a four-lane highway, is the major transportation system within the Fremont Valley. SR 14 is not listed as a scenic highway by the California Department of Transportation (Caltrans).

Much of the Garlock Road Alternative site is currently vacant farmland and some farm-related auxiliary structures. The nearest known population centers (Johannesburg and Randsburg) are roughly nine miles east of the Garlock site. The town of Garlock is less than two miles north of the proposed site, but is considered a ghost town. There are isolated structures on the site, as well as in and around the town of Garlock, but it is unclear if they are occupied. Viewer concern of the project should it be developed at the Garlock Road Alternative site would be moderate. The number of residential viewers represented in this view is low.

Environmental Impacts

For the Garlock Road Alternative site, a visual impact analysis would be based on a comparison of the area's visual sensitivity with the industrial features added by the solar project. With the addition of a 250 MW project, views of the rural landscape would be increasingly industrial. Views would be dominated by roughly three square miles of mirror-arrays, graded areas, as well as light rays reflected off ambient atmospheric dust. There would be no natural features to block the view of the solar facilities on any side of the site.

The site would be prominently visible from Garlock Road and Redrock-Randsburg Road, for both northbound and southbound traffic. Travelers would see the site from a distance and there is little elevation or natural contouring that would block the solar facilities on the alternative site.

As previously mentioned, there are parks and recreation areas in the immediate vicinity. Should the Garlock Road site be developed, visitors to these destinations could experience an unsatisfying visual experience given the industrial nature of a solar thermal facility. With minimal surrounding development, a project at this site would develop an otherwise vacant desert landscape. Redrock-Randsburg Road is slightly elevated above the site, and a solar thermal facility would likely be visible to motorists traveling in both directions. It could also be visible to users of designated offroad routes in the BLM Rand Mountains Fremont Valley Management Area.

The linear facilities associated with the Garlock Road Alternative site would include a 230-kV transmission line approximately eight miles long. The transmission interconnection to SCE's Kramer-Inyoken 230-kV transmission line would be visible to viewers along Redrock-Randsburg road and Garlock Road, in addition to the RMMA and Western Rand Mountains ACEC. There are also a number of offroad trails in the El Paso Mountains including Last Chance Canyon, Mesquite Canyon, and Goler Canyon. There is the potential for the site to be visible from the southeast portion of the Red Rock Canyon State Park

Comparison to Proposed Project

Fewer viewers would see a solar facility at the Garlock Road Alternative site and a solar facility at this location would not impact viewsheds associated with historic tribal activities, as would a solar facility at the proposed RSPP site. Additionally, the RSPP site has four sensitive subgroups within a three-mile radius with the nearest residential receptor located approximately 3,200 feet west of the northwestern boundary of the

Northern solar field. As a result, a large solar project on the RSPP area would create a more dramatic change to the visual environment than would occur at the Garlock Road Alternative site.

The interconnection transmission line at the Garlock Road Alternative site would be longer than at the proposed RSPP site but would be located in an already disturbed area (Redrock-Randsburg Road and Garlock Road right of way) to the greatest extent feasible,. However, given the lines proximity to the RMMA ACEC, the visual impact of the transmission line would be greater at the Garlock Road Alternative site. Overall, visual impacts would be expected at both sites.

Waste Management

Environmental Setting

As discussed in the **WASTE MANAGEMENT** section of this SA/DPA/DEIS, the 28-month construction period would generate 8,500 cubic yards (non-hazardous) and 31,000 cubic yards (hazardous) of solid and liquid wastes, including wastewater. Operation of the solar facility would generate 31,000 cubic yards or more of non-hazardous wastes over a 30-year operating lifetime. Up to 790 cubic yards of non-recyclable hazardous waste would be generated over the 30-year operating lifetime; however a portion of this quantity could be recovered (oil absorbent and oil filters) or treated (HTF contaminated soil) and not require landfill disposal. Waste would be recycled where practical and nonrecyclable waste would be deposited in a Class III landfill.

Similar waste quantities would be expected from construction and operation of a solar facility at the Garlock Road Alternative site. However, the presence of unexploded ordnance (UXO) would not be expected at the Garlock Road site in contrast to the RSPP site, where proximity to military operations has resulted in observed UXO at the site.

Seven Class III waste disposal facilities in Kern County could potentially accommodate the non-hazardous construction and operation wastes generated by the proposed project. Their combined remaining capacity is over 66.6 million cubic yards (SM 2009a page 5.16-9). Project operations would generate hazardous wastes including: used hydraulic fluid, oils, and grease associated with the HTF system, turbine, and other hydraulic equipment; effluent from the oily water separation system resulting from plant wash down; oil adsorbent and oil filters; spent carbon from air pollution control of the HTF vent; soil contaminated with HTF as a result of solar array equipment leaks; and spent lead acid batteries. The two Class I landfills that accept hazardous wastes in California are the Clean Harbor Landfill (Buttonwillow) in Kern County and the Chemical Waste Management Landfill (Kettleman Hills) in Kings County (SM 2009a). The Kettleman Hills facility also accepts Class II and Class III wastes. In total, there is a combined excess of 10 million cubic yards of remaining hazardous waste disposal capacity at these landfills, with at least 30 years remaining in their operating lifetimes (SM 2009a, page 5.16-10).

Environmental Impacts

Both nonhazardous and hazardous wastes would be created by the construction of the 250 MW RSPP project at the Garlock Road Alternative site in similar quantities as at the proposed site and would be disposed of at appropriate facilities. The applicant would be required to obtain a unique hazardous waste generator identification number for the site prior to starting construction and would be required to comply with conditions of certification similar to those identified for the proposed site.

All construction and operation activities would need to be conducted in compliance with regulations pertaining to the appropriate management of wastes. The total amount of nonhazardous waste generated from the RSPP is estimated to be 70 cubic yards of solid waste per week from construction, and approximately 20 cubic yards per week from operation. The disposal of the solid wastes generated by a solar facility at the Garlock Road Alternative site can occur without significantly impacting the capacity or remaining life of Kern County disposal facilities.

Like nonhazardous wastes, hazardous wastes would be recycled to the extent possible. The 2 cubic yards per week of construction hazardous waste and the 0.5 cubic yards of operation hazardous waste requiring off-site disposal would not impact the capacity or remaining life of the Class I waste facilities. Similar to the proposed RSPP, a project at the Garlock Road Alternative site would need to implement a comprehensive program to manage hazardous wastes and obtain a hazardous waste generator identification number (required by law for any generator of hazardous wastes).

Comparison to Proposed Project

The environmental impacts of waste disposal at the Garlock Road Alternative site would be similar to those at the proposed RSPP site. However, the Garlock Road Alternative site would not require investigation and removal of UXO.

Worker Safety and Fire Protection

Environmental Setting

The Garlock Road Alternative site would be located within an area that is primarily fallow agricultural land. The area is currently served by the Kern County Fire Department. Station 75 is approximately 10 miles east of the Garlock Road site, in the town of Randsburg. Mutual aid service for police and fire emergencies is available from California City Fire Department and Edwards Air Force Base. The **WORKER SAFETY AND FIRE PROTECTION** section in this SA/DPA/DEIS provides more information regarding the Kern County Fire Department. The fire risks of this alternative site would be similar to those of the proposed RSPP site as both have desert conditions.

Environmental Impacts

A solar plant at the Garlock Road Alternative site would require a Project Demolition and Construction Injury and Illness Prevention Program and a Project Operations Safety and Health Program in order to ensure adequate levels of industrial safety. The applicant would also be required to provide safety and health programs for project construction, operation, and maintenance, similar to the requirements for the proposed project site. The Kern County Fire Department would be contacted to assure that the

level of staffing, equipment, and response time for fire services and emergency medical services are adequate. A UXO training program would not be required at the Garlock Road Alternative site.

Comparison to Proposed Project

The environmental impact of worker safety and fire protection at the Garlock Road Alternative site would be similar to that at the proposed RSPP site, with the exception of the reduced risk from no UXO expected at the site.

Engineering Assessment for Garlock Road Alternative

Facility Design

The design of a 250 MW project at the Garlock Road Alternative would be similar to that of RSPP project at the proposed RSPP site. The facility design analysis encompasses the civil, structural, mechanical and electrical engineering design of a project. It is assumed that each renewable technology would abide by the required LORS for that facility and would comply with the California Building Standards Code.

Geology, Paleontology and Minerals

Environmental Setting

The Garlock Road Alternative site lies within the geological active area of the northwestern Mojave Desert Geomorphic Province. There are two fault trends that control topography in this province, the NW-SE trend (San Andreas Fault) and a secondary east-west trend (Garlock Fault). The Garlock Fault has been active throughout the Quaternary period (USGS 2006). The Garlock Road Alternative site is located in the Fremont Valley near the northwest boundary of the Mojave Desert Geomorphic Province where it terminates against the Garlock Fault. Historic groundwater extraction in the Fremont Valley has caused subsidence and/or dilation due to pull-apart faulting between the western and central strands of the Garlock Fault and has resulted in formation of localized tension cracks and surface fissuring along stress planes parallel to the Garlock Fault system.

There are historic salt, borax, bentonite, copper and gold mines within the Garlock Road Alternative site vicinity (USGS 2010). It is unknown if important paleontological resources exist at the Garlock site; however, previous agricultural activities at the site would have reduced such potential.

Environmental Impacts

Seismic ground shaking and fissuring due to subsidence is probable at the Garlock Road site given its location near the Garlock Fault and represent the primary geologic hazards at the site. As such, design criteria would be required in accordance with a design-level geotechnical report and California Building Code (2007) standards. Adequate design parameters for the facility would need to be determined through a site-specific evaluation by a Certified Engineering Geologist or Geotechnical Engineer. Impacts due to seismic hazards and soil conditions, such as subsidence, would be addressed by compliance with the requirements and design standards of the California Building Code. The potential for liquefaction in this area is low due to anticipated depths

of groundwater; however, the water table may rise temporarily and sections of the Garlock Road Alternative site are adjacent to active river washes. As such the alternative site may be moderately susceptible to liquefaction if a strong earthquake occurs when valley floor sediments are saturated.

Comparison to Proposed Project

Similar to the proposed RSPP site, construction at the Garlock Road Alternative site would include grading, foundation excavation and utility trenching and the potential to expose paleontological resources would increase with the depth of excavations. As with the RSPP site, the proposed conditions of certification are designed to mitigate any paleontological resource impacts to a less-than-significant level. The applicant would follow all applicable building codes and standard practices for power plant construction as required by the CEC including: Title 24, California Code of Regulations, which adopts the current edition of the CBC as minimum legal building standards; the 2001 California Building Code (CBC) for design of structures; the 1996 Structural Engineers Association of California's Recommended Lateral Force Requirements, for seismic design; ASME-American Society of Mechanical Engineers Boiler and Pressure Vessel Code, and the NEMA-National Electrical Manufacturers Association.

The paleontological sensitivity and potential to encounter significant paleontological resources at this alternative site would be lower in comparison to the RSPP site. Numerous vertebrate fossil localities have been documented in the RSPP region. The Garlock Road Alternative site is subject to a greater risk of geologic hazards as compared to the proposed RSPP site. Strong ground shaking would be effectively mitigated through facility design. The conditions of certification provided in the **GEOLOGY, PALEONTOLOGY AND MINERALS** section would be applicable to the Garlock Road Alternative site. Impacts are considered to be somewhat greater at the Garlock Road Alternative site.

Power Plant Efficiency

The parabolic trough technology that would be employed at the Garlock Road Alternative would be similar to the proposed RSPP project although the plant configuration may be altered. A project at either location would decrease reliance on fossil fuel, and would increase reliance on renewable energy resources. They would not create significant adverse effects on fossil fuel energy supplies or resources, would not require additional sources of energy supply, and would not consume fossil fuel energy in a wasteful of inefficient manner.

Power Plant Reliability

A solar facility at the Garlock Road Alternative site would be generally similar to the RSPP site in terms of plant maintainability, fuel and water availability, and reliability of the plant in relation to natural hazards as compared to the proposed RSPP project. However, the nearby presence of the Garlock Fault and the increased potential for flooding at the Garlock Road Alternative site suggest that it would have greater impacts to power plant reliability as compared to the RSPP site.

Transmission System Engineering

Locating a solar facility at the Garlock Road Alternative site would require longer connector lines than at the proposed RSPP site but would interconnect with the same transmission line. The Garlock Road site would not require the relocation of the two existing SCE lines at the RSPP site. Overall, the transmission system evaluation for the Garlock Road Alternative site would be similar to that at the RSPP site.

Summary of Impacts – Garlock Road Alternative Site

The Garlock Road Alternative site would have impacts similar to the proposed RSPP site for 8 of the 20 environmental and engineering disciplines discussed above: air quality, hazardous materials, socioeconomics, traffic and transportation, visual, waste management, worker safety and fire protection, facility design, and transmission system engineering.

The RSPP site is preferred over the Garlock Alternative site in four disciplines: geology, paleontology and minerals; transmission line safety and nuisance; power plant efficiency; and power plant reliability. The Garlock Road Alternative site would require a longer transmission interconnection that would be adjacent to the RMMA ACEC and would require a CDCA Plan Amendment in addition to easement acquisition where the transmission line would cross private land.

The Garlock Road Alternative site is preferred over the proposed RSPP site for seven disciplines: biology, cultural resources, land use, recreation, noise and vibration, public health and safety, and soils and water. Impacts to biological and cultural resources are anticipated to be reduced at the Garlock Road Alternative site compared to the RSPP site because the Garlock Road Alternative site would be located on disturbed land. This would lessen the amount of sensitive species habitat that would be lost due to the construction of the project and would potentially lessen impacts to cultural resources.

The Garlock Road Alternative Site is comprised of approximately 11 parcels with 6 private land owners. The largest quantity of land, 6 parcels encompassing 1,523 acres, is owned by one land owner who has indicated that this land may be available for sale, increasing the feasibility of acquiring the Garlock Road site as a potential solar facility. However, known flooding at the site may reduce the feasibility of a solar project at this location.

B.2.7.3 SOLAR PHOTOVOLTAIC TECHNOLOGY – UTILITY SCALE ONSITE ALTERNATIVE

A utility scale solar photovoltaic (PV) power generation facility would consist of PV panels that would absorb solar radiation and convert it directly to electricity. The definition of a utility scale photovoltaic projects varies; for this analysis utility scale project would consist of any solar photovoltaic facilities that would require transmission to reach the load center, or center of use.

PV facilities have been suggested using two general technologies:

- Thin film installed on fixed metal racks, as proposed by OptiSolar, Inc. (see **Alternatives Figure 5**

- Concentrating photovoltaics installed in elevated groups of panels that track the sun. These technologies are available from companies such as SunPower and Amonix. SunPower's PowerTracker technology consists of a single-axis mechanism that rotates the PV panels to follow the sunlight. The Amonix technology allows tracking on two axes. See **Alternatives Figure 5**.

Examples of existing utility scale PV facilities are:

- El Dorado Energy (Boulder City, NV): First Solar built a 10 MW facility using thin film technology for Sempra Energy demonstrating the commercial viability of its technology. The facility consists of over 167,000 solar modules on 80 acres of land and was completed in December 2008 (Sempra 2008). Additionally, Sempra Generation will begin expanding the facility by 48 MW in January 2010. All 58 MWs would be purchased by PG&E (Sempra 2009).
- NRG Solar (Blythe, CA): NRG Solar acquired a 21 MW thin film (First Solar) PV project in Blythe, CA. Commercial operation of the facility began in December 2009 and the electricity generated by the project is being sold to SCE under a 20 year power purchase agreement (NRG 2009).

Because PV technologies vary, the acreage required per MW of electricity produced from a large solar PV power plant is wide ranging and likely to change as technology continues to develop. The land requirement varies from approximately three acres per MW of capacity for crystalline silicon to more than 10 acres per MW for thin film and tracking technologies (NRDC 2008b). Therefore, a nominal 250 MW solar PV power plant would require between 750 and 2,500 acres.

PV installation varies in its grading and ground disturbance requirements; however all technologies require some ground disturbance activities for associated buildings, access roads and transmission line interconnections. The Solargen Energy Panoche Valley Solar Farm is a proposed 1,000 MW solar PV facility located on 10,000 acres in eastern San Benito County. The solar farm would employ crystalline silicon PV technology and require grading only for access roads, the operation and maintenance facility and the site's substation (Solargen 2009). The SunPower California-Valley Solar Ranch proposed 250 MV PV facility located in San Louis Obispo County using Power Tracker technology would cause ground disturbance on 1,920 acres of the proposed 1,965 acre site (SLO 2009). First Solar Desert Sunlight Solar Farm proposed 550 MW project located in Riverside County would employ thin film PV technology and would require grading of approximately 4,103 acres of the proposed 4,410 acre site. First Solar cited reasons such as needing to create a level, compact ground floor that drains properly as sheet flow across the site (First Solar 2009). First Solar PV structures are five feet in height, while Power Tracker and crystalline silicon PV structures range from 15 to 20 feet in height.

Utility-scale solar PV installations require land with less than 3% slope. Solar PV facilities do not require water for electricity generation. Because some water is required to wash the solar panels to maintain efficiency, approximately 2-10 AFY of water is estimated to be required for a 100 MW utility solar PV installation or 5 to 25 AFY for a 250 MW installation (NRDC 2008b). The SunPower-CA Valley Solar Ranch states that the facility would use approximately 11.6 AFY for a 250 MW PV facility (SLO 2009).

Depending on the technology, solar PV arrays and inverters could range from 5 (First Solar thin film) to 15 feet (Power Tracker) high; however, some components of the solar PV facility, such as collector power lines or a transmission interconnection may be substantially taller (SLO 2009).

As with any large solar facility, additional operational components may be required. The SunPower-California Valley Solar Ranch would require operational components such as electrical equipment, collector power lines, access roads, a substation, an operation and maintenance building, and water tanks (SLO 2009).

The Environmental Setting for the Solar PV Technology - Utility Scale Alternative at the proposed site would be the same for each technical area found in the corresponding technical sections of this SA/DPA/DEIS.

Environmental and Engineering Assessment of the Photovoltaic Technology – Utility Scale Alternative at the Proposed Site

Air Quality

Environmental Impacts

Air quality impacts would principally consist of exhaust emissions from on-site, off-road and gasoline-powered construction equipment (*e.g.,* ozone precursors, NOx and VOC; other criteria pollutants, such as CO and PM10; and toxic diesel particulate matter emissions) and fugitive particulate matter (dust) from travel on unpaved surfaces. Depending on the PV technology employed, the amount of grading and soil disturbing activities carried out would contribute to air quality impacts in the form of fugitive dust.

Exhaust emissions would be caused by workers commuting to and from the work sites, from trucks hauling equipment and supplies to the sites, and crew trucks. Exhaust emissions from heavy-duty diesel and gasoline-powered construction equipment and fugitive particulate matter (dust) would be essentially the same for PV utility-scale technology as for solar thermal facilities. Workers would likely come from the Ridgecrest area, roughly five miles northeast of the proposed site, and other regional locations. The project would likely be required to implement fugitive dust control measures to reduce emissions of particulate matter during construction and operation. Emissions released during operation of the solar PV facility would be limited to worker vehicles

Valley fever (Coccidioidomycosis) is a fungal disease that occurs in southwestern US, northern Mexico and some places in Central and South America. The fungus that causes the disease (*Coccidioides immitis*) is normally soil-dwelling, unless the soil is disturbed, at which time the fungal spores become airborne and can infect a host if inhaled. The fungus only occurs in the top few inches of soil. Kern County has experienced more cases of Valley Fever and Valley Fever related deaths than any other county in the United States (CHCF 1997). Dust storms, high winds and secondary dust creating activities like soil disturbing activities such as; earth moving (construction), earth tilling (agriculture), recreation (off road vehicles) that occur on previous undisturbed soils, are all known causes of Valley Fever transmission (KCHD 1995). Concerns about Valley Fever were identified in several Scoping comments for the RSPP project.

Comparison to Proposed Project

Both a solar parabolic trough and a solar PV installation at the proposed RSPP site would introduce soil disturbing activities in the form of grading, and would be required to adhere to Kern County's Zoning and Grading Ordinances (Kern 2007). However, parabolic trough technology requires grading of the entire disturbed area (1,944 acres), where as some PV technologies require only minimal grading for access roads, transmission line interconnection and ancillary facilities (e.g., maintenance buildings). Air emissions from operation of the solar thermal parabolic trough technology result from project facilities (e.g., auxiliary broiler, generator engines, auxiliary cooling tower, HTF heater and HTF ullage system). Solar PV emissions during operation would result only from worker vehicles. The air quality impacts would be greater for the proposed parabolic trough technology, given the large grading requirements and pollutants released during operation of the facility.

Biological Resources

Environmental Impacts

Development and installation of solar PV at the proposed project site could have adverse impacts to vegetation and wildlife from construction of access roads, transmission lines and any needed ancillary facilities (e.g., substation, water tank and a maintenance building). PV technologies do require level ground; however, the RSPP site has an average 2% slope throughout the site, and PV arrays can be located on areas of the site that are level and would not require grading. PV facilities can require more acreage per MW of power output. Construction of a PV project would cause both temporary (during construction from vegetation clearing) and permanent (displacement of vegetation with project features) impacts to vegetation and wildlife habitat. Construction activities may also result in the alteration of soil conditions, including the loss of native seed banks and changes in topography and drainage, such that the ability of a site to support native vegetation after construction is impaired. Desert ecosystems are especially sensitive to ground disturbance and can take decades to recover, if at all. PV facilities could require security fencing; however some projects have proposed fencing that leaves 12 inch spacing from the ground to allow wildlife to enter into the solar array areas to aid in wildlife movement (SLO 2009).

The introduction of elevated structures can create increased perching opportunities for predatory birds causing increased impacts to sensitive prey (i.e. desert tortoise, Mohave ground squirrel). Shaded areas would result on the ground from PV arrays and non-native plants could proliferate in these areas, resulting in habitat alteration. First Solar predicts that 72% of the 4,410 acres of the proposed Desert Sunlight Solar Farm site would be covered or shaded by the above ground solar modules (First Solar 2009).

Comparison to Proposed Project

As with the RSPP project, construction and operation would result in ground disturbance (possibly slightly more if additional land is required) and loss of vegetation and wildlife habitat. However, depending on the PV technology employed and associated grading requirements at the RSPP site, impacts to biological resources could be less than the RSPP project. Solargen Energy Panoche Valley Solar Farm (2009), for example, would not require grading of the entire site and would allow the

existing land use, dry grazing of sheep, to continue to occur under the 15 foot solar arrays. Solar PV arrays can be sited in irregular shapes versus parabolic troughs which require continuous land; thus PV arrays can be arranged to avoid sensitive habitat or desert washes. Solar PV technologies that do not require mass ground disturbing activities could be employed at the RSPP site and impacts to biological resources would be reduced in comparison to the proposed RSPP site.

Cultural Resources

Environmental Impacts

Known archaeological, architectural, or historical sites would potentially be affected by construction and operation of a solar PV facility. The eastern portion of the Last Chance Canyon Archeological District, which is listed on the National Register of Historic Places (NRHP), currently covers approximately one-third of the western portion of the project site. The possibility for unanticipated archeological and/or historical resources would be discovered during construction.

Comparison to Proposed Project

While the implementation of solar PV facilities at the RSPP site would result in ground disturbance and could impact known and unknown cultural resources, the facilities could be sited around known sensitive cultural resources. As such, it is likely that the solar PV facilities would create fewer impacts to cultural resources compared with the RSPP project.

Hazardous Materials

Environmental Impacts

Construction activities would require the transport, storage and use of hazardous materials for fuel and servicing of construction equipment. Soil or groundwater contamination could result from accidental spill or release of hazardous materials at the PV facility during construction activities of the power plant. This could result in exposure of the facility, maintenance workers, and the public to hazardous materials; and could result in contamination to soil and/or groundwater.

Solar PV facilities do not require hazardous materials during operation, aside from mobile sources.

Comparison to Proposed Project

The proposed solar thermal facility would require the use of the following hazardous materials. Therminol VP-1(heat transfer fluid), propane, diesel fuel, mineral insulating oil, and lube oil, among others. A solar PV facility located at the proposed RSPP site would require diesel fuel for mobile source use during construction and operation activities. The parabolic trough technology would require the use of a larger number of hazardous materials and while conditions of certification would reduce impacts, spills of HTF would be inevitable. Therefore impacts from hazardous materials would be greater for the parabolic trough technology.

Land Use

Environmental Impacts

Solar PV facilities would require more land to generate 250 MW than the proposed parabolic trough technology for the RSPP project. The amount of ground disturbance for a solar PV facility varies and depends on the PV technology used. Impacts to land use depend on the existing use of the land. For example, BLM lands within the RSPP project area are classified as 'Multiple Use Class Limited', with the remaining land unclassified. Both designations allow for solar development (SM 2009a). No sensitive land uses would be traversed by or adjacent to the RSPP site. However, the proposed RSPP site is used by off-highway vehicles and a solar facility using either parabolic trough arrays or PV panels would potentially create impacts to recreation (see the discussion of **Recreation and Wilderness** below).

Comparison to Proposed Project

Impacts to land use from a solar PV facility would be similar to land use impacts from the proposed RSPP project. Similar to the proposed project, a solar PV project on the RSPP site would require a CDCA Plan Amendment, in addition to a BLM ROW Grant. Considering the minimal amount of water needed for operation of a PV facility, installation of a water pipeline would be unlikely. Water needed for construction and operation would likely be trucked in and stored onsite.

Recreation and Wilderness

Environmental Impacts

The construction of solar arrays, staging areas, switch yards, transmission lines, and roads for solar PV facilities would reduce the amount of land available to recreationists for hiking, wildlife viewing, camping, and OHV use. Solar PV development in the area would eliminate the opportunities for OHV vehicles to access certain areas of the RSPP site during construction of operation of the solar PV facility.
Views of equipment or the addition or change of industrial structures such as pipelines, power lines, and power production facilities conflict with the natural background of recreational resources in the desert and could also diminish users' recreational experiences on lands that remain open for recreation.

Comparison to Proposed Project

As with the RSPP facility, a solar PV facility constructed on Federal land could disrupt the use of recreation and wilderness lands.

Noise and Vibration

Environmental Impacts

Construction of a solar PV facility at the RSPP site would result in elevated ambient noise levels. Construction activities, especially the use of heavy equipment for construction and grading of access roads, would be the greatest contributor to elevated noise levels. As stated above, depending on the PV technology used at the site, grading may only be necessary for the access roads and for the construction of a substation or

any operation and maintenance (O&M) facilities. The most common source of noise disturbance would come from the substation as a result of cooling fans and the resonance from vibrations of the transformer core (Solargen 2009). These noise disturbances activities would be contained within an enclosed structure onsite.

Comparison to Proposed Project

Both a solar PV facility and the RSPP facility would require use of heavy equipment which would create construction noise. Nearby sensitive receptors would experience elevated noise impacts during construction. The RSPP project would use dry cooling during operation of the project. Increased daytime noise levels are estimated to attenuate over 6,300 feet to approximately 42 decibels (SM 2009a). The nearest residential receptor at the RSPP site is 3,200 feet east of the northern solar field. Operation of the proposed RSPP project would have greater noise impacts than operation of a solar PV facility at the site.

Public Health and Safety

Environmental Impacts

The primary materials contained within the PV arrays include glass, steal and several semiconductor materials. First Solar utilizes thin film cadmium telluride (CdTe) as a semiconductor material in its PV technology. Cadmuim telluride is a stable compound of cadmium (Cd) and tellurium (Te). Cadmium by itself is a human carcinogen, produced primarily as a byproduct of zinc refining. It is compounded with Te, a byproduct of copper refining, to form the stable compound CdTe. CdTe can be recycled for use in new solar modules. A very thin layer of CdTe is encapsulated between two protective sheets of glass; therefore the risk of exposure is negligible. Furthermore, the French Ministry of Ecological, Energy, Sustainable Development, and the Sea, conducted an assessment of the environmental, health and safety aspects of First Solar's CdTe PV systems. The study concluded that there are no cadmium emissions to air, water, or to soil during the operation of standard CdTe PV systems. In the case of fire or broken panels, the study found that emissions remained negligible (First Solar 2009).

The potential for windblown dust from the project could affect nearby receptors. Valley fever (Coccidioidomycosis) is a fungal disease that occurs in southwestern US, northern Mexico and some places in Central and South America. The fungus that causes the disease (*Coccidioides immitis*) is normally soil-dwelling, unless the soil is disturbed, at which time the fungal spores become airborne and can infect a host if inhaled. The fungus only occurs in the top few inches of soil. Kern County has experienced more cases of Valley Fever and Valley Fever-related deaths than any other county in the United States (CHCF 1997). Dust storms, high winds and secondary dust creating activities like soil disturbing activities that occur on previous undisturbed soils (e.g., earth moving, earth tilling and OHV use) are all known causes of Valley Fever transmission.

Comparison to Proposed Project

Given the proximity of sensitive receptors within a three mile radius of the proposed site and the potential for winds to carry Valley Fever to receptors, public health and safety impacts would be similar for a solar PV project at the RSPP site.

Socioeconomics and Environmental Justice

Environmental Impacts

The source of construction and operation workers would be similar and the estimated benefits to Kern County would be similar for a solar PV project at the RSPP site. Construction workers would most likely be from the City of Ridgecrest and the surrounding regional area. The solar PV alternative would cause similar impacts on the area's housing, schools, police, emergency services, hospitals, and utilities as would the RSPP project. Construction of a solar PV facility would create nominal short-term employment opportunities for additional employees; however it would not create a long term demand for additional employees. Solargen's 1,000 MW Panoche Valley Solar Farm estimates a need of 10 workers during plant operation (Solargen 2009). In comparison, the proposed RSPP 250 MW parabolic trough project would employ 84 full-time employees during operation.

A solar PV at the Ridgecrest site is not expected to have adverse impacts on minority or low income populations. Benefits from a solar PV project at the RSPP site are likely to less than the benefits from the RSPP project in the Ridgecrest City region. These include increases in sales taxes, employment, and income for Kern County. Like the RSPP project solar PV facilities would not be required to pay property taxes on their facility over the life of the project, thus not contributing to the county's revenue.

Comparison to Proposed Project

Similar to a parabolic trough facility at the proposed site, a solar PV facility would not result in adverse socioeconomic impacts. However, benefits to the Ridgecrest area would be reduced during operations due to a significantly reduced workforce.

Soil and Water Resources

The construction activities associated with solar PV development at the RSPP site have the potential to adversely impact surface water quality. During grading and construction activities there is the potential for surface water runoff to carry pollutants and sediment offsite and degrade water quality in nearby waters. Common pollutants that could be introduced into storm water during construction include, but are not limited to, fertilizers from landscape management, petroleum hydrocarbons and heavy metals from construction vehicles. Accelerated wind and water-induced erosion may result from construction. Precipitation, or high intensity and short duration runoff events coupled with ground disturbing activities, can result in onsite erosion eventually increasing the sediment load into nearby waters. Soils devoid of vegetation have a high potential for erosion, particularly when disturbed.

A Stormwater Pollution Prevention Plan (SWPPP) would be required for construction of the solar PV facilities. This SWPPP would outline best management practices that would control sedimentation during construction. Since solar PV facilities do allow for vegetation to remain under the solar arrays and grading is often confined to access roads and construction of ancillary facilities, surface water would be allowed to percolate into the ground. However, since the projects would involve extensive construction and grading on the site a drainage plan would be developed to ensure minimal long-term disturbance to drainage patterns.

Because the solar PV technology does not require any water for cooling or steam generation, the technology uses less water during operations than solar concentrating technologies. For certain PV technologies, water is required only for washing the solar PV arrays. Solargen's 1,000 MW Panoche Valley Solar Farm (2009) would use 10.5 AFY during operation. First Solar's 550 MW Desert Sunlight Solar Farm (thin film) operation water estimates are for domestic purposes (drinking, washing, and toilets) and would be no more than a few hundred gallons per day. However, during construction an estimated 1,800 AFY would be required for soil compaction, dust control and sanitary needs (First Solar 2010). The RSPP project proposes to use 150 AFY for operation of the power plant.

Comparison to Proposed Project

Impacts related to erosion and sedimentation for a solar PV installation at the RSPP site would be reduced in comparison to a parabolic trough facility at the same location given the need for less ground disturbance. In addition, impacts related to water consumption at solar PV facilities would be less since this technology requires much less water during operation. As such, a solar PV facility would create lesser impacts to soils and water than the proposed RSPP facility.

Traffic and Transportation

A construction traffic control and transportation demand implementation program would need to be developed in coordination with Caltrans for the RSPP site. This analysis may result in the need to limit construction-period truck and commute traffic to off-peak periods to avoid or reduce traffic and transportation impacts. These impacts would likely be similar to those of the proposed project as a solar PV project would likely require the use SR 395 and SR 178 and other smaller roads for access.
Transportation facilities serving the solar PV facility would be the same as the proposed RSPP site. Inyokern Airport, just west of Ridgecrest, provides the nearest commercial airport service. Other airports in the region include California City Municipal Airport, Trona Airport, Mojave Air and Space Port, Edwards Air Force Base, and China Lake NAWS. Kern Regional Transit's Mojave Ridgecrest Express offers limited Monday-Wednesday-Friday bus service between Mojave, California City, Inyokern, and Ridgecrest and between Inyokern, Mojave, and Lancaster.

Comparison to Proposed Project

Impacts to traffic and transportation from a solar PV facility at the RSPP site would be generally similar to the proposed project. The construction workforce and need for heavy duty vehicle trips would be similar, and construction activities would create the greatest impacts to traffic and transportation. As noted above, more operations personnel would be needed at a parabolic trough facility but impacts from the limited number of commuters and deliveries would not be expected to create greater impacts to traffic and transportation than a solar PV facility at the site especially since water would be trucked to the PV facility during operations while the parabolic trough facility would obtain water from a pipeline. However, the solar PV facility would not create glare impacts that could potentially affect travelers along adjacent roadways.

Transmission Line Safety and Nuisance

Similar to the proposed project, this alternative would not be likely to cause transmission line safety hazards or nuisances. As stated in the **TRANSMISSION LINE SAFETY AND NUISANCE** section, the potential for nuisance shocks would be minimized through grounding and other field-reducing measures that would be implemented in keeping with current standard industry practices, and the potential for hazardous shocks would be minimized through compliance with the height and clearance requirements of CPUC's General Order 95. Compliance with Title 14, California Code of Regulations, section 1250, would minimize fire hazards, while the use of low-corona line design, together with appropriate corona-minimizing construction practices, would minimize the potential for corona noise and its related interference with radio-frequency communication in the area around the route. As with the proposed RSPP transmission lines, the public health significance of any related field exposures cannot be characterized with certainty. The only conclusion to be reached with certainty is that the proposed lines' design and operational plan would be adequate to ensure that the generated electric and magnetic fields are managed to an extent the CPUC considers appropriate in light of the available health effects information.

Visual Resources

Environmental Impacts

The size and height of the solar PV arrays would likely be visible from nearby areas, including recreation areas and the El Paso Mountains. The large number of solar PV arrays, access roads, and interconnection power lines required for a 250 MW solar facility would introduce prominent industrial features. However, the solar PV technology would not introduce components as tall as the 22-foot parabolic trough structures since solar PV modules range from 5-15 feet in height. Additional components at the solar parabolic trough would range up to 120 feet in height (air cooled condenser). Similar to the RSPP project, a solar PV project would likely require a high voltage line, approximately 140 feet in height. Since most PV panels are dark in color to absorb sun light, rather than mirrored to reflect it, glare and reflection would be lessened.

Comparison to Proposed Project

Converting open space to industrial use would be required for both a solar PV project and the RSPP project, thus altering the aesthetics of the land and impacting viewers. However, visual impacts from a solar PV facility would be less, since solar PV modules are shorter in height than parabolic trough structures, and the RSPP project would employ a 120 foot tall air cooling condenser. Impacts to the viewshed from a high voltage transmission line would be the same from both technologies. Impacts from glare would be greater from the RSPP project. Overall a solar PV facility would have fewer impacts on visual resources than the RSPP project.

Waste Management

Environmental Impacts

Like the RSPP project, solid waste disposal must comply with federal, state and local statutes and regulations. Construction activities would involve the limited transport,

storage and disposal of hazardous waste. Hazardous waste during construction and operation would include diesel, oil and gasoline, and transformer oil (SLO 2009). Operation activities for the Panoche Valley Solar Farm would not require the use of hazardous waste (Solargen 2009).

Comparison to Proposed Project

Waste disposal impacts during construction are expected to be similar for both technologies. Waste disposal impacts from operations would be less for a solar PV project than the RSPP project since no HTF-contaminated soils or reverse osmosis cleaning wastes would generated at a PV facility. The total amount of nonhazardous waste generated from operation of the RSPP project is estimated to be approximately 20 cubic yards per week. In addition, 0.5 cubic yards per week of hazardous waste would be generated during operation. While the exact amount of construction waste produced for a solar PV project is unknown, it is likely to be less than the RSPP project. The environmental impacts of waste disposal from a solar PV facility site would be fewer than those for the proposed RSPP project.

Worker Safety and Fire Protection

Environmental Impacts

Industrial environments are potentially dangerous, during both construction and operation of facilities. Workers at the proposed project would be exposed to loud noises, moving equipment, trenches, and confined space entry and egress problems. The workers may experience falls, trips, burns, lacerations, and numerous other injuries. They have the potential to be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, and electrical sparks and electrocution. During construction and operation of the solar PV facility there is the potential for both small fires and major structural fires. However, no heat transfer fluid (HTF) would be required. Electrical sparks, combustion of fuel oil, flammable gas or liquids, explosions, and over-heated equipment, may cause small fires. Compliance with all LORS will be adequate to assure protection from all fire hazards.

Comparison to Proposed Project.

The environmental impact of worker safety and fire protection of a solar PV facility at the project site would be less than the RSPP project.due to the lack of HTF.

Facility Design

This analysis encompasses the civil, structural, mechanical and electrical engineering design of a project. It is assumed that each renewable technology would abide by the required LORS for that facility and would comply with the California Building Standards Code.

Geology, Paleontology and Minerals

Environmental Impacts

Grading and ground disturbing activities required for a solar PV facility vary and however minimal, could cause impacts to geology resources. The applicant would follow

all applicable building codes and standard practices for power plant construction as required by the CEC including: Title 24, California Code of Regulations, which adopts the current edition of the CBC as minimum legal building standards; the 2001 California Building Code (CBC) for design of structures; the 1996 Structural Engineers Association of California's Recommended Lateral Force Requirements, for seismic design; ASME-American Society of Mechanical Engineers Boiler and Pressure Vessel Code, and the NEMA-National Electrical Manufacturers Association.

Construction of a solar PV project would include grading, foundation excavation and utility trenching and the potential to expose paleontological resources would increase with the depth of excavations. As with RSPP site, the proposed conditions of certification are designed to mitigate any paleontological resource impacts to a less-than-significant level. Potential mineral and paleontological resources could be avoided through the flexible siting of the project infrastructure.

Comparison to Proposed Project

Depending on the solar PV technology used, a solar PV facility at the RSPP sites would likely create fewer impacts to geologic resources because solar PV tends to have less grading and ground disturbing requirements.

Power Plant Efficiency

Both a solar PV facility and the RSPP project would decrease reliance on fossil fuel, and would increase reliance on renewable energy resources. They would not create significant adverse effects on fossil fuel energy supplies or resources, would not require additional sources of energy supply, and would not consume fossil fuel energy in a wasteful of inefficient manner.

Power Plant Reliability

A solar PV facility would be generally similar to a solar parabolic trough facility in terms of plant maintainability, fuel and water availability, and reliability of the plant in relation to natural hazards. Transient cloud cover however can lead to sudden variability of the output of a PV facility (Renewable Energy World 2008). Solar thermal facilities have thermal inertia in the heat transfer fluid and the HTF rate can be slowed, which increases the temperature of the HTF. This would aid in reliability if adverse weather persists. Cloud cover over PV systems would cause temporary outages. A parabolic trough facility at the proposed site would have fewer impacts on plant reliability.

Transmission System Engineering

Locating a solar PV facility at the Ridgecrest City site would not require a longer interconnection than at the proposed RSPP site. As such, the transmission system evaluation for a solar PV facility at the RSPP site would be similar to that of the RSPP project.

Summary of Impacts – Solar PV Technology – Utility Scale at the RSPP Site

The impacts from a solar PV technology can vary and strongly depend on the type of PV technology used. The amount of grading required is a primary difference in the

technologies and affects the project impacts to biological resources, cultural resources, air quality and public health and safety. A utility scale solar PV facility would create a number of substantial adverse effects similar to those created by the proposed RSPP facility. If utility scale solar PV technology were built at the RSPP site, approximately 750 to 2,500 acres would be disturbed, depending on the technology. Because the proposed site is crossed by several desert washes, it is likely that additional acreage would be required to site the solar PV arrays away from the major washes. It is likely that a portion of the entire site would be graded, removing all vegetation and animal life from the area.

A Solar PV facility would have impacts similar to the proposed RSPP project in 9 of the 20 areas for environmental and engineering resource elements: recreation and wilderness, land use, worker safety and fire protection, transmission line safety, public health and safety, traffic and transportation, facility design, power plant efficiency and transmission system engineering.

A Solar PV facility would likely have greater impacts than the proposed RSPP site for the following resource element: power plant reliability and socioeconomics and environmental justice (reduced benefits during operations).

A solar PV facility would have fewer impacts than the proposed RSPP project for five resources: soil and water resources, visual resources, noise and vibration, hazardous materials, and waste management. If significant grading is not required, then the following additional resource areas would have fewer impacts: air quality, biological resources, cultural resources, and geology, paleontology and minerals. However, if the PV technology employed requires grading of the entire site, than impacts to the aforementioned resources areas would be similar to the RSPP project.

B.2.8 ALTERNATIVES CONSIDERED BUT NOT EVALUATED IN FURTHER DETAIL

This section considers potential alternatives to the proposed RSPP project that were evaluated, and determined to not be feasible for meeting key project objectives, they are not yet commercially available, or they would not result in lesser impacts than the proposed action. This analysis complies with state and federal environmental laws by providing an analysis of reasonable alternatives which could substantially reduce or avoid any potentially significant adverse impacts of the proposed project. However, because these alternatives would not avoid or substantially reduce the adverse impacts of the proposed RSPP or because they do not meet project objectives and/or the purpose and need for the project, they are not analyzed in further detail in this SA/DPA/DEIS.

B.2.8.1 Applicant's Site Alternatives

The following alternative sites were evaluated in this analysis and, based on the findings of those analyses, were not carried forward for detailed evaluation in this SA/DPA/DEIS:

- Alabama Hills Alternative Site
- Boron Alternative Site
- South of California City Alternative Site

Each site is discussed in the following paragraphs.

Alabama Hills Alternative Site

Alabama Hills was identified by Solar Millennium LLC in the AFC as a potential alternative site for the proposed RSPP project. The Alabama Hills Alternative Site is 2,600 acres and occupies Sections 20, 21, 28 and 29 of Township 16S, Range 36E. The site is on BLM land south of Lone Pine in Inyo County; no ROW applications have been received by BLM for any portion of the Alabama Hills site (SM 2010a). The site is located in the Alabama Hills National Recreation area and has a 5% grade (SM 2009a, page 4-7). A 7.5 mile transmission line would be required to interconnect to a 230-kV Los Angeles Department of Water and Power (LADWP) transmission line. Highway 395 is 0.7 miles east of the site and new roads accessing the site would be required. The solar resource at the site is 7.2 kWh/m2/day in comparison to the RSPP site solar resource of 8 kWh/m2/day. A stream traverses the southwest corner of the site. There are no wetlands or riparian areas on the site but ephemeral washes on the site likely qualify as jurisdictional waters of the state (SM 2010a).

The Alabama Hills Alternative site is located northwest of the proposed RSPP site; see **Alternatives Figure 6**.

The Alabama Hills Alternative site was not pursued as a possible site for the proposed RSPP project because the ground slope exceeded the 2% threshold; and its solar resource is lower than at the RSPP site. The site (and access roads) would also be within the Alabama Hills National Recreation Area. This area has historically been used for filming old westerns & cowboy movies and more recently television commercials and videos.

Environmental Assessment

As with the proposed RSPP site, the Alabama Hills site would result in the permanent loss of approximately 2,600 acres of desert habitat. Although CNDBB records do not indicate the presence of sensitive species on the site, several special-status species have been documented within five miles of the site (SM 2010a). The site contains channels descending from foothills of the Eastern Sierras towards Owens Lake. The ephemeral washes may facilitate animal movement in the area. The washes, although impacted by a 250 MW solar facility at this location, would not be required for the continued functioning of biological and ecological processes in the immediate area due to the similarity of vegetation type and density at the site and surrounding area (SM 2010a). The results of a cultural resources record search indicate that no resources have been previously recorded within the Alabama Hills Alternative site.

Impacts to land use and recreation at Site AS1 would potentially be significant as it is within the Alabama Hills National Recreation Area and would be visible from nearby vistas. The site is not located within the CDCA and WEMO Planning Areas as is the RSP site. Both the proposed RSPP site and the Alabama Hills Alternative site would require a large lease area from BLM and both sites would require extensive grading, potentially resulting in erosion and runoff. The Alabama Hills Alternative site would likely be visible to viewers in the Alabama Hills National Recreation Area. Given the size of

the power plants and their locations on BLM land used for recreational purposes, visual impacts would be considerable and similar at both locations.

Rationale for Elimination

The Alabama Hills Alternative site would likely cause biological and cultural resources impacts due to the extensive grading required for the 250 MW solar power plant (approximately 2,000 acres). Additionally, because the Alabama Hills site is further from a existing road than the proposed RSPP site, longer access roads would be required increasing the amount of grading and potentially resulting in greater soil impacts and wind and water erosion. Given the Alabama Hills Alternative site location within the Alabama Hills National Recreation Area, visual impacts would potentially be significant. This alternative site would not reduce the potential impacts of the proposed RSPP project without creating severe impacts of its own. Therefore, the Alabama Hills Alternative site was eliminated from further consideration in this SA/DPA/DEIS.

Boron Alternative Site

The Boron Alternative site was identified by Solar Millenniun, LLC in the AFC as a potential alternative site for the proposed RSPP project. The Boron Alternative Site is 1,900 acres and occupies Sections 13 and 24 of Township 1N, Range 9W and Section 19 of Township 1N, Range 8W. All but 50 acres of the site are owned by US Borax Inc. (SM 2010a). The site is approximately 0.5 miles west of North Edwards. Highway 58 is approximately two miles to the south. Edwards Air Force Base is directly south of the site. Paved and unpaved roads cross the site and the site is listed on environmental databases as being used for pesticide production. Corrective Action may be required at the site. It is also listed as a formerly used military site – Pac Coast Borax Plant and Landing Field Boron, although the military has indicated that it had no operations at the landing field. Borrow pits, a mine dump and tailing ponds occur at the site (DOD 1999). A 16.2 mile transmission line would be required to interconnect to a 230-kV SCE transmission line. The solar resource at the site is 7.7 kWh/m2/day. A stream traverses the southwest corner of the site. There are no wetlands or riparian areas on the site but ephemeral washes on the site likely qualify as jurisdictional waters of the state (SM 2010a). The results of a record search indicate that no resources have been previously recorded within the Boron Alternative site.

The site is located southwest of the proposed RSPP site; see **Alternatives Figure 7**. It was not pursued as a possible site for the proposed project by the applicant because of the poor probability of obtaining site control from the owners of the multiple parcels of private land comprising the site, insufficient size and greater distance for transmission interconnection (SM 2009a).

Environmental Assessment

The project would require grading of approximately 2,000 acres of what appears to be land degraded in a number of areas. The site is not located within designated Desert Tortoise Critical Habitat. CNDDB records indicate the presence of desert tortoise, Mohave ground squirrel and several sensitive plant species within a five mile radius of the site (SM 2010a). As private land, the Boron site does not support recreational uses. A solar facility at the Boron Alternative site would be visible to travelers along Highway 58 and would be in contrast to the surrounding area. The site is zoned limited

agriculture (A-1); a Conditional Use Permit from Kern County would be required for a solar facility at this site. No Williamson Act lands occur on the site. Historic mining operations on the site may have resulted in contamination within the site.

Rationale for Elimination

The feasibility of the Boron Alternative site is questionable in that US Borax, the main property owner, is the major landowner at the site and operations at the US Borax's Boron operations are projected to last at least 75 years (U.S. Borax 2010). Contamination may occur at the site and grading of borrow pits, tailing ponds, and mines would be required. The Boron Alternative site's proximity to Edwards Air Force Base may be within "no build" or "no fly" areas and glare from plant operations could impact base operations. For these reasons, the Boron Alternative site was eliminated from further consideration in this SA/DPA/DEIS.

South of California City Alternative Site

The South of California City (SCC) Alternative site was identified by Solar Millenniun, LLC in the AFC as a potential alternative site for the proposed RSPP project. The SCC Alternative Site is 1,300 acres and occupies Sections 29 and 30 of Township 11N, Range 9W. Three separate lands owners comprise the site; US Borax is the largest land owner with 634.5 acres (SM 2010a). The site is approximately 8.5 miles southwest of California City and approximately 10 miles west of Boron. Highway 58 is approximately 2,000 feet to the south. Edwards Air Force Base is directly south of the site. A residential area is 0.5 miles to the east. Unpaved roads cross the site. A 20 mile transmission line would be required to interconnect to a 230-kV SCE transmission line although connections to LADWP lines would be shorter (12.3 miles and 15.9 miles). The solar resource at the site is 7.7 kWh/m2/day. The site is zoned for both limited agriculture (A-1) and light manufacturing (M-1). There are no wetlands or riparian areas on the site but ephemeral washes on the site likely qualify as jurisdictional waters of the state (SM 2010a). The eastern portion of Section 29 is ADIRM flood zone.

The SCC Alternative site is located southwest of the proposed RSPP site; see **Alternatives Figure 8**.

It was not pursued as a possible site for the proposed project by the applicant because of the poor probability of obtaining site control from the owners of the private land comprising the site, insufficient size and greater distance for transmission interconnection (SM 2009a).

Environmental Assessment

The project would require grading of approximately 1,300 acres of land. The site is not located within designated Desert Tortoise Critical Habitat. The results of a record search indicate that no resources have been previously recorded within the SCC site. A CNDDB search indicated the potential presence of Prairie falcon (*Falco mexicanus*), burrowing owl (*Athene cunicularia*), Mohave ground squirrel (*Xerospermophilus mohavensis*), desert tortoise (*Gopherus agassizii*), and desert cymopterus (*Cymopterus deserticola*). As private land, the SSC site does not support recreational uses. A solar

facility at the SSC Alternative site would be visible to travelers along Highway 58 and would be in contrast to the surrounding area, particularly to the residential community 0.5 miles to the east.

Rationale for Elimination

The SSC site is considerably smaller at 1,300 acres than the 2,002 acre footprint of the RSPP site. A smaller solar facility (approximately 150 MW based on roughly similar acreage at the Northern Unit Alternative) would not meet the applicant's objective of providing 250 MW of solar energy. The SSC Alternative site's proximity to Edwards Air Force Base may be within "no build" or "no fly" areas and glare from plant operations could impact base operations. For these reasons, the SCC Alternative site was eliminated from further consideration in this SA/DPA/DEIS.

Ridgecrest Landfill Alternative Site

Several public comments suggested that the RSPP project be sited on a triangular segment of BLM land encompassing the Ridgecrest Landfill. Although approximately 3,000 acres of land would be available, optimum design features for a solar field would require rectangular arrangement of array, preferably close to square, with the power block located in the center of the solar field. The presence of the landfill would not allow for optimum placement of the arrays and power output would be lower than at the RSPP site. There is significant debris (cars, waste) on the site and multiple washes occur throughout the site. The terrain is very uneven and rolling and major grading of the site would be required. Residences occur within 0.5 miles of the site and residential development is 1.0 mile from the site boundary. A shorter water line (approximately 2miles) and longer transmission interconnection (approximately 3.3 miles) would be required. The northern boundary of the site is located two miles south of the China Lake Naval Weapons Center. Improvements to Highway 395 may require use of this land in the future. See **Alternatives Figure 10** at the end of this section for a depiction of the Ridgecrest Landfill Alternative.

Environmental Assessment

Locating a solar facility at the Ridgecrest Landfill Alternative site would result in substantial altering of the existing land given the extensive need for grading of the uneven terrain. Although the site has experienced dumping, desert tortoise, Mohave ground squirrel and special status species are likely present and grading would result in the loss of habitat and species. The multiple, large washes on the site would require extensive engineering controls and thus would alter natural drainage patterns. Construction impacts to sensitive receptors would be greater. The extensive need for grading and the closer proximity to residents would increase the level of dust and the risk of Valley fever. Impacts to water supply would be similar to that of the RSPP, depending on the ultimate size of the solar facility. Impacts to recreation would be reduced. Visual impacts to residents would be greater. Cultural impacts would be reduced at the Ridgecrest Landfill Alternative site. Land use impacts would potentially be greater should the City of Ridgecrest desire to expand its western boundary in the future.

Rationale for Elimination

The Ridgecrest Landfill Alternative site would not permit the optimum placement of solar arrays to generate 250 MW. The presence of the landfill and traffic associated with landfill operations would impact the ability to place arrays on the northwestern section of the site. The closer proximity to residents would cause greater impacts, particularly during construction. Drainage impacts would be greater at this location. The loss of biological habitat and a need for groundwater from the Indian Wells Valley Water District would be similar to the proposed RSPP project. The Ridgecrest Landfill Alternative site's proximity to China Lake Naval Weapons Center could cause glare impacts to military operations. For these reasons, the Ridgecrest Landfill Alternative site was eliminated from further consideration in this SA/DPA/DEIS

B.2.8.2 Alternative Solar Generation Technologies

In addition to the range of alternative sites discussed earlier, several alternative solar generation technologies were evaluated as potential alternatives to the proposed RSPP project (which would use the parabolic trough technology). Although alternative solar generation technologies would achieve most of the project objectives, each would have different environmental or feasibility concerns. The following solar generation technologies were considered in this analysis:

- Stirling dish technology
- Solar power tower technology
- Linear Fresnel technology
- Distributed solar technologies

Among the solar thermal technology alternatives, the linear Fresnel alternative has the potential for least ground disturbance due to its more compact configuration (reducing ground disturbance); however, the technology is proprietary and is not available to other applicants or developers. The distributed solar alternative would have fewer impacts than the proposed RSPP project because it would be located on already existing buildings or on already disturbed land. However, achieving 250 MW of distributed solar PV or solar thermal would depend on additional policy support, manufacturing capacity, and lower cost than currently exists to provide the renewable energy required to meet the California Renewable Portfolio Standard requirements so additional technologies, like utility-scale solar thermal generation, would also be necessary.

These analyses assumed that the alternative technologies would be implemented on the site for the proposed RSPP project site.

Stirling Dish Technology

Stirling dish technology uses a mirror array to convert thermal energy to electricity by concentrating and focusing sunlight on the receiver end of a Stirling engine. The curved dishes used to focus the sun's energy stand approximately 45 feet tall and occupy a maximum horizontal space of approximately 1,135 square feet (0.026 acres), with an anchored footprint of 12.5 square feet (assumed 4-foot diameter caisson). See **Alternatives Figure11** for an illustration. The internal side of the receiver heats

hydrogen gas, which expands; the pressure created by the expanding gas drives a piston, crankshaft, and drive shaft. The drive shaft turns a small electricity generator.

The entire energy conversion process takes place within a canister the size of an oil barrel. The generation process requires no water, and the engine does not produce emissions as no combustion takes place. Each concentrator consists of one Stirling engine mounted above one mirror array. Very little maintenance is required once each concentrator is installed, aside from periodic washing of the surface of the mirrors. In general, the Stirling system requires 7 to 9 acres of land per MW of power generated; a 250-MW Stirling engine field would require from 1,750 acres to 2,250 acres of land. Site preparation involves sinking a cement base with an embedded pedestal to support the dish (SES 2008). Each Stirling dish generates 25 kilowatts (KW) of power, so 10,000 dishes would be required to generate 250 MW. Each dish includes two major elements:

- **Solar Concentrator.** Large parabolic concentrators include 89 mirror facets attached to a frame by three point adjusting mounts (SES 2008). They are designed in five subassembly units for ease of transport and installation on site. Two small motors are attached to the pedestal and programmed to swivel the dish on two axes, following the sun's progress across the sky during the day.
- **Power Conversion Unit.** The Stirling engine's cylinder block incorporates four sealed cylinder assemblies along with coolers, regenerators, and heater heads (SES 2008). Concentrated solar energy heats up self-contained gas (hydrogen) in the power conversion unit, causing the gas to expand into the cylinders, moving the cylinders, and generating electricity. This cycle is repeated over and over as the engine runs at a steady rate of 1,800 rpm (SES 2008). Power is generated by heat transfer from the concentrated solar rays to the working gas in the engine's heater head, which converts the heat energy into mechanical motion. The generator of each unit in a utility-scale project is connected by underground transmission line to a small substation where the power can be transformed into a higher voltage for more efficient transmission across the grid.

Environmental Assessment

The land area required for a 250-MW Stirling engine power plant is similar to that required for the proposed RSPP project. However, it is not necessary to grade the entire parcel as only the 18-inch diameter pedestal of the Stirling engine requires level ground. It would still be necessary to grade permanent access roads between every two rows of Stirling engines due to the need for periodic mirror washing, which would result in vegetation removal. Additionally, because the proposed RSPP site is crossed by several desert washes, the installation of 10,000 Stirling engines could require a larger total acreage of land, resulting in a greater loss of habitat.

Due to the size and height of the Stirling mirrors, impacts to visual resources would be similar or greater to those of RSPP; 10,000 Stirling engines 45 feet in height would introduce an industrial character and transformation of the site. There would be less grading for the Stirling engine structures, but the numerous access roads required for cleaning the energy systems would impact biological and cultural resources and create a high contrast between the disturbed area and its surroundings.

Summary of Impacts

The large area needed for a Stirling engine power plant would be comparable to the land requirement for the RSPP power plant. Although grading requirements for the Stirling engines and solar concentrators are relatively small, grading for access roads would be extensive because access roads are required for every other row of Stirling engines (SES 2008a). For these reasons, recreation and land use, and biological and cultural resources impacts would be similar to those of the RSPP facility. In addition, due to the extent of the facility and the height of each concentrator, visual impacts would not be significantly reduced by this alternative and may be greater considering that the 45-foot high solar concentrators would be more pronounced than the approximately 22-foot high parabolic troughs. However, the Stirling technology does not require a cooling system or a turbine reducing the need for structures up to 120 feet in height.

Rationale for Elimination

Because no substantial reduction in impact has been identified, the Stirling dish technology has been eliminated from further consideration as an alternative technology.

Solar Power Tower Technology

The solar power tower technology converts thermal energy to electricity by using heliostat (mirror) fields to focus energy on a boiler located on power tower receivers near the center of each heliostat array. Each mirror tracks the sun during the day. The heliostats would be 7.2 feet high by 10.5 feet wide. See **Alternatives Figure 11** for an illustration. The solar power towers can be up to 459 feet tall with additional 10-foot tall lightening rods. The solar power tower would receive heat from the heliostats then convert the heat into steam by heating water in the solar boilers. A secondary phase would convert the steam into electricity using a Rankine-cycle reheat steam turbine electric generator housed in a power block facility at each of the plants.

In general, a solar power tower power plant requires 5 to 10 acres of land per MW of power generated. A 250 MW solar power tower field would require from 1,250 acres to 2,500 acres of land.

Site preparation involves grading the heliostat field and grading the access roads required for maintenance. Each heliostat field has the following primary components.

- Heliostats. The heliostat mirrors are arranged around each solar receiver boiler. Each mirror tracks the sun throughout the day and reflects the solar energy to the receiver boiler. The heliostats are approximately 7.2 feet high by 10.5 feet wide. They are arranged in arcs around the solar boiler towers asymmetrically.
- Power Tower. The power tower structure height is up to 459 feet. Primary thermal input is via solar receiver boilers, superheater and reheaters at the top of the distributed power towers.
- Steam Turbine Generator (STGs). The steam turbine system consists of a condensing steam turbine generator with reheat, gland steam system, lubricating oil system, hydraulic control system, and steam admission/induction valving. Power

would be generated by the STGs at 19 kV (hydrogen cooled) and then stepped up by transformers for more efficient transmission across the grid.

Environmental Assessment

The land area required for a 250 MW solar power tower plant is similar to that required for the proposed RSPP project. Grading of almost the entire RSPP site would be required along with grading of permanent access roads due to the need for regular washing of the mirrors. This grading would cause removal of vegetation and loss of wildlife. Additionally, because the proposed RSPP site is crossed by desert washes, the installation of the heliostats and power towers could require a larger total acreage of land, resulting in a greater loss of habitat.

Due to the size and height of the solar power towers, up to 600 feet, and mirrors, impacts to visual resources would be greater than those of the RSPP project and would introduce an industrial character to this site and the surrounding areas.

Because of the height of the solar power towers, there may be concerns regarding nearby aviation or military operations. The solar power tower technology built at the RSPP site would be located in the military Special Use Airspace Complex which establishes height limitations on structures within the Complex area, thus conflicts with the nearby China Lake Naval Air Weapons Station may arise.

Rationale for Elimination

The area needed for a solar power tower plant would be comparable to the land requirement for the RSPP. Grading requirements for the solar power tower would be extensive because of the minimal slope requirements for the heliostat fields. For these reasons, recreation and land use, biological resources, cultural resource and soil erosion impacts would be similar to those of the RSPP facility. In addition, due to the extent of the facility and the height of the power towers, visual impacts would like be greater for this alternative. Additionally, the height of the power tower would create potential impacts with the adjacent military facilities.

Because no substantial reduction in impacts would occur under this alternative technology, the solar power tower technology was eliminated from further consideration in this SA/DPA/DEIS as an alternative technology.

Linear Fresnel Technology

A solar linear Fresnel power plant converts solar radiation to electricity by using flat moving mirrors to follow the path of the sun and reflect its heat on the fixed pipe receivers located about the mirrors. During daylight hours, the solar concentrators focus heat on the receivers to produce steam, which is collected in a piping system and delivered to steam drums located in a solar field and then transferred to steam drums in a power block (Carrizo 2007). The steam drums transferred to the power block will be used to turn steam turbine generators and produce electricity. The steam is then cooled, condensed into water, and recirculated back into the process.

In general, the linear Fresnel technology requires 4 to 5 acres of land per MW of power generated. A 250 MW solar linear Fresnel field would require approximately 1,000 to 1,250 acres of land.

Each row-segment is supported by large hoops that rotate independently on metal castors. Rotation of the reflectors would be driven by a small electrical pulse motor. Reflectors are stowed with the mirror aimed down at the ground during the night. The major components are:

- Compact Linear Fresnel Reflector (CLFR) Solar Concentrator. A solar Fresnel power plant would use Ausra's CLFR technology which consists of slightly curved linear solar reflectors that concentrate solar energy on an elevated receiver structure. Reflectors measure 52.5 by 7.5 feet (Carrizo 2007). There are 24 reflectors in each row. A line is made up of 10 adjacent rows and operates as a unit, focusing on a single receiver (Carrizo 2007).
- Receiver Structure. The receiver structure is approximately 56 feet tall (Carrizo 2007). It would carry a row of specially coated steel pipes in an insulated cavity. The receiver would produce saturated steam at approximately 518°F from cool water pumped through the receiver pipes and heated (Carrizo 2007). The steam would drive turbines and produce electricity.

Rationale for Elimination

The Fresnel solar technology is a proprietary technology owned by Ausra, Inc. However, Ausra, Inc. has changed its focus to being a technology and equipment provider rather than an independent power developer and owner and will focus on medium-sized (50 MW) solar steam generating systems for customers including steam users, such as food processors and enhanced oil firms and utilities for power augmentation systems that deliver steam into existing fossil-fuel power plants. A project of 250 MW is theoretically possible, and would require smaller acreage per megawatt. However, at 1,250 acres for 250 MW, this technology would not eliminate the significant impacts of the proposed RSPP technology at this site.

Distributed Solar Technology

There is no single accepted definition of distributed solar technology. The *2009 Integrated Energy Policy Report* (IEPR) defines distributed generation resources as "grid-connected or stand-alone electrical generation or storage systems, connected to the distribution level of the transmission and distribution grid, and located at or very near the location where the energy is used."

Distributed solar facilities vary in size from kilowatts to tens of megawatts but do not require transmission to get to the areas in which the generation is used. Distributed solar generation is generally considered to use photovoltaic (PV) technology although at slightly larger scales it is also being implemented using solar thermal technologies. Both technologies are considered below.

Distributed Solar PV Systems

A distributed solar alternative would consist of PV panels that would absorb solar radiation and convert it directly to electricity. The PV panels could be installed on

residential, commercial, or industrial building rooftops or in other disturbed areas such as parking lots or disturbed areas adjacent to existing substations. To be a viable alternative to the proposed RSPP project, there would have to be sufficient newly-installed panels to generate 250 MW of capacity.

California currently has over 500 MW of distributed solar PV systems which cover over 40 million square feet (CPUC 2009). During 2008, 158 MW of distributed solar PV was installed in California, doubling the amount installed in 2007 (78 MW), and with 78 MW installed through May 2009, installation data suggests that at least the same amount of MW could be installed in 2009 as in 2008 (CPUC 2009).

Rooftop PV systems and parking lot systems exist in small areas throughout California. Larger distributed solar PV installations are becoming more common. Examples of distributed PV systems are:

- Nellis Air Force Base (AFB, Nevada): Over 72,000 solar panels, generating 14 MW of energy, were constructed in 2007, by SunPower Corp. on 140 acres of Nellis AFB land (Whitney 2007). Energy generated is used at the Nellis AFB.
- Southern California Edison (Fontana, CA): SCE has installed over 3 MW of distributed solar energy in two phases on over 1 million square-foot commercial roof using thin film PV technology provided by First Solar. This is the beginning of a planned installation of 3.5 million PV panels that would generate 250 MW of capacity (SCE 2009).
- San Diego Gas & Electric (San Diego, CA): SDG&E's Solar Energy Project is designed to install up to 80 MW of solar PV, which would include PV installation on parking structures and tracking systems on open land (SDG&E 2008).
- Pacific Gas & Electric (San Francisco, CA): PG&E launched a five-year program to develop 500 MW of solar PV power. The program would consist of 250 MW of utility-owned PV generation and an additional 250 MW to be built and operated by independent developers under a streamlined regulatory process. PG&E's program targets mid-sized projects, between 1 to 20 MWs, mounted on the ground or rooftops within its service area (PG&E 2009).
- City of San Jose (San Jose, CA): The City of San Jose is considering the development and implementation of 50 MW of renewable solar energy on city facilities and/or land (San Jose 2009). San Jose's Green Vision lays out a goal of achieving 100% of the city's electricity from renewable energy by 2020 and plans to implement strategies of a 24-month period to increase solar installations in San Jose by 15%. The City anticipates that City facilities with appropriate solar access including parking lots, garages, lands and landfills would be eligible for solar installation and San Jose received ARRA funding for the project.

Like utility-scale PV systems, the acreage of rooftops or other infrastructure required per MW of electricity produced is wide ranging. As stated above, California has approximately 40 million square feet (approximately 920 acres) of distributed solar PV accounting for 441 MW installed (CPUC 2008a). However, based on SCE's use of 600,000-square-feet for 2 MW of energy, 75 million square feet (approximately 1,721 acres) would be required for 250 MW.

A study prepared in 2007 by Navigant Consulting, Inc. (NCI) and the Energy Commission calculated the economic potential of rooftop PV, by county, for new and retrofitted buildings (NCI 2007). Kern County was identified as having 37 MW of economic potential PV in 2016 which would be dependent upon subsidies and favorable business models. However, distributed solar PV could be located throughout the State. The location of the distributed solar PV would impact the capacity factor of the distributed solar PV.[1] The capacity factor depends on a number of factors including the insolation[2] of the site. Because a distributed solar PV alternative would be located throughout the State, the insolation at some of these locations may be less than in the Mojave Desert. The Renewable Energy Transmission Initiative (RETI) assumed a capacity factor of approximately 30% for solar thermal technologies and tracking solar PV and approximately 20% capacity factor for rooftop solar PV which is assumed to be non-tracking, for viable solar generation project locations (B&V 2009; CEC 2009). Tracking distributed solar PV would have a higher capacity factor as well.

Environmental Assessment

Installations of 250 MW distributed solar PV would require up to 75 million square feet (approximately 1,721 acres). Distributed solar PV is assumed to be located on already existing structures or disturbed areas so little to no new ground disturbance would be required and there would be few associated biological and cultural resources impacts. Minimal grading or new access roads would be required and relatively minimal maintenance and washing of the solar panels would be required. As such, it is unlikely that the rooftop solar PV alternative would create erosion impacts. Some water would be required to wash the solar panels, especially with larger commercial rooftop solar installations; however, the commercial facilities would likely already be equipped with drainage systems. Therefore, the wash water would not contribute to runoff or to erosion.

Because most PV panels are black to absorb sun, rather than mirrored to reflect it, glare would be lessened. Additionally, the distributed solar PV alternative would not require the additional operational components, such as dry-cooling towers, HTF system, substations, transmission interconnection, and maintenance and operation facilities with corresponding visual impacts. Solar PV panels would be visible to passing residents and may be viewed by a larger number of people.

Consideration of CEQA/NEPA Criteria

Reduction of Impacts

Distributed solar technology is assumed to be located on already existing structures or disturbed areas so little to no new ground disturbance would be required; there would be few associated impacts to biological and cultural resources. Additionally, impacts to soils and waters as well as visual resources would be reduced.

[1] The capacity factor of a power plant is a percentage that tells how much of a power plant's capacity is used over time (CEC 2008a)

[2] Insolation is the total amount of solar radiation striking a surface exposed to the sky (CEC 2008a).

Meet Most Project Objectives

A distributed solar technology alternative, if constructed at 250 MW, would meet the CEC project objectives to operate 250 MW of renewable power in California capable of selling competitively priced renewable energy. The solar technology would not necessarily meet the objective to locate the facility in areas of high solarity, because the distributed technology could be located throughout the State.

Feasibility

The rate of PV manufacturing and installation is expected to continue to grow very quickly. However, given that there are currently only about 500 MW of distributed solar PV in California, the addition of an additional 250 MW to eliminate the need for the RSPP project cannot be guaranteed. This would require an even more aggressive deployment of PV at more than double the historic rate of solar PV than the California Solar Initiative program currently employs. Challenges to an accelerated implementation of distributed solar PV are discussed below.

- **RETI Consideration of Subsidies, Tariffs, Cost, and Manufacturing.** The RETI Discussion Draft Paper California's Renewable Energy Goals – Assessing the Need for Additional Transmission Facilities published with the RETI Final Phase 2A Report (September 2009), addresses the likelihood of a scenario of sufficient distributed solar PV to remove the need for utility scale renewable development. This discussion paper identified the factors likely to influence the pace of large scale deployment of distributed solar PV: subsidies, feed-in tariffs, manufacturing and installation cost, and manufacturing scale-up.
- Cost. The 2009 IEPR states that solar PV technology has shown dramatic cost reductions since 2007, and is expected to show the most improvement of all the technologies evaluated in the 2009 IEPR model, bringing its capital cost within range of that of natural gas-fired combined cycle units. However, the CPUC 33% Renewables Portfolio Standard Implementation Analysis Preliminary Results considered a number of cases to achieve a 33% RPS standard. The results of this study state that the cost of a high distributed generation case is significantly higher than the other 33% RPS alternative cases. The study explains that this is due to the heavy reliance on solar PV resources which are more expensive than wind and central station solar.
- Tariffs. Additionally, the IEPR discusses the need to adjust feed-in tariffs to keep downward pressure on costs. Feed-in tariffs should be developed based on the size and type of renewable resources, given that the cost of generating energy from a 100-MW wind farm is less than the cost of generating to ensure a good mix of new renewable energy projects. According to the report, differentiating feed-in tariffs by type and size can ensure a good mix of new renewable energy projects and avoid paying too much for some technologies and too little for others.
- Limited Installations. Examples of large scale distributed solar projects are still limited. In the spring of 2008, SCE proposed 250 to 500 MW of rooftop solar PV to be installed in five years. As of January 2010, SCE had installed only 3 MW. As the 2009 IEPR points out, the potential for distributed resources remains largely untapped and integrating large amounts of distributed renewable generation on distribution systems throughout the State presents challenges.

- Electric Distribution System. The State's electric distribution systems are not designed to easily accommodate large quantities of randomly installed distributed generation resources at customer sites. Accomplishing this objective efficiently and cost-effectively will require the development of a new transparent distribution planning framework.

The 2009 IEPR makes a number of recommendations to support the integration of distributed generation into the California grid, expand feed-in tariffs, and support the efforts to achieve the RPS goals as a whole. It also recommends supporting new renewable facilities and the necessary transmission corridors and lines to access the facilities.

In testimony filed by the Center for Biological Diversity in the Ivanpah Solar Electric Generating System (ISEGS) proceeding [Docket No. 07-AFC-5], Bill Powers stated his disagreement with the conclusions of the ISEGS Alternatives FSA/DEIS section addressing distributed solar PV. Powers believed that the technology and manufacturing capacity would be adequate to develop 400 MW of distributed PV, and that the distribution system would be able to accommodate the additional distributed generation. He presents numerous examples of California utility programs that have committed to development of hundreds of megawatts of additional distributed solar PV. The conclusion of this section is that, while it will very likely be possible to achieve 250 MW of distributed solar energy over the coming years, the very limited numbers of existing facilities make it difficult to conclude with confidence that it will happen within the timeframe required for the RSPP project. As a result, this technology is eliminated from detailed analysis in this SA/DPA/DEIS.

B.2.8.3 Alternative Renewable Technologies

Non-solar renewable generation technologies were considered as potential alternatives to the proposed RSPP project. The following renewable generation technologies were considered in this analysis:

- Wind energy
- Geothermal energy
- Biomass energy
- Tidal energy
- Wave energy

The non-solar renewable technologies alternatives (wind, geothermal, biomass, tidal, wave) would either be infeasible for meeting key project objectives at the scale of the proposed RSPP project, or would not eliminate significant impacts caused by the project without creating significant impacts in other locations. Specifically, wind and geothermal energy that would be viable at some locations in Kern County could create significant impacts to biological, visual, cultural, and water and soils resources.

Wind Energy

Wind carries kinetic energy that can be used to spin the blades of a wind turbine rotor and an electrical generator, which then feed alternating current (AC) into the utility grid.

Most state-of-the-art wind turbines operating today convert 35-40% of the wind's kinetic energy into electricity. A single 1.5-MW turbine operating at a 40% capacity factor generates 2,100 MWh annually.

Wind turbines currently being manufactured have power ratings ranging from 250 watts to 5 MW, and units larger than 7 MW in capacity are now under development (AWEA 2008). The average capacity of wind turbines installed in the United States in 2007 was 1.65 MW (EERE 2008). The perception of wind as an emerging energy source reached a peak in the early 1980s, when wind turbine generators to convert wind power into electricity were being installed in California at a rate of nearly 2,000 per year. Progress slowed a few years later, however, as start-up tax subsidies disappeared and experience demonstrated some deficiencies in design. At the present time, technological progress has caught up, contributing lower cost, greater reliability, and reason for genuine optimism for this renewable energy source in the future.

This technology is now well developed and can be used to generate substantial amounts of power. There are now approximately 2,490 MW of wind-generated power being produced in California (AWEA 2008). Worldwide wind capacity reached 159,213 MW in 2009, with over 38,000 MW added in 2009 (WWEA, 2010). Modern wind turbines represent viable renewable alternatives to solar energy projects in the region as exemplified by the number of wind projects applications pending at the BLM in California. The BLM has received approximately 64 applications for wind projects in the California Desert District as of August 2009, for use of over 457,769 acres of land (BLM 2009). A total of 14 applicants have been submitted for Kern County, estimating over 4,345 MW of generation (CEC 2010).

Environmental Assessment

Wind turbines can create adverse environmental impacts, as summarized below (AWEA 2008):

- Wind energy requires between 5 and 17 acres per MW of energy created. As such a nominal 250 MW power plant would require between 1,250 and 4,250 acres. However, wind turbine footprints typically use only 5% of the total area and other uses (e.g., grazing, farming) may occur on land occupied by wind turbines.
- Erosion can be a concern in certain habitats such as the desert or mountain ridgelines. Standard engineering practices can be used to reduce erosion potential.
- Birds collide with wind turbines. Avian deaths, particularly raptors, are a substantial concern depending on raptor use of the area.
- Wind energy can negatively impact birds and other wildlife by fragmenting habitat, both through installation and operation of wind turbines themselves and through the roads and power lines that are required to support the turbines.
- Bats collide with wind turbines. The extent of bat mortality depends on turbine placement and bat flight patterns.
- Visual impacts of wind turbines can be significant, and installation in scenic and high traffic areas can result in strong local opposition. Other impressions of wind turbines are that they are attractive and represent clean energy.

Summary of Impacts

Approximately 1,250 to 4,250 acres of land would be required for a 250 MW wind electricity power plant. While wind plants would not necessarily impact the same types of wildlife and vegetation as the proposed RSPP plant, the significant acreage necessary for a 250 MW wind plant would still cause significant habitat loss in addition to potentially significant impacts from habitat fragmentation and bird and bat mortality. Wind turbines are often over 400 feet high for 2-MW turbines. As such, any wind energy project would be highly visible and can conflict with civilian or military flight operations.

Rationale for Elimination

While wind electricity generation is a viable and important renewable technology in California, it would not reduce the large-scale ground disturbance and visual impacts associated with the RSPP project. Therefore wind generation was eliminated from further consideration in this SA/DPA/DEIS. Furthermore, it is part of a renewable energy supply mix along with solar thermal, which staff believes will be needed to meet SCE and statewide RPS requirements.

Geothermal Energy

Geothermal technologies use steam or high-temperature water obtained from naturally occurring geothermal reservoirs to drive steam turbine/generators. There are vapor dominated resources (dry, super-heated steam) and liquid-dominated resources where various techniques are used to extract energy from the high-temperature water.

Geothermal plants account for approximately 5% of California's power and range in size from under 1 MW to 200 MW. California is the largest geothermal power producer in the United States, with about 1,800 MW installed capacity; in 2007, 13,000 gigawatt hours of electricity were produced in California (CEC 2008). Geothermal plants provide highly reliable baseload power, with capacity factors from 90-98%. The RETI Phase 1A Report (2008) estimated an incremental capacity of approximately 2,400 MW for the entire State by 2018.

Geothermal plants must be built near geothermal reservoir sites because steam and hot water cannot be transported long distances without substantial thermal energy loss. Geothermal power plants are currently operating in the following California counties: Lake, Sonoma, Imperial, Inyo, Mono, and Lassen.

The Most-Likely (MLK) geothermal resource capacity for Kern County is 48 MW (CEC 2005). However, the Coso geothermal facility is located in Inyo County just outside Kern County on China Lake Naval Air Weapons Station and BLM lands. The Coso Operating Company recently received a permit from Inyo County to pump approximately 4,800 AFY from Rose Valley and export the water for use in its geothermal facility (OVC 2009). The water would be injected into the reservoir to enhance and stabilize steam production; output is expected to increase from the current level of 200 MW to 272 MW, the maximum generating capability of the steam turbines (Business Wire 2010).

The BLM is currently evaluating a potential geothermal leasing area of approximately 22,060 acres in Rose Valley, based on three applications the BLM received for geothermal leasing covering approximately 4,460 acres. The BLM identified

approximately 17,600 acres of public lands, also within the Haiwee Geothermal Leasing Area and adjacent to the three geothermal lease applications, which will be considered for competitive geothermal leasing under 43 CFR 3203.10(e). The Haiwee Geothermal Leasing Evaluation Initiative EIS is expected in 2010. This is considered to be a fast track project.

Geothermal Alternative Scenario

The Coso geothermal facility is a representative 250 MW project in the vicinity of the RSPP site; however production from the field will be maximized by 2011. Geothermal development in the Haiwee Geothernal Leasing Area is under evaluation and project-specific environmental documents have not been produced. In order to develop an alternative scenario for analysis, this analysis assumes that approximately two to five smaller projects would be required to achieve 250 MW of geothermal energy. While a site-specific environmental assessment is not possible, the following analysis describes the types of environmental impacts that geothermal facilities would create.

The amount of land required for a geothermal facility varies greatly. Examples of these facilities follow:

- The Truckhaven EIS Reasonably Foreseeable Development Scenario of 50 MW included use of 14,731 acres of land, of which the total surface disturbance including well locations, access roads, pipelines, power plant sites, and transmission lines was approximately 400 acres (BLM 2007).
- The Salton Sea Unit #6 project, now the Black Rock 1, 2, and 3 Geothermal Power Project, currently proposes to develop 3,180 acres of the Salton Sea Known Geothermal Resource Area (KGRA) to generate 150 MW of energy (CEC 2009a). Of the 3,180 acres, approximately 197 acres would be graded and occupied by structures (CEC 2003).
- The Obsidian Butte region of the KGRA has nine plants producing 350 MW of geothermal energy on 4,808 acres of land. The amount of ground disturbance for these projects is unknown.

Based on the above examples, 250 MW of geothermal energy could require the use of thousands of acres of land. However, the amount of ground disturbance on that area would be less than 10%. Based on the Salton Sea Unit #6 scenario, less than 900 acres of ground disturbance would be required for 750 MW of geothermal energy. The Truckhaven EIS Reasonably Foreseeable Development Scenario would require development covering nearly 6,000 acres to achieve 750 MW of energy. Additionally, while the power plant, cooling towers and brine ponds would likely be fenced, there would not likely be fencing required for the wells and well pads. In that two to five geothermal facilities would be required for provision of 250 MW, depending on the locations of the new facilities, more transmission lines and switchyards with corresponding potential impacts (i.e., biological, cultural, soil & water, land use, visual) may be required for grid interconnection, when compared to the proposed RSPP project.

Environmental Assessment

Air Quality

As with the RSPP project, construction of geothermal facilities would cause dust and exhaust emissions with crews operating off-road equipment and on-road mobile sources. The construction phase activity would also cause emissions during well drilling from diesel engine exhaust, dust from activity on unpaved surfaces, and geothermal steam from well testing. Beyond the boundaries of the project area, exhaust emissions would also be caused by workers commuting to and from the construction sites, trucks hauling equipment and supplies to the sites, dump trucks hauling away dirt or vegetation debris, and trucks delivering fresh concrete.

Toxic air contaminants and odors would be emitted as a result of fuel combustion in construction-related equipment and vehicles and as a result of geothermal steam released during well testing. Hydrogen sulfide (H_2S) in geothermal steam is a toxic air contaminant and a colorless, flammable, poisonous compound with a characteristic rotten-egg odor. Ammonia also occurs in geothermal steam and is a toxic air contaminant with a pungent, penetrating odor. Ammonia is also a precursor pollutant to particulate matter in the ambient air. Releasing geothermal steam during well testing and development would cause substantial emissions of these toxic air contaminants and odors over the construction phase. Aside from closely managing the well testing schedule, few mitigation options are available, and the impact of toxic air contaminants and odors during construction would be significant and unavoidable.

Operational air emissions would result from vehicle use that would be necessary for periodic maintenance, repair, and inspection of the facilities. Operating a geothermal power facility generally causes very low or no emissions of CO_2 or other pollutants, except when geothermal steam escapes to the atmosphere. Geothermal steam can contain varying amounts of CO_2, methane, ammonia, and H_2S.

Extracting power from geothermal steam equipment can cause emissions of ammonia and H_2S, which are odors and toxic air contaminants present in the geothermal brine. Ammonia emissions also react with ambient air to form inhalable PM10, and H_2S in the atmosphere will oxidize to SO_2 and sulfuric acid. Without proper control, emissions of these contaminants would cause increased health risks, create objectionable odors, and cause or substantially contribute to violations of H_2S and/or PM10 ambient air quality standards. These contaminants would be emitted during any short-term commissioning activities or uncontrolled releases of geothermal steam, but these impacts would be less than significant because they would be short-term and managed in accordance with ICAPCD permitting requirements.

Ammonia and H_2S emissions could be avoided with sulfur control systems and use of an air-cooling system to reduce cooling tower drift. Commonly, water cooling causes the geothermal fluid entering the cooling tower to be emitted to the atmosphere as water vapor, which results in high levels of ammonia and H_2S in the vapor from the cooling tower. However, a binary cycle plant emits only fresh water vapor from the cooling tower. Cool geothermal brine is injected into the ground after the energy is extracted.

Comparison to Proposed Project

The construction emissions resulting from building two to five geothermal facilities would be similar to the type of construction emissions for the RSPP project. However, the two to five geothermal facilities would require fewer acres of ground disturbance. Operational emissions from the geothermal facilities would be greater than those of the proposed RSPP project because of the potential emissions of ammonia and H_2S. However, with mitigation, these impacts would be less than significant.

Biological Resources

The development and utilization of geothermal energy could have adverse impacts to vegetation and wildlife from the construction of well pads, wells, ponds, power plants, access roads, pipelines, transmission lines, other generation or transmission facilities, and any temporary extra workspace. Construction of geothermal projects would cause both temporary (during construction from vegetation clearing) and permanent (displacement of vegetation with project features) impacts to vegetation and wildlife habitat. Construction activities may also result in the alteration of soil conditions, including the loss of native seed banks and changes in topography and drainage, such that the ability of a site to support native vegetation after construction is impaired. Because the geothermal facilities would not require the entire geothermal field to be fenced, wildlife migration would potentially be allowed to continue.

Exploratory drilling and associated surface disturbances could cause soil to become contaminated with construction-related materials, such as oils, greases, hydraulic fluids, etc.

Comparison to Proposed Project

As with the RSPP project, the construction of two to five geothermal facilities would result in ground disturbance and loss of vegetation and wildlife habitat. However, the geothermal facilities would disturb fewer acres than the RSPP facility. Additionally, because the geothermal field would not require perimeter fencing as with the RSPP project, the impact to wildlife migration would be reduced. As such, the geothermal facilities would create fewer impacts to biological resources compared with the RSPP project.

Cultural Resources

Currently unknown, unrecorded cultural resources may be found at the geothermal facility sites. As they are discovered, resources are recorded and information retrieved. If the nature of the resource requires it, the resource is protected. When discovered, cultural resources are treated in accordance with applicable federal and state laws and regulations as well as the mitigation measures and permit requirements applicable to a project. As with RSPP site location, resources discovered during construction of current and future projects would be subject to legal requirements designed to protect them, thereby reducing the effect of impacts.

Comparison to Proposed Project

While the construction of two to five geothermal facilities would result in ground disturbance and could impact known and unknown cultural resources, the facilities

would disturb fewer acres than the RSPP facility. As such, it is likely that the geothermal facilities would create fewer impacts to cultural resources compared with the RSPP project.

Hazardous Materials

Soil or groundwater contamination could result from accidental spill or release of hazardous materials at the geothermal facility during operations or maintenance of the transmission line, towers, wells or power plant. This could result in exposure of the facility, maintenance workers, and the public to hazardous materials; and could result in contamination to soil and/or groundwater.

Geothermal plants can also produce waste and byproducts that can have significant impacts. The most potentially harmful gas generally encountered in geothermal systems is H_2S, which at concentrations higher than 30 parts per million (ppm) is toxic (CEC 2003). It can cause a variety of problems including dizziness, vomiting, and eventually death if one is exposed for long periods of time. In concentrations above 100 ppm, H_2S can be fatal. H_2S is heavier than air and can accumulate in low-lying areas (equipment pits, ravines, and other depressions) and become concentrated over time.

H_2S releases could potentially be of concern during drilling, well testing, and plant start-up and shut-down operations, although recent technology improvements in atmospheric separators can significantly decrease emissions and noise during these operations. H_2S is now often abated at geothermal power plants, resulting in a conversion of close to 100% of the H_2S into elemental sulfur (GEA 2007). Since 1976, H_2S emissions have decreased from 1,900 pounds per hour to 200 pounds per hour despite an increase in geothermal power production from 500 MW to 2,000 MW (GEA 2007).

Comparison to Proposed Project

Both the construction and operation of two to five geothermal facilities would require the use of H_2S. Because of the potentially harmful releases of H_2S with geothermal projects, impacts from hazardous materials would be greater for the geothermal facilities. However, with mitigation these impacts would likely be less than significant.

Land Use

The amount of land required for geothermal facilities varies greatly and is contingent in part on the geothermal resource below ground. The amount of ground disturbance for a geothermal facility is significantly smaller than the total amount of land required for the geothermal field, approximately 10%. Impacts to land use depend on the existing use of the land. For example, BLM lands within the Truckhaven area are open space areas. No sensitive land uses would be traversed by or adjacent to the Truckhaven Geothermal Leasing Area. However, the Truckhaven area is used by off-highway vehicles and would potentially create impacts to recreation (see the discussion of **Recreation and Wilderness** below).

Comparison to Proposed Project

Two to five geothermal facilities are expected to require over a thousand of acres of land similar to the RSPP facility. While a smaller portion of this land would be disturbed, the entire site would be converted to an industrial use, similar to that of the RSPP facility.

Recreation and Wilderness

The construction of pipelines, wells, storage yards, staging areas, power plants, transmission lines, and roads for geothermal facilities would reduce the amount of land available to recreationists for hiking, wildlife viewing, camping, and ORV use. For example, approximately 83% of the Truckhaven Geothermal Leasing Area is within the Ocotillo Wells State Vehicular Recreation Area (SVRA). Most vehicles gain access to the SVRA through OHV routes accessible via SR-78. Geothermal development in the area would restrict or reduce the opportunities for OHV vehicles to access certain areas of the SVRA during construction of geothermal wells and electric generation facilities.

Additionally, geothermal facilities would result in a long-term impact from the noise and vibration of the power plant and nearby pipelines. Views of equipment or the addition or change of industrial structures such as pipelines, power lines, and power production facilities conflict with the natural background of recreational resources in the desert and could also diminish users' recreational experiences on lands that remain open for recreation.

Comparison to Proposed Project

As with the RSPP facility, geothermal facilities constructed on Federal land could disrupt the use of recreation and wilderness lands.

Noise and Vibration

Construction of the proposed facilities would require heavy equipment operations for grading, filling, compacting, and paving. After site preparation, noise would be generated by well-boring equipment and by normal construction activities such as the use of power saws, drills, and hammers. Noise will be generated from drilling and testing operations at each well pad and would create both continuous and intermittent noise.

Typically, the loudest noise encountered during construction, inherent in building any project incorporating a steam turbine, is created by the steam blows. After erection and assembly of the steam system, the piping and tubing that comprises the steam path has accumulated dirt, rust, scale and construction debris such as weld spatter, dropped welding rods and the like. If the plant were started up without thoroughly cleaning out these systems, all this debris would find its way into the steam turbine, quickly destroying the machine.

In order to prevent this, before the steam system is connected to the turbine, the steam line is temporarily routed to the atmosphere. High pressure steam is then allowed to escape to the atmosphere through the steam piping. This flushing action, referred to as a steam blow, is quite effective at cleaning out the steam system. Such steam blows could produce noise as loud as 118 dBA at a distance of 100 feet. However, silencers can be used to reduce noise levels by up to 44 dBA (CEC 2003).

Well operations and energy generation would also contribute to increased noise levels. The principal noise sources would be turbine operations, noise generated from cooling tower, and associated project vehicles. However, at any distance greater than roughly 0.5 miles, power plant operation would generate noise levels indistinguishable from existing ambient noise levels.

Comparison to Proposed Project

Both geothermal facilities and the RSPP facility would require use of heavy equipment which would create construction noise. However, the drilling of the geothermal wells would likely require 24 hour drilling and the power plant would operate 24 hours a day, creating more daily noise. Additionally, the geothermal facility operation would require steam blows. The additional noise caused by the geothermal facilities would create greater noise impacts than the RSPP facility.

Public Health and Safety

Without meteorological conditions and topography at the specific geothermal sites, conclusions regarding air dispersion modeling and a human health risk assessment are not possible. The analysis for the Salton Sea Unit #6 resulted in a less than significant impact to public health and safety and this same analysis would be required for each of the two to five geothermal facilities required to achieve 250 MW of geothermal energy. Without more specific site analysis comparison with the proposed RSPP facility is not possible.

One additional concern regarding hazardous materials present in geothermal facilities includes the possibility for bacterial growth to occur in the cooling tower, including Legionella. Legionella is a type of bacteria that grows in water and causes Legionellosis, otherwise known as Legionnaires' disease. Untreated or inadequately treated cooling systems in the United States have been correlated with outbreaks of Legionellosis. These outbreaks are usually associated with building heating, ventilating, and air conditioning (HVAC) systems but it is possible for growth to occur in industrial cooling towers. In order to ensure that Legionella growth is kept to a minimum, mitigation would require the project owner to prepare and implement a biocide and anti-biofilm agent monitoring program to ensure that proper levels of biocide and other agents are maintained within the cooling tower water at all times, that periodic measurements of Legionella levels are conducted, and that periodic cleaning is conducted to remove bio-film buildup. With the use of an aggressive antibacterial program coupled with routine monitoring and biofilm removal, the chances of Legionella growing and dispersing would be reduced to insignificance.

Comparison to Proposed Project

Without site specific information, a detailed comparison of the risk to public health and safety is not possible.

Socioeconomics and Environmental Justice

The socioeconomic impacts of building two to five geothermal facilities in Kern County would be similar to building and operating the RSPP project at the proposed site. The source of construction and operation workers would be similar and the estimated

benefits to Kern County would be similar. However, local county revenues from geothermal royalty and leasing revenues would be greater than revenues from a solar facility if legislation proposed by Senator Reid restoring language in the Energy Policy Act of 2005, which provided 50% of geothermal royalties to the state, 25% to the county and 25% to the federal government, is successful.

Soil and Water Resources

The construction activities associated with geothermal exploration and development have the potential for adverse impacts to surface water quality, especially through erosion of disturbed soil and resulting sedimentation. Accelerated wind and water-induced erosion may result from earthmoving activities associated with construction. Precipitation, or high intensity and short duration runoff events coupled with ground disturbing activities, can result in onsite erosion eventually increasing the sediment load into nearby waters. Soils devoid of vegetation have a high potential for erosion, particularly when disturbed. Background levels of erosion and sedimentation would also be high for the same reason.

A Stormwater Pollution Prevention Plan (SWPPP) would be required for construction of the geothermal facilities. This SWPPP will outline best management practices that will control sedimentation during construction. However, since the projects would involve extensive construction and grading over the site area, it is recommended that a drainage plan be developed to ensure minimal long-term disturbance to drainage patterns.

Excavation for geothermal wells and other project facilities, including tower foundations in shallow groundwater could contaminate groundwater if oil from excavation equipment is spilled into the excavation pit. However, per typical permit requirements, any facilities related to geothermal exploration and development must be designed with appropriate standards to protect against such releases.

A geothermal brine spill could adversely impact the soils surrounding pipelines. If a surface spill were to reach lands currently farmed, the soil would be rendered hypersaline and most likely unsuitable for agricultural purposes. It is likely that if a spill were to occur, such disturbance would be temporary, lasting only as long as remediation measures required.

The operation of the geothermal facilities and of wells, pipelines, and power facilities could cause indirect impacts to surface or groundwater quality due to a pipeline rupture, leakage, or failure from a surface impoundment or well casing leakage. Pipeline, pond, or well failures could be related to a seismic event. Any facilities related to geothermal exploration and development would be designed in accordance with appropriate standards to protect against such releases.

Geothermal facilities may require use of large amounts of fresh water. For example, the Salton Sea Unit #6 project would require approximately 293 AFY of fresh water during an average year, but could require up to 987 AFY if the brine were to reach a salinity of 25.0%. This would translate into approximately 490 AFY during an average year for 250 MW of geothermal facilities and up to 1,645 AFY. The use of 4,800 AFY from the Rose

Valley by the Coso geothermal project has raised concerns about impacts on a groundwater-fed lake, springs and wetlands and the wildlife associated with these habitats.

Comparison to Proposed Project

Impacts related to erosion and sedimentation for the two to five geothermal projects are assumed to be mitigable to less than significant because a geothermal facility requires much less ground disturbed than the RSPP facility and because there is flexibility when siting the geothermal plant structures and well pads. However, it should be noted that the geothermal facility would require a significantly greater amount of water than the RSPP facility during project operation. Overall, the geothermal facilities would create impacts to soils and water to the same degree as the proposed RSPP facility.

Traffic and Transportation

Before construction could occur at the geothermal facilities, a construction traffic control and transportation demand implementation program would need to be developed in coordination with Caltrans. This analysis may result in the need to limit construction-period truck and commute traffic to off-peak periods to avoid or reduce traffic and transportation impacts. These impacts would likely similar to those of the proposed project as the geothermal projects would likely require the use of Highway 395 and other smaller roads for access.

Comparison to Proposed Project

Impacts to traffic and transportation of the geothermal facilities would be similar to those at the proposed RSPP site, although the geothermal facilities would have no glare impacts to oncoming traffic.

Transmission Line Safety and Nuisance

Similar to the proposed project, this alternative would not be likely to cause transmission line safety hazards or nuisances. As stated in the **TRANSMISSION LINE SAFETY AND NUISANCE** section, the potential for nuisance shocks would be minimized through grounding and other field-reducing measures that would be implemented in keeping with current standard industry practices, and the potential for hazardous shocks would be minimized through compliance with the height and clearance requirements of CPUC's General Order 95. Compliance with Title 14, California Code of Regulations, section 1250, would minimize fire hazards, while the use of low-corona line design, together with appropriate corona-minimizing construction practices, would minimize the potential for corona noise and its related interference with radio-frequency communication in the area around the route. As with the proposed RSPP transmission lines, the public health significance of any related field exposures cannot be characterized with certainty. The only conclusion to be reached with certainty is that the proposed lines' design and operational plan would be adequate to ensure that the generated electric and magnetic fields are managed to an extent the CPUC considers appropriate in light of the available health effects information.

Visual Resources

Geothermal facilities would require a power plant, production wells, injection wells, and pipelines to connect the wells to the plants. The wells would be approximately 15 feet high and the pipelines may run several miles (CEC 2003). The pipelines may be elevated up to three feet off the ground. The most visible features of geothermal projects would include the steam turbine generator and crane, crystallizers, cooling towers, dilution water heaters, and emergency relief tanks (CEC 2003). The transmission interconnection and switchyards would also be visible components of a geothermal facility.

Construction of geothermal power plant and linear facilities would cause temporary adverse visual impacts due to the presence of equipment, materials, and workforce. Construction would involve the use of cranes, heavy construction equipment, temporary storage and office facilities, and temporary laydown/staging areas. Construction would include site clearing and grading, trenching, construction of the actual facilities, and site and rights-of-way cleanup and restoration.

Geothermal projects would introduce the prominent geometric forms and vertical and horizontal lines of the various structures and stacks. These structural characteristics would be consistent with the forms and lines related to any existing industrial facilities and would contrast with natural forms and lines present in the setting. The wells and pipelines would be visible to motorists and agricultural workers in the local area, particularly if they are incased in shiny aluminum jackets or are painted with reflective paint.

Geothermal facilities would likely require nighttime lighting for operational safety and security though not FAA beacons. Lighting would be directed on site to avoid back-scatter, and shielded from public view to the extent practical. High illumination areas not occupied on a regular basis would be provided with switches or motion detectors to light these areas only when occupied.

Visible plumes from cooling towers would occur. The resulting visual contrast would be high and the power plant and cooling tower would appear co-dominant compared to the surrounding landforms. Geothermal unabated dilution water heater plume may be a somewhat prominent and persistent feature in the views from sections of local roads and residences.

Comparison to Proposed Project

Geothermal facilities would introduce industrial facilities into what may be predominantly natural settings. Additionally, geothermal facilities may have visible plumes that rise hundreds of feet into the air. Their location in remote areas used for recreation could result in additional impacts. However, the permanent facilities required for a geothermal facility would be much less extensive than those required at the RSPP project with thousands of parabolic troughs approximately 20 feet tall and additional structures, up to 120 feet tall. As such, visual impacts of the RSPP facility would likely be similar to those of geothermal power facilities.

Waste Management

The minimal amounts of nonhazardous waste generated from geothermal projects, would be disposed of in a Class III waste disposal site. The brine pond solids would constitute the largest percentage of waste at geothermal facilities. Brine pond solids and scale found in pipes, clarifiers, and separators during maintenance shutdowns would be disposed of as hazardous waste in a Class I landfill. The drilling waste and H_2S abatement waste would be tested and, if found hazardous, would be disposed of in a Class I landfill.

Comparison to Proposed Project

The environmental impacts of waste disposal at geothermal facilities would be similar to those at the proposed RSPP site and would not be expected to create significant impacts.

Worker Safety and Fire Protection

Industrial environments are potentially dangerous, during both construction and operation of facilities. Workers at the proposed project would be exposed to loud noises, moving equipment, trenches, and confined space entry and egress problems. The workers may experience falls, trips, burns, lacerations, and numerous other injuries. They have the potential to be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, and electrical sparks and electrocution. It is important for the facilities to have well-defined policies and procedures, training, and hazard recognition and control at their facility to minimize such hazards and protect workers. If the facility complies with all LORS, workers would be adequately protected from health and safety hazards (CEC 2003).

During construction and operation of the geothermal facilities there is the potential for both small fires and major structural fires. Electrical sparks, combustion of fuel oil, flammable gas or liquids, explosions, and over-heated equipment, may cause small fires. Major structural fires may develop from uncontrolled fires or be caused by large explosions of flammable gasses or liquids. Compliance with all LORS would be adequate to assure protection from all fire hazards.

Comparison to Proposed Project

The environmental impact of worker safety and fire protection at geothermal facilities sites would be similar to that at the proposed RSPP site.

Engineering Assessment

Facility Design

This analysis encompasses the civil, structural, mechanical and electrical engineering design of a project. It is assumed that each renewable technology would abide by the required LORS for that facility and would comply with the California Building Standards Code.

Geology, Paleontology and Minerals

Active seismicity and subsidence generally occur in areas with high levels of tectonic activity (e.g., volcanic regions, fault zones), which are the same areas in which geothermal resources occur; therefore, it is difficult to discern between power plant-induced and naturally occurring seismicity and subsidence. Drilling deep into the earth's crust to access high-temperature geothermal resources and subsequent re-injection of fluid into the geothermal reservoir may result in microearthquakes, which are generally below magnitude 2-3 on the Richter scale. These microearthquakes are typically centered on the injection site and are too low to be noticed by humans (Kagel 2007).

The applicant would follow all applicable building codes and standard practices for power plant construction as required by the CEC including: Title 24, California Code of Regulations, which adopts the current edition of the CBC as minimum legal building standards; the 2001 California Building Code (CBC) for design of structures; the 1996 Structural Engineers Association of California's Recommended Lateral Force Requirements, for seismic design; ASME-American Society of Mechanical Engineers Boiler and Pressure Vessel Code, and the NEMA-National Electrical Manufacturers Association.

Subsidence can occur naturally or through the extraction of subsurface fluids, including geothermal fluids. Subsidence has been proven to be effectively mitigated through injection of spent geothermal fluids into the underground reservoir (CEC 2003a). Injection is regulated by the U.S. Environmental Protection Agency (EPA) to adhere to requirements of the Underground Injection Control Program.

Site specific information regarding mineral resources and paleontological resources would be required. However, it is likely that should mineral resources and paleontological resources be present, mitigation would be required to reduce the impacts to less than significant. This is because both mineral and paleontological resources could be avoided through the flexible siting of the project infrastructure.

Comparison to Proposed Project

Geothermal facilities sites would create greater impacts to geologic resources because they are known to create microearthquakes through the development of the technology.

Power Plant Efficiency

Both geothermal facilities and the RSPP project would decrease reliance on fossil fuel, and would increase reliance on renewable energy resources. They would not create significant adverse effects on fossil fuel energy supplies or resources, would not require additional sources of energy supply, and would not consume fossil fuel energy in a wasteful of inefficient manner.

Power Plant Reliability

Geothermal facilities may achieve a 95% or higher availability (CEC 2003). Because the geothermal steam is available throughout the day, geothermal facilities provide an adequate level of reliability throughout the entire day.

Comparison to Proposed Project

Compared to solar energy, geothermal facilities provide a higher reliability because of their ability to provide base load energy throughout the entire day, whereas solar projects can generate power only when the sun is shining.

Transmission System Engineering

The geothermal facilities would require evaluating the capacity of the transmission lines that would be used for interconnection. The geothermal facilities may cause adverse effects to the transmission system and require system upgrades.

Summary of Impacts – Geothermal Technology

Geothermal facilities would have impacts similar to the proposed RSPP project for 13 of the 20 environmental and engineering resource elements: land use, recreation and wilderness, public health and safety, socioeconomics, soil and water resources, traffic and transportation, transmission line safety and nuisance, visual, waste management, worker safety and fire protection, facility design, power plant efficiency, and transmission system engineering.

Geothermal generation would likely have greater impacts than the proposed RSPP site for four resource elements: air quality, hazardous materials, noise and vibration, and geology, paleontology and minerals.

Geothermal generation would likely have fewer impacts than the proposed RSPP site for three resources: biological resources, cultural resources, and power plant reliability.

Rationale for Elimination

Geothermal generation is a commercially available technology and is important for California's renewable energy future because it provides baseload power that is available 24 hours a day. It also can be developed with substantially less ground disturbance than that needed for the RSPP project, so impacts related to biological and cultural resources would be reduced. However, despite the encouragement provided by Renewable Portfolio Standard targets and ARRA funding, no geothermal projects are included on the Renewable Energy Action Team list of projects requesting ARRA funds. No geothermal projects may be expected in the future, however, particularly in Inyo County. Therefore, while the technology is clearly feasible and additional development is expected, the technology is not retained for detailed analysis in this SA/DPA/DEIS.

Biomass Energy

Electricity can be generated by burning organic fuels in a boiler to produce steam, which then turns a turbine; this is biomass generation. Biomass can also be converted into a fuel gas such as methane and burned to generate power. Wood is the most commonly used biomass for power generation. Major biomass fuels include forestry and mill wastes, agricultural field crop and food processing wastes, and construction and urban wood wastes. Several techniques are used to convert these fuels to electricity, including direct combustion, gasification, and anaerobic fermentation. Biomass facilities do not require the extensive amount of land required by the other renewable energy sources discussed, but they generate much smaller amounts of electricity.

Currently, nearly 19% of the state's renewable electricity derives from biomass and waste-to-energy sources (CEC 2007). Most biomass plant capacities are in the 3- to 10-MW range and typically operate as baseload capacity. Kern County currently has one proposed biomass project (44 MW), the Mt. Poso Cogeneration Company project (CEC 2010a). The average size of a sales generation biomass plant is 21 MW (CBEA 2008). Unlike other renewable sources, the locational flexibility of biomass facilities would reduce the need for substantial transmission investments. Solid fuel biomass (total of 555 MW) makes up about 1.75% of the state's electricity, and landfill methane gas generation (total of 260 MW) makes up about 0.75%. Existing landfills not now producing electricity from gas could add a maximum of about 170 MW of new generation capacity (CBEA 2008).

Environmental Assessment

Generally, small amounts of land are required for biomass power facilities; however, a biomass facility should be sited near a relatively large source of biomass to minimize the cost and truck emissions associated with bringing the biomass waste to the facility. Operational noise impacts may be a concern, originating from truck engines entering and exiting the facility repeatedly on a daily basis. Other operations of the biomass facilities, while internal to the main structure, can result in increased noise due to the material grinding equipment.

The emissions due to biomass fuel-fired power plant operation are generally unavoidable. Direct impacts of criteria pollutants could cause or contribute to a violation of the ambient air quality standards. Significant impacts can potentially occur for PM10 and ozone because emissions of particulate matter and precursors and ozone precursors could contribute to existing violations of the standards for those criteria pollutants. Biomass/biogas facility emissions could also adversely affect visibility and vegetation in federal Class I areas or state wilderness areas as a result of significantly deteriorating air quality related values in the wilderness areas. Toxic air contaminants from routine operation would also cause health risks that could adversely affect sensitive receptors in the local area of the plant.

Rationale for Elimination

Most biomass facilities produce only small amounts of electricity (in the range of 3 to 10 MW) and so could not meet the project objectives. Biomass facilities also generate significant air emissions and require numerous truck deliveries to supply the plants with the biomass waste materials. Also, in waste-to-energy facilities, there is some concern regarding the emission of toxic chemicals, such as dioxin, and the disposal of the toxic ash that results from biomass burning. Therefore, this technology is not analyzed in detail in this SA/DPA/DEIS as an alternative to the RSPP project.

Tidal Energy

The oldest technology to harness tidal power for the generation of electricity involves building a dam, known as a *barrage*, across a bay or estuary that has large differences in elevation between high and low tides. Water retained behind a dam at high tide generates a power head sufficient to generate electricity as the tide ebbs and water released from within the dam turns conventional turbines.

Certain coastal regions experience higher tides than others. This is a result of the amplification of tides caused by local geographical features such as bays and inlets. In order to produce practical amounts of power for tidal barrages, a difference between high and low tides of at least 5 meters is required. There are about 40 sites around the world with this magnitude of tidal range. The higher the tides, the more electricity can be generated from a given site and the lower the cost of the electricity produced. Worldwide, existing power plants using tidal energy include a 240-MW plant in France, a 20-MW plant in Nova Scotia, and a 0.5-MW plant in Russia (EPRI 2006).

Tidal Fences

Tidal fences are effectively barrages that completely block a channel. If deployed across the mouth of an estuary, they can be very environmentally destructive. However, in the 1990s, their deployment in channels between small islands or in straights between the mainland and islands has increasingly been considered a viable option for the generation of large amounts of electricity.

The advantage of a tidal fence is that all the electrical equipment (generators and transformers) can be kept high above the water. Also, by decreasing the cross-section of the channel, current velocity through the turbines is significantly increased.

The United Kingdom is currently considering the feasibility of tidal energy across the Bristol Channel. The feasibility study began with the consideration of the Severn tidal barrage. The barrage would work similarly to a dam which generates hydro electric power by holding water back before it is allowed to flow at speed through a pipe at the base of the dam to drive the turbines (BBC 2007). Since then, alternative tidal projects have been proposed, including a tidal fence that would allow shipping to move freely and keep ports at Cardiff and Bristol open (BBC 2008). The results of the feasibility study are expected to be published in 2010; however, preliminary results from the Sustainable Development Commission confirmed the potential of the huge Severn tidal range to generate approximately 5% of United Kingdom's electricity (BIS 2009).

Tidal Turbines

Tidal turbines are the chief competition to the tidal fence. Looking like an underwater wind turbine, they offer a number of advantages over the tidal fence. They are less disruptive to wildlife, allow small boats to continue to use the area, and have much lower material requirements than tidal fences.

Tidal turbines function well where coastal currents run at 2 to 2.5 meters per second (slower currents tend to be uneconomic while larger ones stress the equipment). Such currents provide an energy density four times greater than air, meaning that a 15-meter-diameter turbine will generate as much energy as a 60-meter-diameter windmill. In addition, tidal currents are both predictable and reliable, a feature which gives them an advantage over both wind and solar systems. The tidal turbine also offers significant environmental advantages over wind and solar systems because the majority of the assembly is hidden below the waterline and all cabling is along the sea bed.

There are many sites around the world where tidal turbines could be effectively installed. An ideal site is close to shore (within 1 kilometer) in water depths of about 20

to 30 meters. In April 2007, the first major tidal-power project was installed in the United States off New York City's Roosevelt Island (Fairley 2007). Turbines such as those used in New York City use in-flow turbines, thereby lessening the environmental impacts. A study conducted in 2006, *System Level Design, Performance, Cost and Economic Assessment – San Francisco Tidal In-Stream Power Plant*, concluded that a tidal plant located under the Golden Gate Bridge could create approximately 35 MW of power with no significant impacts to the environment and recommended further research and development into both ocean energy technology and a pilot project in San Francisco (EPRI 2006a).

Environmental Assessment

Tidal technologies, especially tidal fences, have the potential to cause significant biological impacts, especially to marine species and habitats. Fish could be caught in the unit's fins by the sudden drop in pressure near the unit. The passageways, more than 15 feet high and probably sitting on a bay floor, could squeeze out marine life that lives there or alter the tidal flow, sediment build-up, and the ecosystem in general. Even the in-flow turbines can have adverse impacts on marine systems. The in-flow turbines off New York City must undergo environmental monitoring for 18 months to ensure the turbines will not create adverse impacts to the river's marine wildlife. Also, depending on the location of the tidal technology, commercial shipping could be disrupted during construction.

The reduced tidal range (difference between high and low water levels) resulting from tidal energy generation can destroy inter-tidal habitat used by wading birds. Sediment trapped behind the barrage could also reduce the volume of the estuary over time.

Rationale for Elimination

Tidal fence technology is a commercially available technology in Europe, although limited to areas that are adjacent to a body of water with a large difference between high and low tides, and it can result in significant environmental impacts to ocean ecosystems. In-flow tidal turbines are a relatively new technology and are not considered an alternative to the RSPP project because they are an unproven technology at the scale that would be required to replace the proposed project. Additionally, the potential for adverse impacts of tidal turbines is still under review, as demonstrated by the pilot project under environmental monitoring in New York. Therefore, this technology is not analyzed in detail in this SA/DPA/DEIS as an alternative to the RSPP project.

Wave Energy

Wave power technologies have been used for nearly 30 years. Setbacks and a general lack of confidence have contributed to slow progress towards proven devices that would have a good probability of becoming commercial sources of electrical power using wave energy.

The highest energy waves are concentrated off the western coasts of the United States in the 40^{o} to 60^{o} latitude range north and south. The power in the wave fronts varies in these areas between 30 and 70 kilowatts per meter (kW/m) with peaks to 100 kW/m in the Atlantic southwest of Ireland, the Southern Ocean and off Cape Horn. Many wave energy devices are still in the research and development stage and would require large

amounts of capital to get started. Additional costs from permitting and environmental assessments also make wave energy problematic (WEC 2007). Nonetheless, wave energy is likely to increase in use within the next 5 to 10 years.

The total power of waves breaking on the world's coastlines is estimated at 2 to 3 million MW. In favorable locations, wave energy density can average 65 MW per mile of coastline. Three approaches to capturing wave energy are:

- Floats or Pitching Devices. These devices generate electricity from the bobbing or pitching action of a floating object. The object can be mounted to a floating raft or to a device fixed on the ocean floor.
- Oscillating Water Columns. These devices generate electricity from the wave-driven rise and fall of water in a cylindrical shaft. The rising and falling water column drives air into and out of the top of the shaft, powering an air-driven turbine.
- Wave Surge or Focusing Devices. These shoreline devices, also called tapered channel or tapchan systems, rely on a shore-mounted structure to channel and concentrate the waves, driving them into an elevated reservoir. Water flow out of this reservoir is used to generate electricity, using standard hydropower technologies.

In December 2007, PG&E signed a power purchase agreement with Finavera Renewables, which had planned to operate a wave farm approximately 2.5 miles off the coast of Eureka, California. The agreement was for 2 MW of power beginning in 2012. On October 16, 2008, the California Public Utilities Commission rejected PG&E's request for approval of a renewable resource procurement contract with Finavery Renewables because, among other reasons, the CPUC concluded the project had not been shown to be viable. As stated in that decision, there is significant uncertainty surrounding wave technology and the wave energy industry is at a beginning stage (CPUC 2008). The CPUC did authorize up to $4.8 million for PG&E to undertake its WaveConnect project in Decision D.09-01-036. WaveConnect is designed to document the feasibility of a facility that converts wave energy into electricity by using wave energy conversion (WEC) devices in the open ocean adjacent to PG&E's service territory.

In January 2010, the California State Lands Commission and the Federal Energy Regulatory Commission issued a Request for Statements of Interest to prepare an environmental document for the PG&E WaveConnect project discussed above. PG&E has selected a wave energy project siting area that is between 2.5 and 3.0 nautical miles (nm) from the shore in Humboldt County. WaveConnect consists of: (1) wave energy converters (WECs) including multi-point catenary moorings and anchors; (2) marker buoys, navigation lights, and environmental monitoring instruments; (3) subsea electrical cables extending on-shore to (4) land-based power conditioning equipment; (5) an above-ground transmission line and interconnection to the electrical grid; (6) data acquisition and telemetry equipment; and (7) security and safety equipment.

Environmental Assessment

The environmental impacts of wave power have yet to be fully analyzed. A recent study published by the U.S. Department of Commerce and National Oceanic and Atmospheric

Administration listed a number of potentially significant environmental impacts created by wave power (Boehlert 2008):

- Significant reduction to waves with possible effects to beaches (e.g. changes to sediment transport processes).
- The use of buoys may have positive effects on forage fish species, which in turn could attract larger predators. Structures need to be designed to reduce the potential entanglement of larger predators, especially marine turtle species.
- Modifications to water circulation and currents may result in changes to larval distribution and sediment transport.
- Wave energy development may affect community structures for fish and fisheries.
- Lighting and above-water structures may result in marine bird attraction and collisions and may alter food webs and beach processes.
- A diversity of concerns would arise regarding marine mammals including entanglement issues.
- Energy-absorbing structures may affect numerous receptors and should avoid sensitive habitats.
- Potential hazards from chemicals used in the process must be addressed both for spills and for a continuous release such as in fouling paints.
- New hard structures and lighting may break loose and increase debris accumulation.
- Impacts on fish and marine mammals caused by noise coming from the buoys should be understood and mitigated.
- Electromagnetic effects may affect feeding or orientation and should be better understood.
- Impact thresholds need to be established. As projects scale up in location or implementation, new risks may become evident.

Rationale for Elimination

Wave energy is new and may not be technologically feasible; as stated above, PG&E is proposing to sponsor a project to test the feasibility of harnessing wave energy. Additionally, wave power must be located where waves are consistently strong; even then, the production of power depends on the size of waves, which result in large differences in the amount of energy produced. Wave technology is not considered an alternative to the RSPP project because is an unproven technology at the scale that would be required to replace the proposed project and because it may also result in substantial adverse environmental impacts. Therefore, this technology is not analyzed in detail in this SA/DPA/DEIS as an alternative to the RSPP project.

B.2.8.4 Alternative Methods of Generating or Conserving Electricity

Nonrenewable generation technologies that require use of natural gas, coal, or nuclear energy would not achieve the key project objective for the proposed RSPP project to provide clean, renewable, solar-powered electricity and to assist SCE in meeting its obligations under California's Renewable Portfolio Standard Program.

While these generation technologies would not achieve this key objective, they are described briefly in this section to present this information to the public and decision makers. Conservation and demand-side management are also briefly addressed in this section.

The following topics were considered in this analysis:

- Natural gas
- Coal
- Nuclear energy
- Conservation and demand-side management

Of the three nonrenewable generation alternatives (natural gas, coal, and nuclear), only natural gas-fired power plants would be viable alternatives within California. However, gas-fired plants would fail to meet a major project objective to construct and operate a renewable power generating facility in California capable of selling competitively priced renewable energy consistent with the needs of California utilities and would therefore not achieve the purpose and need of the project. Because these alternatives would not support renewable power generation within California, and could have significant environmental impacts of their own, they were eliminated from further consideration.

Natural Gas Generation

Natural gas power generation accounts for approximately 22% of all the energy used in the United States and comprises 40% of the power generated in California (CEC 2007). Natural gas power plants typically consist of combustion turbine generators, heat recovery steam generators, a steam turbine generator, wet or dry cooling towers, and associated support equipment. An interconnection with a natural gas pipeline, a water supply, and electric transmission are also required. A gas-fired power plant generating 250 MW would generally require about 10 acres of land.

Environmental Assessment

Natural gas power plants may result in numerous adverse environmental impacts such as the following.

- Overall air quality impacts would increase because natural gas-fired power plants can contribute to local violations of the PM10 and ozone air quality standards, and operational emissions could result in toxic air contaminants that could adversely affect sensitive receptors. Net increases in greenhouse gas emissions due to natural gas-firing in the conventional power plants would also be substantial.
- Environmental justice may be a concern. Gas-fired power plants tend to be located in developed urban areas that are zoned for heavy industry. In some instances, low-income and minority populations are also located in such areas.
- To avoid adverse land use impacts, natural gas-fired power plants must be consistent with local jurisdictions' zoning.
- Several hazardous materials, including regulated substances (aqueous ammonia, hydrogen, and sulfuric acid), would be stored at a natural gas power plant during

- Cultural impacts can be severe depending on the power plant siting; however, because natural gas power plants require substantially fewer acres per MW of power generated, impacts to cultural resources would be expected to be fewer than with solar facilities.
- Power plant siting may result in the permanent conversion of designated farmland to non-agricultural uses. However, because natural gas power plants require substantially fewer acres per MW of power generated, impacts to designated farmlands would be expected to be less than with solar facilities.
- Visual impacts may occur with natural gas power plants because they introduce large structures with industrial character. The most prominent structures are frequently the cooling towers, which may reach 100 feet tall, and the power plant stacks, which may reach over 100 feet tall. Visible plumes from the cooling tower would also potentially occur.

Rationale for Elimination

Although natural gas generation is clearly a viable technology, it is not a renewable technology, so it would not attain the objective of generating renewable power meeting California's renewable energy needs. The air quality impacts of gas-fired plants include greenhouse gases and are one major reason that California's Renewable Portfolio Standard was developed. Therefore, this alternative is not considered in detail as an alternative to the RSPP project and is not analyzed further in this SA/DPA/DEIS.

Coal Generation

Coal-fired electric generating plants are the cornerstone of America's electric power generation system. Traditional coal-fired plants generate large amounts of greenhouse gases. New efforts to develop cleaner coal technology including processes that reduce air emissions and other pollutants from coal-burning power plants are in various phases of research and design. The Clean Coal Power Initiative is providing government co-financing for new coal technologies that help utilities meet the Clear Skies Initiative to cut sulfur, nitrogen, and mercury pollutants by nearly 70% by 2018. The Clean Coal Power Initiative is now focusing on developing projects that use carbon sequestration technologies and/or beneficial reuse of carbon dioxide (DOE 2008). However, these technologies are not yet in use and from initial mining of coal to final disposal of waste fly ash, coal creates significant adverse impacts to the environment and human health.

In 2006, approximately 15.7% of the energy used in California came from coal fired sources; 38% of this was generated in state, and 62% was imported (CEC 2007). The in-state coal-fired generation includes electricity generated from out-of-state, coal-fired power plants owned by and reported by California utilities (CEC 2007). In 2006, California enacted Senate Bill 1368 (Perata, Chapter 598, Statutes of 2006), which

prohibits utilities from making long-term commitments for electricity generated from plants that create more carbon dioxide (CO_2) than clean-burning natural gas plants (CEC 2007).

Environmental Assessment

Coal-fired power plants may also result in numerous adverse environmental impacts such as the following.

- Overall, air quality impacts would increase because coal-fired power plants contribute carbon dioxide, sulfur dioxide, nitrogen oxides, mercury, and fly ash (USEPA 2008a). Mining, cleaning, and transporting coal to the power plants generates additional emissions. Average per megawatt hour emissions of a coal-fired power plant are 2,249 pounds of carbon dioxide, 13 pounds of sulfur dioxide and 6 pounds of nitrogen oxides (USEPA 2008a). Net increases in greenhouse gas emissions due to coal-firing in conventional power plants would be significant.
- Health risks associated with power plants have also been documented, including problems associated with exposure to fine particle pollution or soot, an increase in asthma, and an increase in non-fatal heart attacks.
- Large quantities of water are generally required to produce steam and for cooling. When coal-fired power plants use water from a lake or river, fish or other aquatic life can be adversely impacted (USEPA 2008).

Rationale for Elimination

Although coal generation is a viable technology, it is not a renewable technology, so it would not attain the objective of generating renewable power meeting California's renewable energy needs. Existing technology for coal-fired plants results in high greenhouse gas emissions. Therefore, coal generation was eliminated from detailed analysis and is not considered further in this SA/DPA/DEIS.

Nuclear Energy

Due to environmental and safety concerns, California law currently prohibits the construction of new nuclear power plants in the state until the California Energy Commission finds that the federal government has approved and there exists a demonstrated technology for the permanent disposal of spent fuel from these facilities (CEC 2006). In June 1976, California enacted legislation directing the Energy Commission to perform an independent investigation of the nuclear fuel cycle. This investigation was to assess whether the technology to reprocess nuclear fuel rods or to permanently dispose of high-level nuclear waste had been demonstrated and approved and was operational (Public Resources Code 25524.1 (a) (1), 25524.1 (b), and 25524.2 (a)). After extensive public hearings, the Energy Commission determined that it could not make the requisite affirmative findings concerning either reprocessing of nuclear fuel or disposal of high-level waste as documented in the *Status of Nuclear Fuel Reprocessing, Spent Fuel Storage and High-level Waste Disposal*, Energy Commission publication P102-78-001 (January 1978.) As a result, the development of new nuclear energy facilities in California was prohibited by law.

It has been more than 25 years since the last comprehensive Energy Commission assessment of nuclear power issues. The *Nuclear Power in California: 2007 Status Report* (October 2007) provides a detailed description of the current nuclear waste issues and their implications for California. This was prepared as part of the development of the Energy Commission's *2007 Integrated Energy Policy Report* (CEC 2007a).

Rationale for Elimination

The permitting of new nuclear facilities in California is currently illegal, so this technology is infeasible and is not considered further in this SA/DPA/DEIS.

Conservation and Demand-Side Management

Conservation and demand-side management consist of a variety of approaches to reduction of electricity use, including energy efficiency and conservation, building and appliance standards, and load management and fuel substitution. In 2005 the Energy Commission and CPUC's Energy Action Plan II declared cost effective energy efficiency as the resource of first choice for meeting California's energy needs. The Energy Commission noted that energy efficiency has helped flatten the state's per capita electricity use and saved consumers more than $56 billion since 1978 (CPUC 2008). The investor-owned utilities' 2006-2008 efficiency portfolio marks the single-largest energy efficiency campaign in U.S. history, with a $2 billion investment by California's energy ratepayers (CPUC 2008). However, with population growth, increasing demand for energy, and the need to reduce greenhouse gases, there is a greater need for energy efficiency.

The CPUC, with support from the Governor's Office, the Energy Commission, and the California Air Resources Board, among others, adopted the *California Long-Term Energy Efficiency Strategy Plan for 2009 to 2020* (CPUC 2008). The plan is a framework for all sectors in California including industry, agriculture, large and small businesses, and households. Major goals of the plan include:

- All new residential construction will be zero net energy by 2020;
- All new commercial construction will be zero net energy by 2030;
- Heating, ventilation, and air conditioning industries will be re-shaped to deliver maximum performance systems;
- Eligible low-income customers will be able to participate in the Low Income Energy Efficiency program and will be provided with cost-effective energy efficiency measures in their residences by 2020.

Rationale for Elimination

Conservation and demand-side management are important for California's energy future and cost effective energy efficiency is considered as the resource of first choice for meeting California's energy needs. However, with population growth and increasing demand for energy, conservation and demand-management alone are not sufficient to address all of California's energy needs. Additionally, it will not provide the renewable energy required to meet the California Renewable Portfolio Standard requirements, so

technologies, like solar thermal generation, would be required. Therefore, they are not analyzed in detail in this SA/DPA/DEIS as an alternative to the RSPP project.

B.2.9 CONCLUSIONS OF ALTERNATIVES ANALYSIS

In this analysis of the RSPP project, 26 alternatives to the proposed RSPP project were developed and evaluated. These include three modifications of the project at the RSPP site, no action/no project alternatives, a solar PV facility at the RSPP site, five alternative sites, solar and renewable technologies, generation technologies using different fuels, and conservation/demand-side management.

Of the three modifications at the RSPP site, the Northern Unit Alternative and the Southern Unit Alternative would reduce impacts in comparison to the proposed project but would still result in significant adverse impacts to biological resources that cannot be mitigated. These alternatives would meet most the project objectives (though reducing the generation capacity), but would not attain the purpose and need for the project. The Original Proposed Project Alternative would meet project objectives and the purpose and need for the project but would increase impacts in comparison to the proposed project.

Energy Commission staff consider the No Project/No Action Alternative to be superior to the proposed project. While it would eliminate the potential for 250 MW of additional solar thermal power created using parabolic trough technology at the RSPP site and thus not meet project objectives, it would eliminate significant immitigable visual and biological resource impacts associated with the RSPP project. New renewable resources may be developed to meet the State's RPS requirements in the absence of the RSPP project.

Alternatives Table 3 identifies the impacts from the four NEPA/CEQA Alternatives and the No Project/No Action Alternative as determined in the technical areas discussed in Sections C and D.

Alternatives Table 3
Impact Comparison of NEPA/CEQA Alternatives

Alternative	Proposed Project	Northern Unit	Southern Unit	Original Project	No Project/ No Action
Technical Area					
Air Quality	• Less than significant impacts with mitigation. • Cumulative impacts less than significant with mitigation.	• Less than significant impacts with mitigation. • Cumulative impacts less than significant with mitigation.	• Less than significant impacts with mitigation. • Cumulative impacts less than significant with mitigation.	• Less than significant impacts with mitigation. • Cumulative impacts less than significant with mitigation.	• No Impact
Biological Resources	• Significant, immitigable impacts to desert tortoise and MGS and habitat linkages. • Significant cumulative impacts to desert tortoise, MGS and habitat linkages.	• Significant, immitigable impacts to desert tortoise and MGS and habitat linkages. • Significant cumulative impacts to desert tortoise, MGS and habitat linkage.	• Significant, immitigable impacts to desert tortoise and MGS and habitat linkages. • Significant cumulative impacts to desert tortoise, MGS and habitat linkage.	• Significant, immitigable impacts to desert tortoise and MGS and habitat linkages. • Significant cumulative impacts to desert tortoise, MGS and habitat linkage.	• No Impact
Cultural Resources	• Significant impacts to Last Chance Canyon Archeological District, El Paso Mountains Native American sacred lands site and 17 assumed eligible archeological sites; however, less than significant with mitigation (BLM-SHPO-CEC Programmatic agreement).	• Less than significant impacts with mitigation.	• Less than significant impacts with mitigation.	• Less than significant impacts with mitigation.	• No Impact

Alternative	Proposed Project	Northern Unit	Southern Unit	Original Project	No Project/ No Action
Hazardous Materials	• Less than significant impacts with mitigation.	• Less than significant impacts with mitigation.	• Less than significant impacts with mitigation.	• Less than significant impacts with mitigation.	• No Impact
Land Use, Recreation & Wilderness	• Less than significant impacts to Recreation with mitigation.	• Less than significant impacts to Recreation with mitigation.	• Less than significant impacts to Recreation with mitigation.	• Less than significant impacts to Recreation with mitigation.	• No Impact
Noise & Vibration	• Impacts from construction less than significant with mitigation. • Less than significant impacts during operation.	• Impacts from construction less than significant with mitigation. • Less than significant impacts during operation.	• Impacts from construction less than significant with mitigation. • Less than significant impacts during operation.	• Impacts from construction less than significant with mitigation. • Less than significant impacts during operation.	• No Impact
Public Health & Safety	• Less than significant Impacts.	• Less than significant Impacts.	• Less than significant Impacts.	• Less than significant Impacts.	• No Impact
Socioeconomics & Environmental Justice	• Less than significant impacts. • Beneficial impacts to local employment, local business and local government.	• Less than significant impacts.	• Less than significant impacts.	• Less than significant impacts. • Beneficial impacts to local employment, local business and local government.	• No Impact
Soil & Water Resources	• Significance determination of impacts to Project from flash flooding and mass erosion cannot be made at this time. • Significance determination of impacts to groundwater levels in the IWVGB cannot be made at this time. • Significant	• Significant impacts to onsite drainage systems, less than proposed project.	• Significant impacts to onsite drainage systems, less than proposed project.	• Significant impacts from soil and wind erosion, greater than proposed project. • Significant impacts to onsite and offsite (El Paso wash) drainage systems.	• No Impact

Alternative	Proposed Project	Northern Unit	Southern Unit	Original Project	No Project/ No Action
	impact to onsite drainage systems. • Temporary cumulative impacts to surface water hydrology, due to grading and construction of drainage channels within the flood plain.				
Traffic & Transportation	• Less than significant impacts to collision rate at US 395 & China Lake Blvd with proposed mitigation. • Less than significant impacts to motorists from glare with proposed mitigation. • Potential cumulative impacts to traffic, routes and patterns. • Impacts to military operations from vapor plumes cannot be determined at this time.	• Less than significant impacts to collision rate at US 395 & China Lake Blvd with proposed mitigation. • Less than significant impacts to motorists from glare with proposed mitigation. • Potential cumulative impacts to traffic, routes and patterns.	• Less than significant impacts to collision rate at US 395 & China Lake Blvd with proposed mitigation. • Less than significant impacts to motorists from glare with proposed mitigation. • Potential cumulative impacts to traffic, routes and patterns.	• Less than significant impacts to collision rate at US 395 & China Lake Blvd with proposed mitigation. • Less than significant impacts to motorists from glare with proposed mitigation. • Potential cumulative impacts to traffic, routes and patterns.	• No Impact
Transmission Line Safety and Nuisance	• Less than significant impacts with mitigation.	• Less than significant impacts with mitigation.	• Less than significant impacts with mitigation.	• Less than significant impacts with mitigation.	• No Impact
Visual Resources	• Significant, immitigable impacts from glare, affecting day and night views and	• Significant, immitigable impacts from glare • Significant, immitigable	• Significant, immitigable impacts from glare • Significant, immitigable	• Significant, immitigable impacts from glare • Significant, immitigable	• No Impact

Alternative	Proposed Project	Northern Unit	Southern Unit	Original Project	No Project/ No Action
	significant impacts to quality and character of viewshed. • Significant, immitigable cumulative impacts to viewshed.	cumulative impacts to viewshed.	cumulative impacts to viewshed.	cumulative impacts to viewshed.	
Waste Management	• Less than significant Impacts on landfill capacity.	• Less than significant Impacts on landfill capacity.	• Less than significant Impacts on landfill capacity.	• Less than significant Impacts on landfill capacity.	• No Impact
Worker Safety	• Less than significant impact on local fire protection with mitigation. • Less than significant cumulative impact on local fire protection with mitigation.	• Less than significant impact on local fire protection with mitigation. • Less than significant cumulative impact on local fire protection with mitigation.	• Less than significant impact on local fire protection with mitigation. • Less than significant cumulative impact on local fire protection with mitigation.	• Less than significant impact on local fire protection with mitigation. • Less than significant cumulative impact on local fire protection with mitigation.	• No Impact
Facility Design	• N/A	• N/A	• N/A	• N/A	• N/A
Geo/Paleo Resources	• Less than significant impacts to Geologic Hazardous (ground shaking) and Paleontological Resources with mitigation. • Cumulative impacts less than significant with mitigation.	• Less than significant impacts to Geologic Hazardous (ground shaking) and Paleontological Resources with mitigation. • Cumulative impacts less than significant with mitigation.	• Less than significant impacts to Geologic Hazardous (ground shaking) and Paleontological Resources with mitigation. • Cumulative impacts less than significant with mitigation.	• Less than significant impacts to Geologic Hazardous (ground shaking) and Paleontological Resources with mitigation. • Cumulative impacts less than significant with mitigation.	• No Impact
Power Plant Efficiency	• Less than significant	• Less than significant	• Less than significant	• Less than significant	• No Impact

Alternative	Proposed Project	Northern Unit	Southern Unit	Original Project	No Project/ No Action
	impacts to fossil fuel energy resources.	impacts to fossil fuel energy resources	impacts to fossil fuel energy resources	impacts to fossil fuel energy resources	
Power Plant Reliability	• Project operation and construction considered reliable.	• Project operation and construction considered reliable.	• Project operation and construction considered reliable.	• Project operation and construction considered reliable.	• No Impact
Transmission System Engineering	• Indirect transmission impacts cannot be determined at this time. Phase II Study and LGIA needed.	• Indirect transmission impacts cannot be determined at this time. Phase II Study and LGIA needed.	• Indirect transmission impacts cannot be determined at this time. Phase II Study and LGIA needed.	• Indirect transmission impacts cannot be determined at this time. Phase II Study and LGIA needed.	• No Impact

Impacts of a solar PV facility at the RSPP site would depend on the degree of grading required; reduced need for grading would reduce impacts to biological resources. Additionally, fencing may permit movement of desert tortoises. Less grading would also reduce cultural resource impacts. Impacts to water use during operations would be substantially reduced. Visual impacts would be reduced due to shorter components of a PV facility. Impacts to recreation and wilderness would be similar.

The Garlock Road site alternative is evaluated in detail by the Energy Commission in this SA/DPA/DEIS under CEQA only. While the impacts of this site would be similar to those of the proposed site in many disciplines, this site would likely have less severe biological and cultural impacts. The site is potentially available but flooding in the area may affect feasibility of locating a project at the Garlock Road site. Transmission interconnection may be difficult in that sensitive areas occur along the right of way. The four other alternative sites (Alabama Hills, Boron, California City and Ridgecrest Landfill) would not substantially reduce impacts and the feasibility of developing projects at these locations is reduced because of size limitations, past operations and private ownership.

All five site alternatives were considered infeasible by the Bureau of Land Management because they would not be reasonable based on the Purpose and Need Statement developed in response to the application received.

Alternative solar thermal technologies (solar power tower, Stirling dish, and linear Fresnel) were also evaluated. As compared with the proposed RSPP parabolic trough technology, these technologies would not substantially change the severity of biological resources and cultural resources impacts, although the land requirements vary among the technologies. Rooftop solar PV would require extensive acreage although it would

minimize the need for undisturbed or vacant land. However, increased deployment of rooftop solar PV faces challenges in manufacturing capacity, cost, and policy implementation.

Other generation technologies (wind, geothermal, biomass, tidal, wave, natural gas, and nuclear) were also examined as possible alternatives to the proposed RSPP project. These technologies would either be infeasible at the scale of the RSPP project, or would not eliminate substantial adverse impacts caused by the RSPP project without creating their own substantial adverse impacts in other locations. A natural gas plant would contribute to greenhouse gas emissions and would not meet the project's renewable generation objective. Construction of new nuclear power plants is currently prohibited under California law.

Conservation and demand side management programs would likely not meet the state's growing electricity needs that could be served by the RSPP project. In addition, these programs would not provide the renewable energy required to meet the California Renewable Portfolio Standard requirements.

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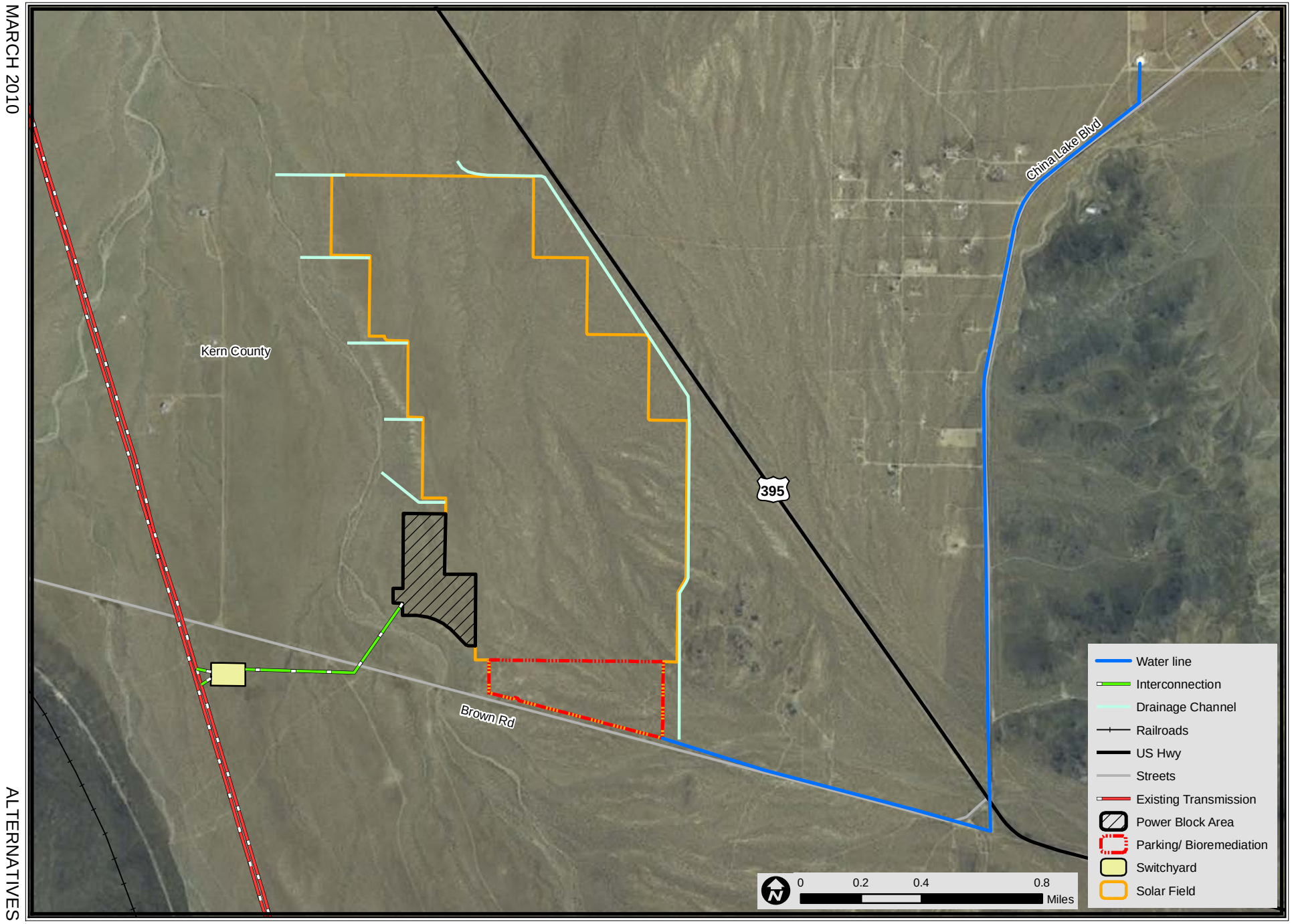
ALTERNATIVES FIGURE 1 - NORTHERN UNIT ALTERNATIVE

Ridgecrest Solar Power Project



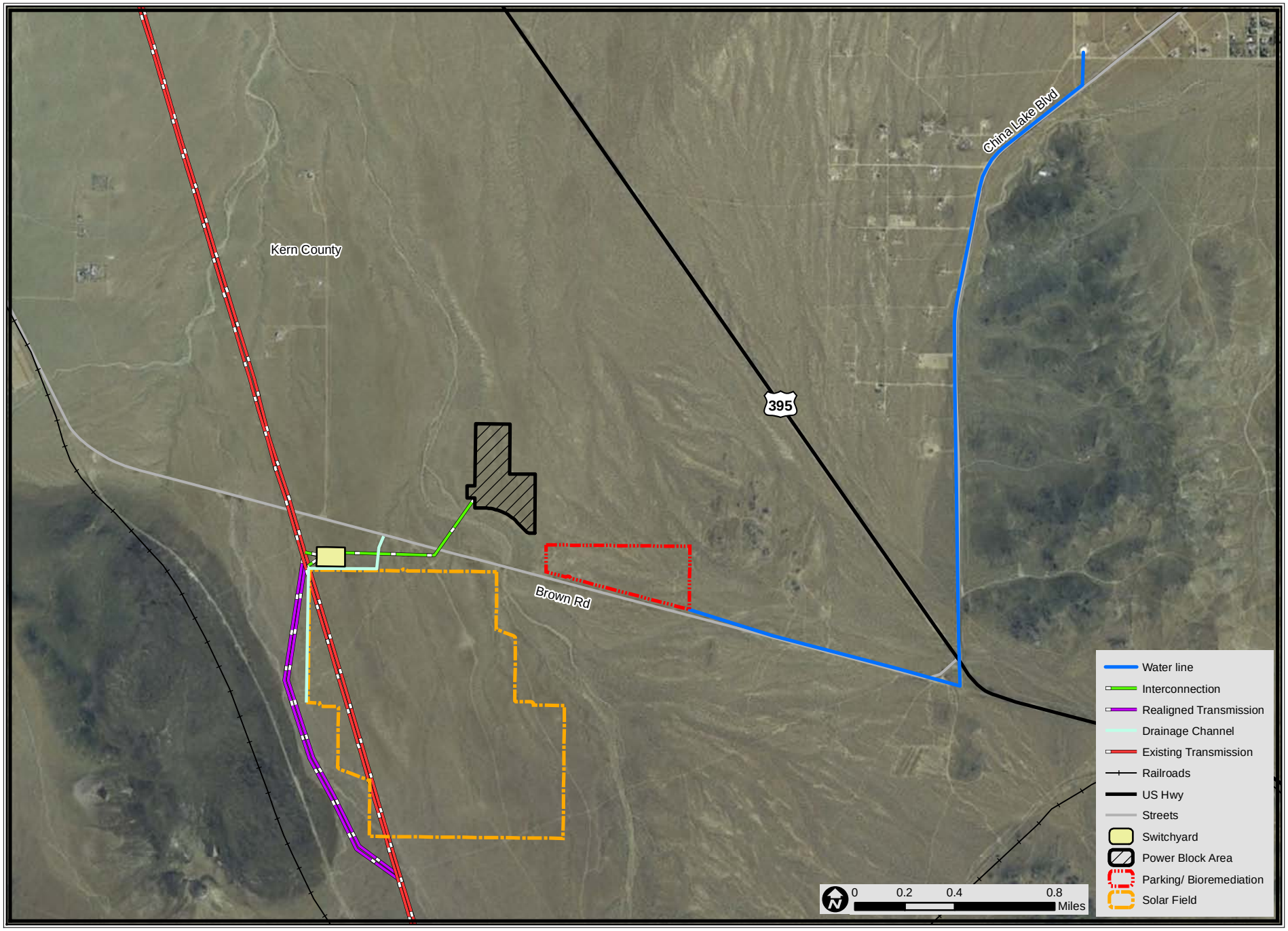
CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE:California Energy Commission, Aspen, NAIP 2005

ALTERNATIVES FIGURE 2 - SOUTHERN UNIT ALTERNATIVE

Ridgecrest Solar Power Project

MARCH 2010



ALTERNATIVES

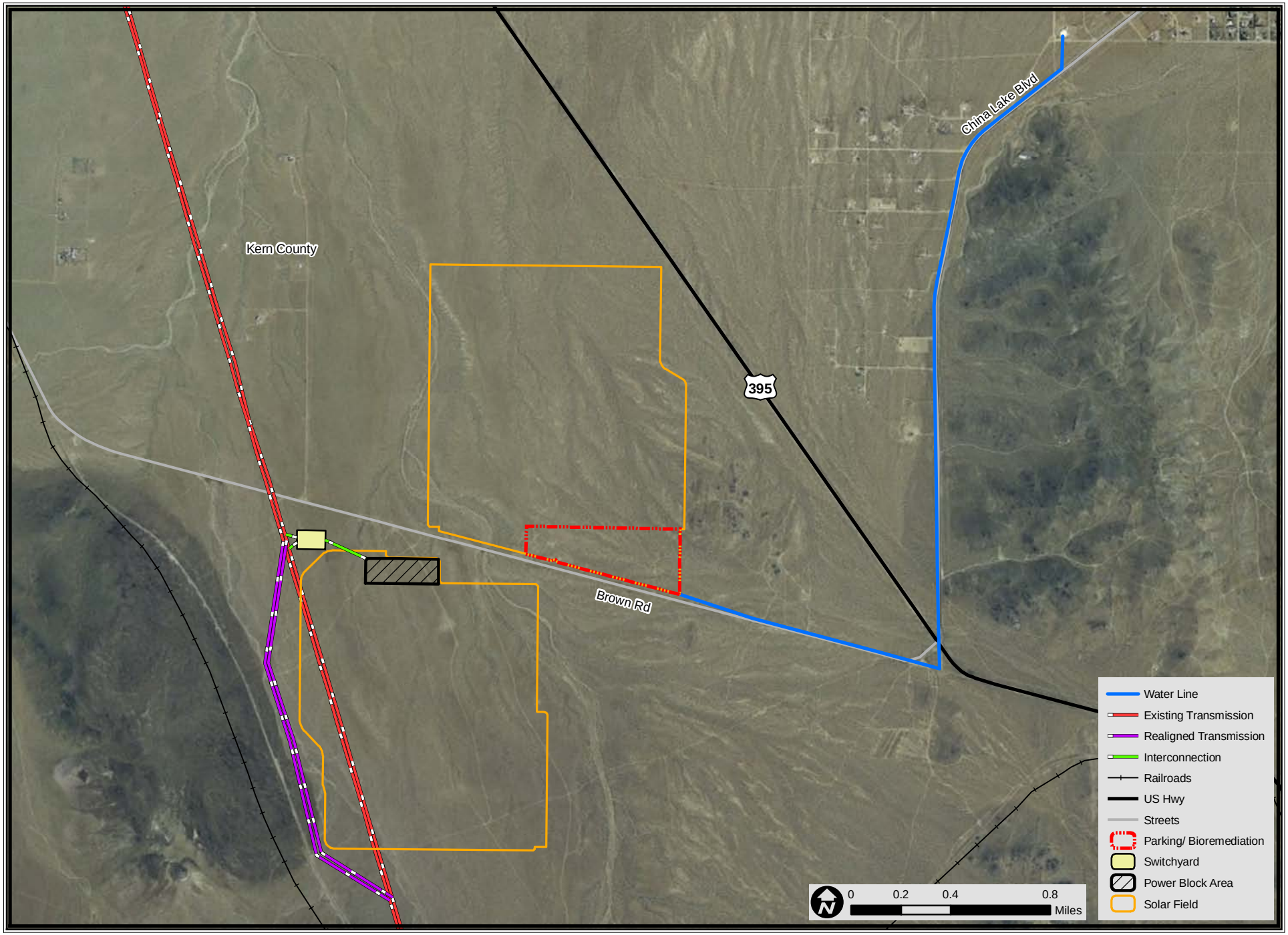
CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: California Energy Commission, Aspen, NAIP 2005

ALTERNATIVES FIGURE 3 - ORIGINAL PROPOSED PROJECT ALTERNATIVE

Ridgecrest Solar Power Project

MARCH 2010



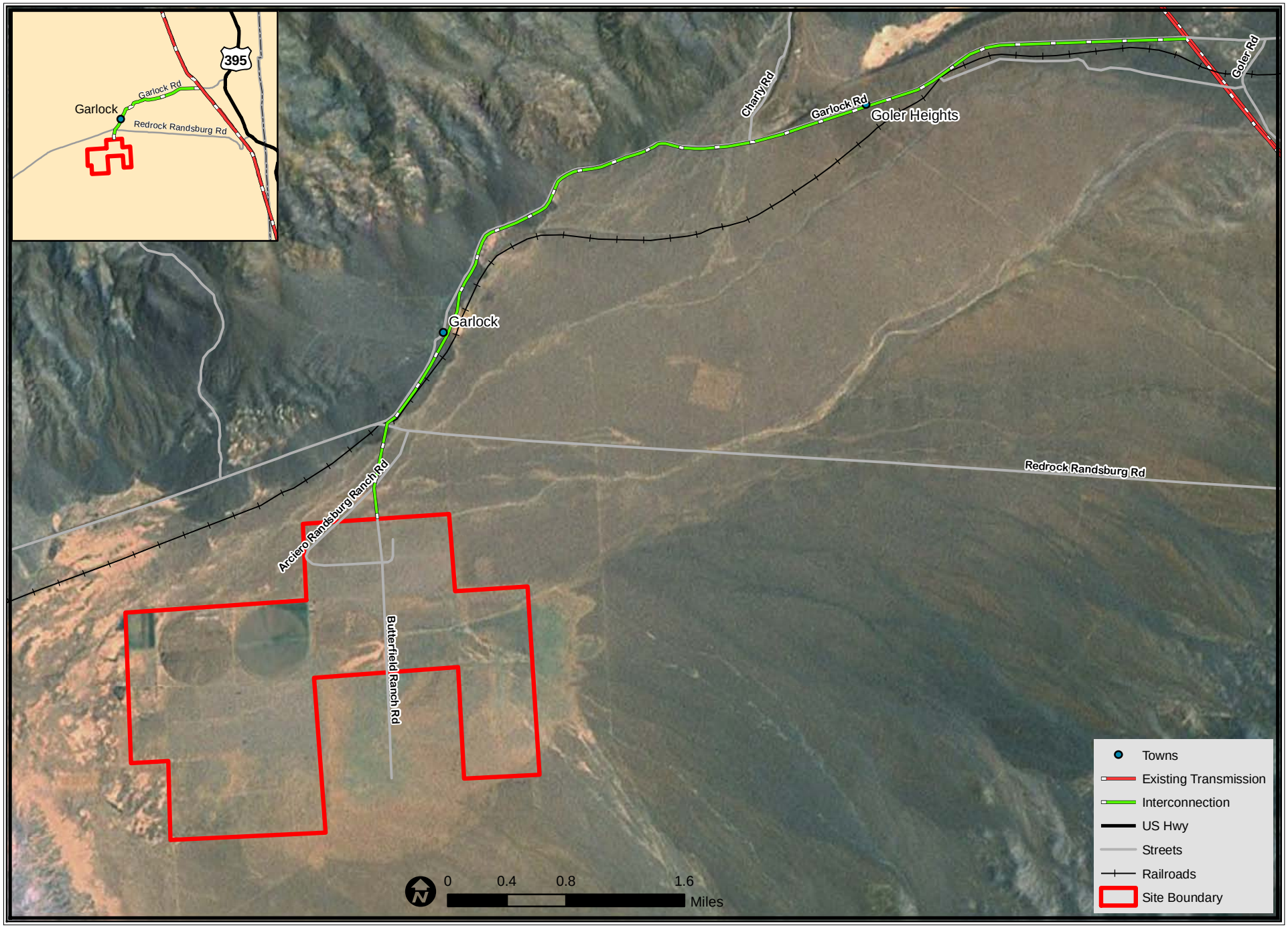
ALTERNATIVES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: California Energy Commission, Aspen, NAIP 2005

ALTERNATIVES FIGURE 4 - GARLOCK ROAD ALTERNATIVE

Garlock Road Site



MARCH 2010

ALTERNATIVES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: California Energy Commission, Aspen, NAIP 2005

Alternatives Figure 5 - Solar PV Technologies - Utility Scale

Canon Solar Partners proposes to use the 35 kW Amonex system (Canon)

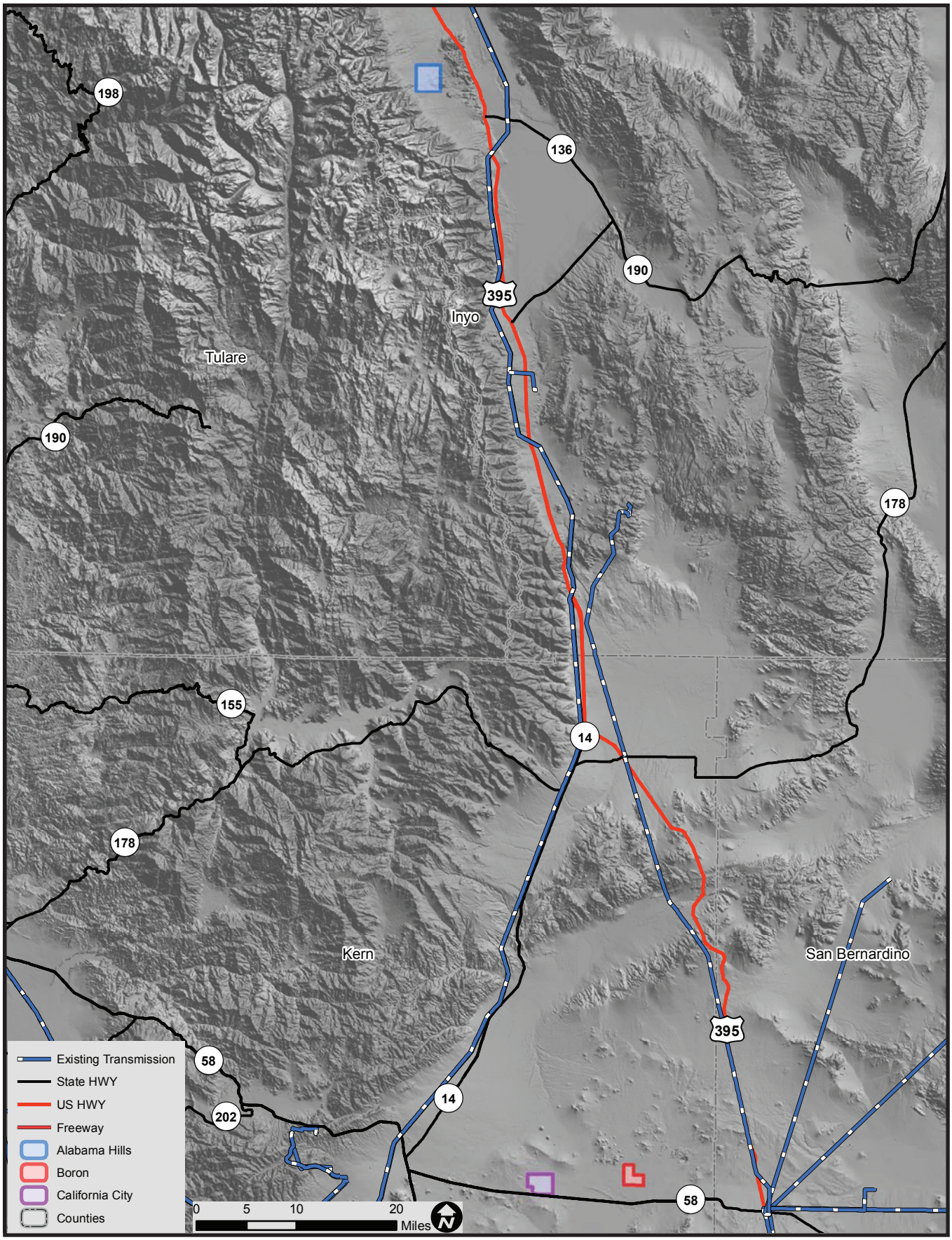
SunPower's PowerTracker Solar in Gwangju City Power Plant, South Korea - 1 MW (http://www.sunpowercorp.com/For-Power-Plants.aspx)

Alternatives Figure 5 – Solar PV Technologies – Utility Scale

First Solar’s thin film solar photovoltaic field (Photo: Susan Lee)

ALTERNATIVES - FIGURE 6

Ridgecrest Solar Power Project - All Applicants Proposed Alternative Sites - Alabama Hills, Boron, California City Sites



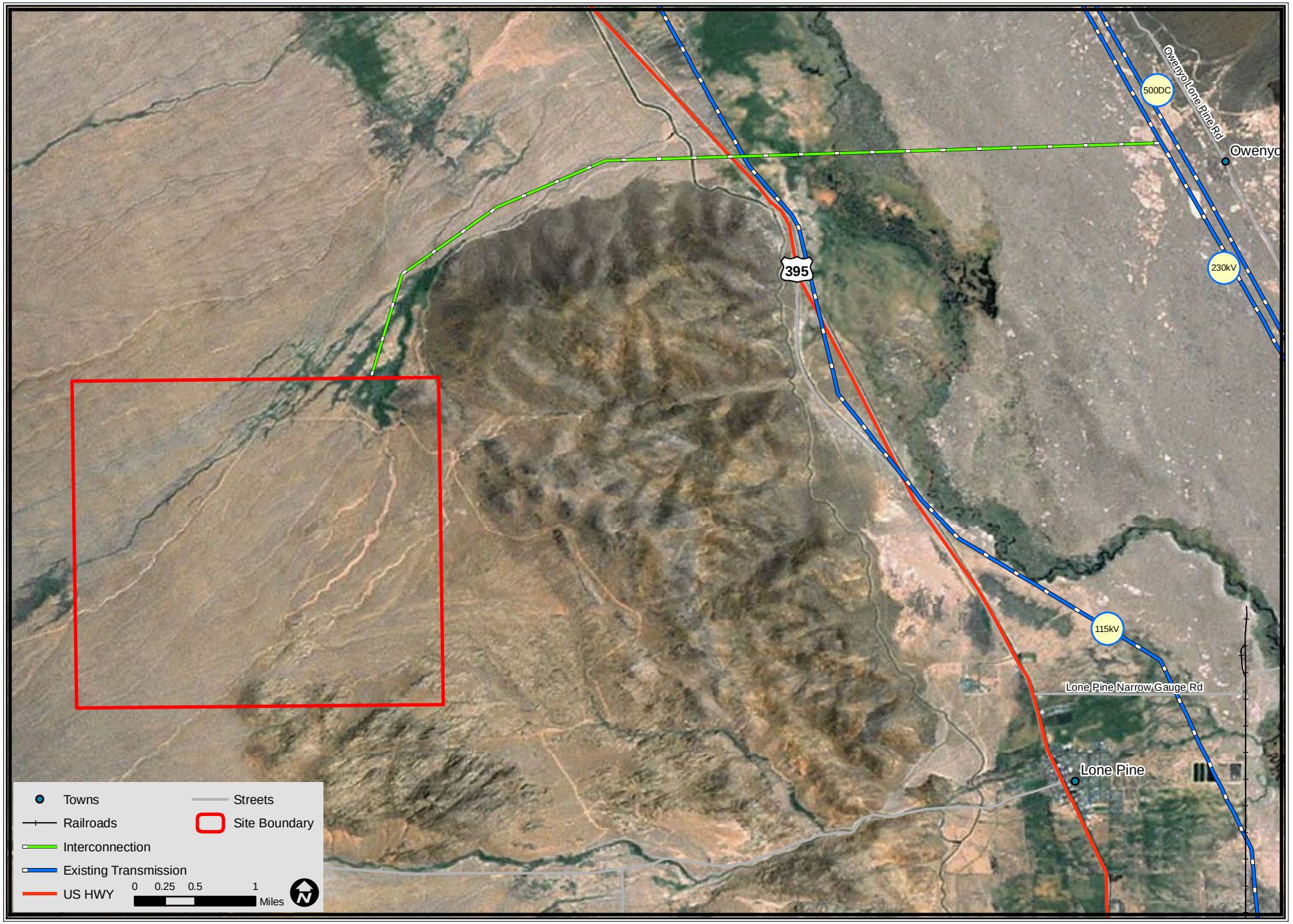
CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: California Energy Commission, Aspen, NAIP 2005

ALTERNATIVES FIGURE 7 - ALABAMA HILLS ALTERNATIVE

Alabama Hills Site

MARCH 2010



ALTERNATIVES

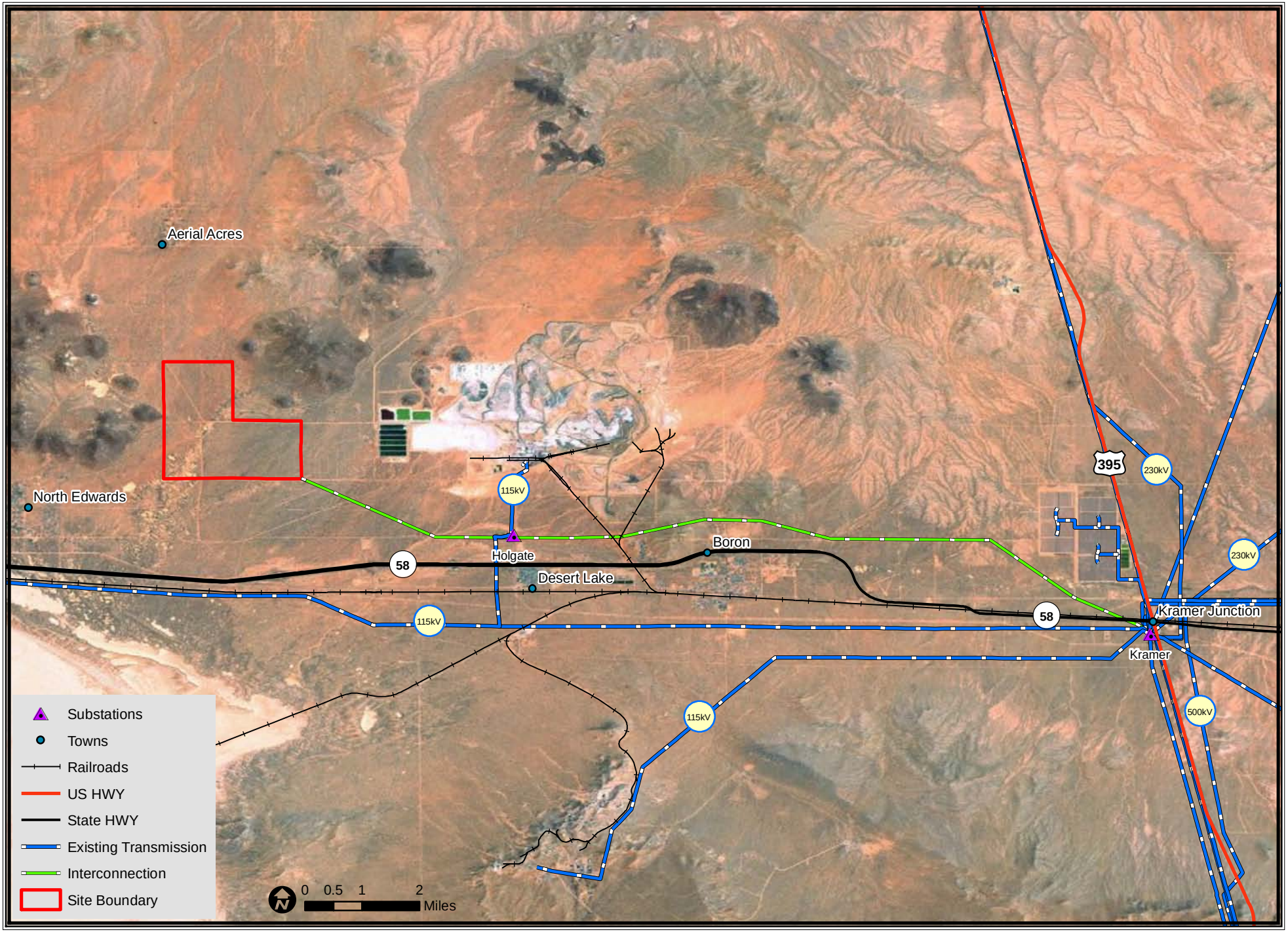
CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: California Energy Commission, Aspen, NAIP 2005

ALTERNATIVES FIGURE 8 - BORON ALTERNATIVE

Boron Site

MARCH 2010



ALTERNATIVES

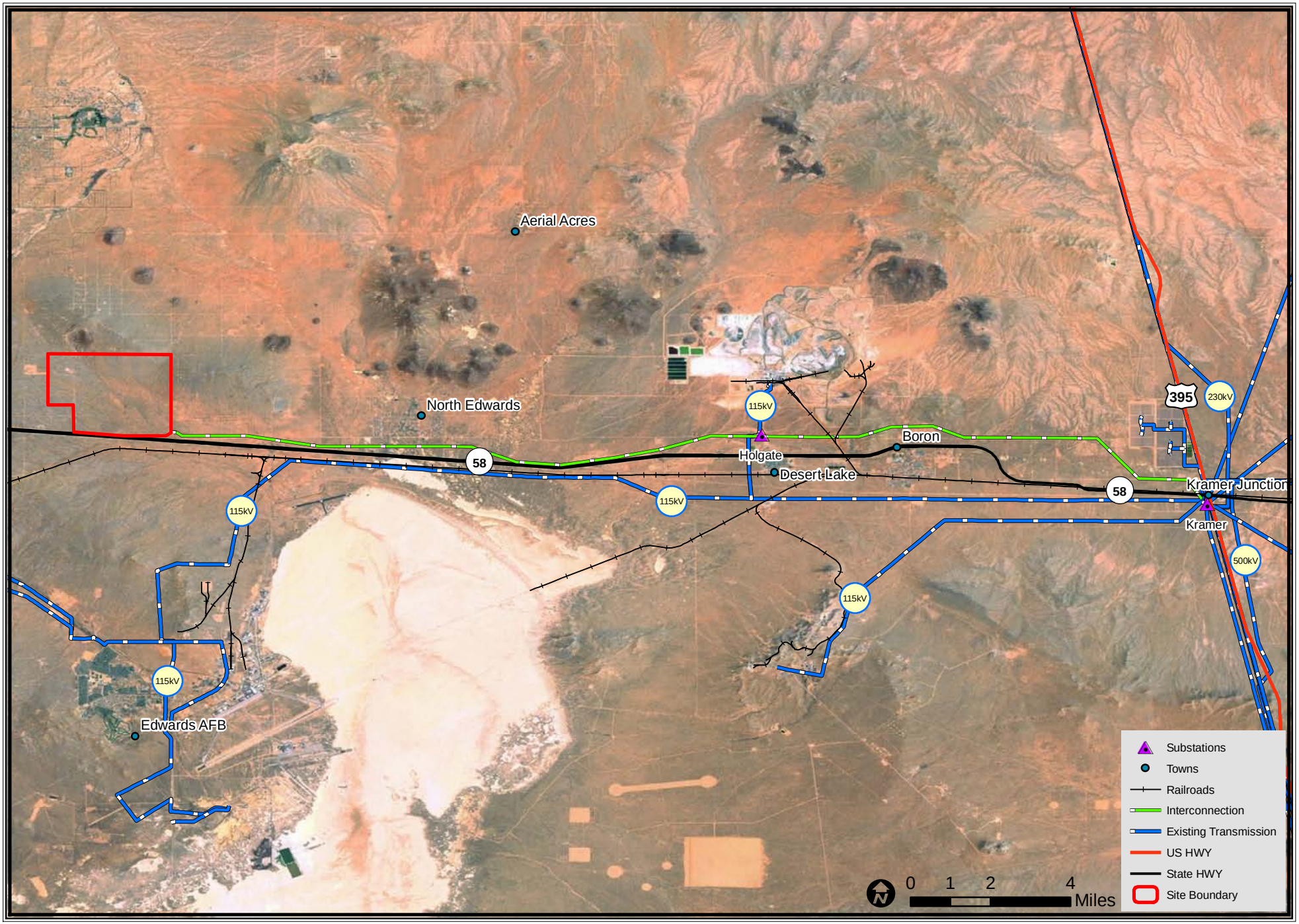
CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: California Energy Commission, Aspen, NAIP 2005

ALTERNATIVES FIGURE 9 - SOUTH OF CALIFORNIA CITY ALTERNATIVE

California City Site

MARCH 2010



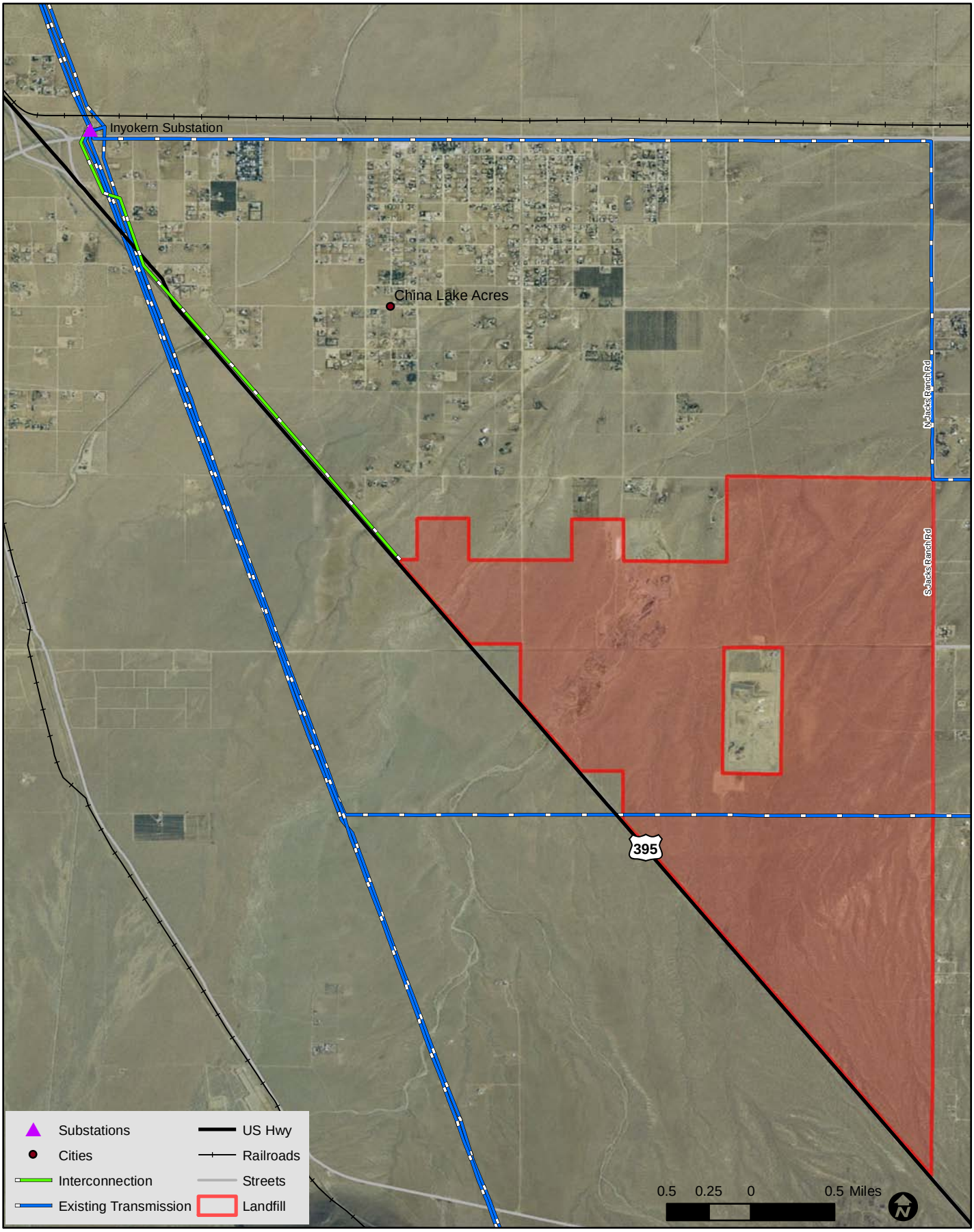
ALTERNATIVES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: California Energy Commission, Aspen, NAIP 2005

ALTERNATIVES FIGURE 10 - RIDGECREST LANDFILL ALTERNATIVE

Ridgecrest Solar Power Project



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Aspen, NAIP 2005

Alternatives Figure 11 – Strirling Dish, Solar Power Tower and Linear Fresnel Technologies

Stirling Dish Technology (www.solarcentral.org)

Solar Power Tower (from ISEGS PSA, 2008)

Linear Fresnel technology (Wikipedia.org, Fresnel_reflectors_ausra.jpg)

B.3 CUMULATIVE SCENARIO

Testimony of Suzanne Phinney, D.Env.

B.3.1 INTRODUCTION

Preparation of a cumulative impact analysis is required under both CEQA and NEPA. "Cumulative impact" is the impact on the environment which results from the incremental impact of the Proposed Project when considered with other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal) or person undertakes such other actions (40 CFR §1508.7).

Under CEQA Guidelines, "a cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts" (14 Cal Code Regs §15130(a)(1)). Cumulative impacts must be addressed if the incremental effect of a project, combined with the effects of other projects is "cumulatively considerable" (14 Cal Code Regs §15130(a)). Such incremental effects are to be "viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects" (14 Cal Code Regs §15164(b)(1)). Together, these projects comprise the cumulative scenario which forms the basis of the cumulative impact analysis.

CEQA also states that both the severity of impacts and the likelihood of their occurrence are to be reflected in the discussion, "but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion of cumulative impacts shall be guided by standards of practicality and reasonableness, and shall focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact" (14 Cal Code Regs §15130(b)).

NEPA states that cumulative effects can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR §1508.7). Under NEPA, both context and intensity are considered. When considering intensity of an effect, we consider "[w]hether the action is related to other actions with individually minor but cumulatively significant impacts. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts." 40 CFR §1508.27(b)(7).

The intensity, or severity, of the cumulative effects should consider the magnitude, geographic extent, duration and frequency of the effects (CEQ, 1997). The magnitude of the effect reflects the relative size or amount of the effect; the geographic extent considers how widespread the effect may be; and the duration and frequency refer to whether the effect is a one-time event, intermittent, or chronic (CEQ, 1997).

B.3.2 RENEWABLE PROJECT BACKGROUND

A large number of renewable projects have been proposed on BLM managed land, State land, and private land in California. As of January 2010, there were 244 renewable projects proposed in California in various stages of the environmental review process or under construction. As of January 2010, *48* of these projects, representing

approximately 10,900MW, were planning on requesting American Recovery and Reinvestment Act funds from the Federal government. Solar, wind, and geothermal development applications have requested use of BLM land, including approximately one million acres of the California desert. State and private lands have also been targeted for renewable solar and wind projects.

A number of existing policies and incentives encourage renewable energy development. These incentives lead to a greater number of renewable energy proposals. Example of incentives for developers to propose renewable energy projects on private and public lands in California, include the following:

- **U.S. Treasury Department's Payments for Specified Energy Property in Lieu of Tax Credits** under §1603 of the American Recovery and Reinvestment Act of 2009 (Public Law 111-5) - Offers a grant (in lieu of investment tax credit) to receive funding for 30% of their total capital cost at such time as a project achieves commercial operation (currently applies to projects that begin construction by December 31, 2010 and begin commercial operation before January 1, 2017).
- **U.S. Department of Energy (DOE) Loan Guarantee Program** pursuant to §1703 of Title XVII of the Energy Policy Act of 2005 - Offers a loan guarantee that is also a low interest loan to finance up to 80% of the capital cost at an interest rate much lower than conventional financing. The lower interest rate can reduce the cost of financing and the gross project cost on the order of several hundred million dollars over the life of the project, depending on the capital cost of the project.

The large renewable projects now described in applications to the BLM and on private land are competing for utility Power Purchase Agreements, which will allow utilities to meet state-required Renewable Portfolio Standards. Not all projects will complete the environmental review, and not all projects will be funded and constructed. It is unlikely that all of these projects will be constructed for the following reasons:

- Not all developers will develop the detailed information necessary to meet BLM and Energy Commission standards. Most of the solar projects with pending applications are proposing generation technologies that have not been implemented at large scales. As a result, preparing complete and detailed plans of development (PODs) is difficult, and completing the required NEPA and CEQA documents is especially time-consuming and costly.
- As part of approval by the appropriate Lead Agency under CEQA and/or NEPA (generally the Energy Commission and/or BLM), all regulatory permits must be obtained by the applicant or the prescriptions required by the regulatory authorities incorporated into the Lead Agency’s license, permit or right-of-way grant. The large size of these projects may result in permitting challenges related to endangered species, mitigation measures or requirements, and other issues.
- Also after project approval, construction financing must be obtained (if it has not been obtained earlier in the process). The availability of financing will be dependent on the status of competing projects, the laws and regulations related to renewable project investment, the ability to qualify for renewable energy incentives offered by the federal government and the time required for obtaining permits.

B.3.3 CUMULATIVE SCENARIO

Cumulative impacts analysis is intended to highlight past actions that are closely related either in time or location to the project being considered, catalogue past projects and discuss how they have harmed the environment, and discuss past actions even if they were undertaken by another agency or another person. Most of the renewable projects proposed in California have, are, or will be required to undergo their own independent environmental review under either CEQA or NEPA.

Under CEQA, there are two acceptable and commonly used methodologies for establishing the cumulative impact setting or scenario: the "list approach" and the "projections approach". The first approach would use a "list of past, present, and probable future projects producing related or cumulative impacts." 14 Cal Code Regs §15130(b)(1)(A). The second approach is to use a "summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact" (14 Cal Code Regs §15130(b)(1)(B)). This SA/EIS uses the "list approach" for purposes of state law to provide a tangible understanding and context for analyzing the potential cumulative effects of a Project.

Under NEPA, an EIS must provide a sufficiently detailed catalogue of past, present, and reasonably foreseeable future projects, and provide an adequate analysis of how these projects, in conjunction with the proposed action, are thought to have impacted or are expected to impact the environment. While NEPA requires an adequate cataloging of past projects, it also requires a discussion of consequences of those past projects. NEPA is designed to inform decision making and through disclosure of relevant environmental considerations, permit informed public comment.

In order to provide a basis for cumulative analysis for each discipline, this section provides information on other projects in both tables and maps. The Energy Commission and the BLM have identified the California desert as the largest area within which cumulative effects should be assessed for all disciplines, as listed in three tables and shown on accompanying maps. However, within the desert region, the specific area of cumulative effect varies by resource. For this reason, each discipline has identified the geographic scope for the discipline's analysis of cumulative impacts. Information on projects within the California desert is provided in the following tables and figures:

- **Cumulative Impacts Table 1A** lists renewable energy projects on BLM land in the California Desert District as defined by BLM.
- **Cumulative Impacts Table 1B** lists renewable energy projects on State and local lands in the California desert that have requested ARRA funding.
- **Cumulative Impacts Figure 1** shows the general location of BLM lease applications within the California Desert District.
- **Cumulative Impacts Figure 2** shows the location of BLM lease applications within the Ridgecrest District office.

All tables and figures are presented at the end of this section.

B.3.4 APPROACH TO CUMULATIVE IMPACT ANALYSIS

This Staff Assessment/Draft EIS evaluates cumulative impacts within the analysis of each resource area, following these steps:

1. Define the geographic scope of cumulative impact analysis for each discipline, based on the potential area within which impacts of the Ridgecrest Solar Power project could combine with those of other projects.

2. Evaluate the effects of the Ridgecrest Solar Power project in combination with past and present (existing) projects within the area of geographic effect defined for each discipline.

3. Evaluate the effects of the Ridgecrest Solar Power project with foreseeable future projects that occur within the area of geographic effect defined for each discipline.

Each of these steps is described below.

GEOGRAPHIC SCOPE OF CUMULATIVE ANALYSIS

The area of cumulative effect varies by resource. For example, air quality impacts tend to disperse over a large area, while traffic impacts are typically more localized. For this reason, the geographic scope for the analysis of cumulative impacts must be identified for each resource area.

The analysis of cumulative effects considers a number of variables including geographic (spatial) limits, time (temporal) limits, and the characteristics of the resource being evaluated. The geographic scope of each analysis is based on the topography surrounding the Ridgecrest Solar Power project and the natural boundaries of the resource affected, rather than jurisdictional boundaries. The geographic scope of cumulative effects will often extend beyond the scope of the direct effects, but not beyond the scope of the direct and indirect effects of the proposed action and alternatives.

In addition, each project in a region will have its own implementation schedule, which may or may not coincide or overlap with the Ridgecrest Solar Power project's schedule. This is a consideration for short-term impacts from the Ridgecrest Solar Power project. However, despite the previous discussion of factors that could limit development, to be conservative, the cumulative analysis assumes that all projects in the cumulative scenario are built and operating during the operating lifetime of the Ridgecrest Solar Power project.

PROJECT EFFECTS IN COMBINATION WITH FORESEEABLE FUTURE PROJECTS

Each discipline evaluates the impacts of the proposed project in light of the current baseline - the past, present (existing) and future projects near the Ridgecrest Solar Power plant site. **Cumulative Impacts Table 2** lists the existing projects located in the Ridgecrest area - an approximate 15 to 20-mile radius around the project site. **Cumulative Impacts Table 3** lists the future/foreseeable projects in this area. Both tables indicate project name, type, location, and status. **Cumulative Impacts Figure 3**

shows the locations of the existing and future/foreseeable projects in the Ridgecrest area. The city of Ridgecrest is currently experiencing significant hotel construction; however these projects are expected to be completed in early to mid-2010 prior to the potential start date of Ridgecrest Solar Power project, and therefore were not included in this analysis (AECOM 2009).

Reasonably foreseeable projects that could contribute to the cumulative effects scenario depend on the extent of resource effects, but could include projects in the immediate Ridgecrest City area as well as other large renewable projects in Inyo, Kern, San Bernardino, Los Angeles, Riverside, San Diego, Orange and Imperial Counties that are in closest proximity to the BLM Ridgecrest District. These projects are illustrated in **Cumulative Impacts Table 1A** and **1B** and **Cumulative Impacts Figures 1** and **2**. Solar and wind development applications for use of BLM land have been submitted for approximately 156,000 acres of the land in Kern, Inyo and San Bernardino Counties (roughly corresponding with the BLM's Ridgecrest Field Office) of the California Desert Conservation Area. Corresponding acreage for solar, wind and geothermal applications on state and private land submitted in Inyo, Kern, San Bernardino, Los Angeles, Riverside, San Diego, Orange and Imperial Counties is not available. However, the projects listed in Cumulative Impacts Table 1B would generate approximately 4,435 MW.

As shown in **Cumulative Impacts Tables 2** and **3** and **Cumulative Impacts Figure 3,** there are several existing and proposed projects in the area around the city of Ridgecrest whose impacts could combine with those of the proposed Ridgecrest Solar Power project.

The data presented in the tables and figures is considered in the analysis of each discipline.

Cumulative Scenario Table 1A
Renewable Energy Projects in the BLM California Desert District

BLM Field Office	Number of Projects & Acres	Total MW
Solar Energy		
Ridgecrest Field Office	• 5 projects • 32,463 acres	• 3,135 MW
Barstow Field Office	• 18 projects • 132,560 acres	• 12,875 MW
Needles Field Office	• 17 projects • 230,480 acres	• 15,700 MW
Palm Springs Field Office	• 17 projects • 123,592 acres	• 11,873 MW
El Centro Field Office	• 7 projects • 50,707 acres	• 3,950 MW
TOTAL	• **64 projects** • **569,802 acres**	• **47,533 MW**
Wind Energy		
Bakersfield Field Office - Central District, borders CDD in Kern County	• 1 project • 200 acres	• n/a
Ridgecrest Field Office	• 16 projects • 123,379 acres	• n/a
Barstow Field Office	• 25 projects • 171,560 acres	• n/a
Needles Field Office	• 8 projects • 115,233 acres	• n/a
Palm Springs Field Office	• 4 projects • 5,851 acres	• n/a
El Centro Field Office	• 9 projects (acreage not given for 3 of the projects) • 48,001 acres	• n/a
TOTAL	• **63 projects** • **464,224 acres**	• n/a

Source: Renewable Energy Projects in the California Desert Conservation Area identifies solar and wind renewable projects as listed on the BLM California Desert District Alternative Energy Website (BLM 2009)
n/a = MW not available

Cumulative Scenario Table 1B
Renewable Energy Projects on State and Private Lands
In California Desert District Counties

Project Name	Location	MW
Solar Projects		
Maricopa Sun Solar Complex (Solar PV)	Kern County	350
Antelope Valley Solar Ranch One	Loa Angeles and Kern Counties	230
Gray Butte Solar PV (Solar PV)	Los Angeles County	150
Monte Vista (Solar PV)	Kern County	126
NRG Alpine Suntower (Solar PV and Solar thermal)	Los Angeles County	86
Palmdale Hybrid Power Project Unit 1 (Solar thermal, part of a hybrid project)	Los Angeles County	50
Lucerne Valley Solar (Solar PV)	San Bernardino County	45
Lost Hills (Solar PV)	Kern County	32.5
Tehachapi Photovoltaic Project (Solar PV)	Kern County	20
Boulevard Associates (Solar PV)	San Bernardino County	20
T, squared, Inc. (Solar PV)	Kern County	19
Man-Wei Solar (solar PV)	Kern County	n/a
Regenesis Power for Kern County Airports Dept.	Kern County	n/a
Abengoa Mojave Solar Project (250 MW solar thermal)	San Bernardino County	250
Rice Solar Energy Project (Solar thermal)	Riverside County	150
3 MW solar PV energy generating facility	San Bernardino County,	3
Blythe Airport Solar 1 Project (Solar PV)	Riverside County	100
First Solar's Blythe (Solar PV)	Riverside County	21
LADWP and OptiSolar Power Plant (Solar PV)	Imperial County,	68
AV Solar Ranch One (Solar PV)	Los Angeles County	230
Bethel Solar Hybrid Power Plant (Hybrid solar thermal and biomass)	Imperial County	49.4
Mt. Signal Solar Power Station (Hybrid solar thermal and biomass)	Imperial County	49.4
Wind Projects		
Alta-Oak Creek Mojave Project	Kern County	800
Pacific Wind	Kern County	300

Project Name	Location	MW
City of Vernon Wind Energy Project	Kern County	300
Manzana Wind Project	Kern County	300
Iberdrola Tule Wind	San Diego County	200
Pine Canyon	Kern County	150
Windstar 1	Kern County	120
AES Daggett Ridge	San Bernardino County	84
Granite Wind, LLC	San Bernardino County	81
Geothermal Projects		
Orni 18, LLC Geothermal Power Plant	Imperial County	49.9
Black Rock Geothermal 1,2,and 3	Imperial County	n/a

* This list is compiled from the projects on CEQAnet as of November 2009 and the projects located on private or State lands that are listed on the Energy Commission Renewable Action Team website as requesting ARRA funding. Additional renewable projects proposed on private and State lands but not requesting ARRA funds are listed on the website.
Source: CEQAnet [http://www.ceqanet.ca.gov/ProjectList.asp], November 2009 and CEC Renewable Action Team – Generation Tracking for ARRA Projects 12/29/2009 [http://www.energy.ca.gov/33by2020/documents/2009-12-29/2009-12-29_Proposed_ARRA_Renewable_Projects.pdf]

Cumulative Scenario Table 2
Existing Projects in the Ridgecrest Area

ID #	Project Name	Location	Agency/Owner	Status	Project Description
1	China Lake Naval Weapons Center	Western Mojave Desert (immediately North of Ridgecrest site)	U.S. Navy	Existing	The China Lake Naval Air Weapons Station is an airborne weapons testing and training facility. China Lake NAWS employs 1,000 military personnel on the base and 5,900 civilian and contract employees. It covers 1.1 million acres of land to the north of the Ridgecrest project site and is immediately west of the city of Ridgecrest (NAWS China Lake, 2009)

Cumulative Scenario Table 3
Future Forseeable Projects in the Ridgecrest Area

ID #	Project Name	Location	Agency/Owner	Status	Project Description
A	City of Ridgecrest New Waste Water Treatment Plant	To Be Determined, within the City of Ridgecrest	City of Ridgecrest	Request For Qualifications released October 2009	The City of Ridgecrest plans to construct a new WWTP to deal with foreseeable population growth (City of Ridgecrest 2009).
B	China Lake Naval Weapons Air Center Base Realignment and Closure	Western Mojave Desert (immediately North of Ridgecrest site)	U.S. Navy	Final EIR published 2004	The Base Realignment and Closure (BRAC) plan proposes to increase testing and training operations at the base by combining several bases throughout the country. (NAWS China Lake, 2009) The BRAC is anticipated to create 4,085 new jobs and potentially 2700 new homes to accommodate growth (AECOM 2009).
C	Super Wal-Mart	Near the intersection of South China Lake Boulevard and East Bowman Road(5 miles northeast of project site)	Wal-Mart	Final EIR published September2009.	A new super Wal-Mart including a fueling station and two vacant parcels for potential developed in the future. The proposed project footprint is 28.5 acres. Bowman Road will be widened from South China Lake Boulevard to Sunland Street, two new roads will be constructed and a portion of Bowman Road will be paved (City of Ridgecrest 2009).
D	Freeman Gulch Four-Lane Project	State Route 14 in Kern County from 0.8 mile north of Redrock Inyokern Road to 2.2 miles south of the junction with U.S. Highway 395.	California Department of Transportation	Construction to start in 2012 - 2015	Caltrans proposes to convert the existing two-lane conventional highway into a four-lane, divided, controlled-access expressway (Cal Trans 2009, Kern County 2009).
E	Inyokern Four-Lane Project	U.S. Highway 395 from 1.1 miles south of South China Lake Boulevard to 1 mile north of State Route 14	California Department of Transportation	Cal Trans anticipates approval of the Mitigated Negative Declaration and Environmental Assessment in October 2010. No start date has been established.	Cal Trans proposes to widen approximately 15.5 miles of the existing U.S. Highway 395. The project will convert the 2 lane highway into a 4 lane expressway (Cal Trans 2009).

ID #	Project Name	Location	Agency/Owner	Status	Project Description
F	Solar Project - CACA 49511	Ridgecrest- (northeast of project site)	First Solar	Application submitted 11/07; cost recovery funds recorded, advised to re-establish application in 11/08.	7,183 acre 600 MW photovoltaic solar plant (BLM 2009).
G	Wind Project – CACA 050020	West side of Highway 395 (immediately west and south of Ridgecrest site)	Brewer Energy Co.	New application; Native American Consultation.	3,200 acre wind project, 3 towers (BLM 2009).
H	Wind Project – CACA 048948	Rand Mountain area- (approximately 3 miles south of Ridgecrest site)	Renewergy, LLC	Initial application incomplete, EA required.	14,209 acre wind project at Laurel and El Paso Peaks in the city of Ridgecrest (BLM 2009).
I	Wind Project – CACA 050319	Searles Hills, crosses Highway 395- (approximately 7 miles south east of Ridgecrest site)	Debenham Energy, LLC	New application; Native American Consultation	8,096 acre wind project, 8 towers, 2 rights of way (BLM 2009).

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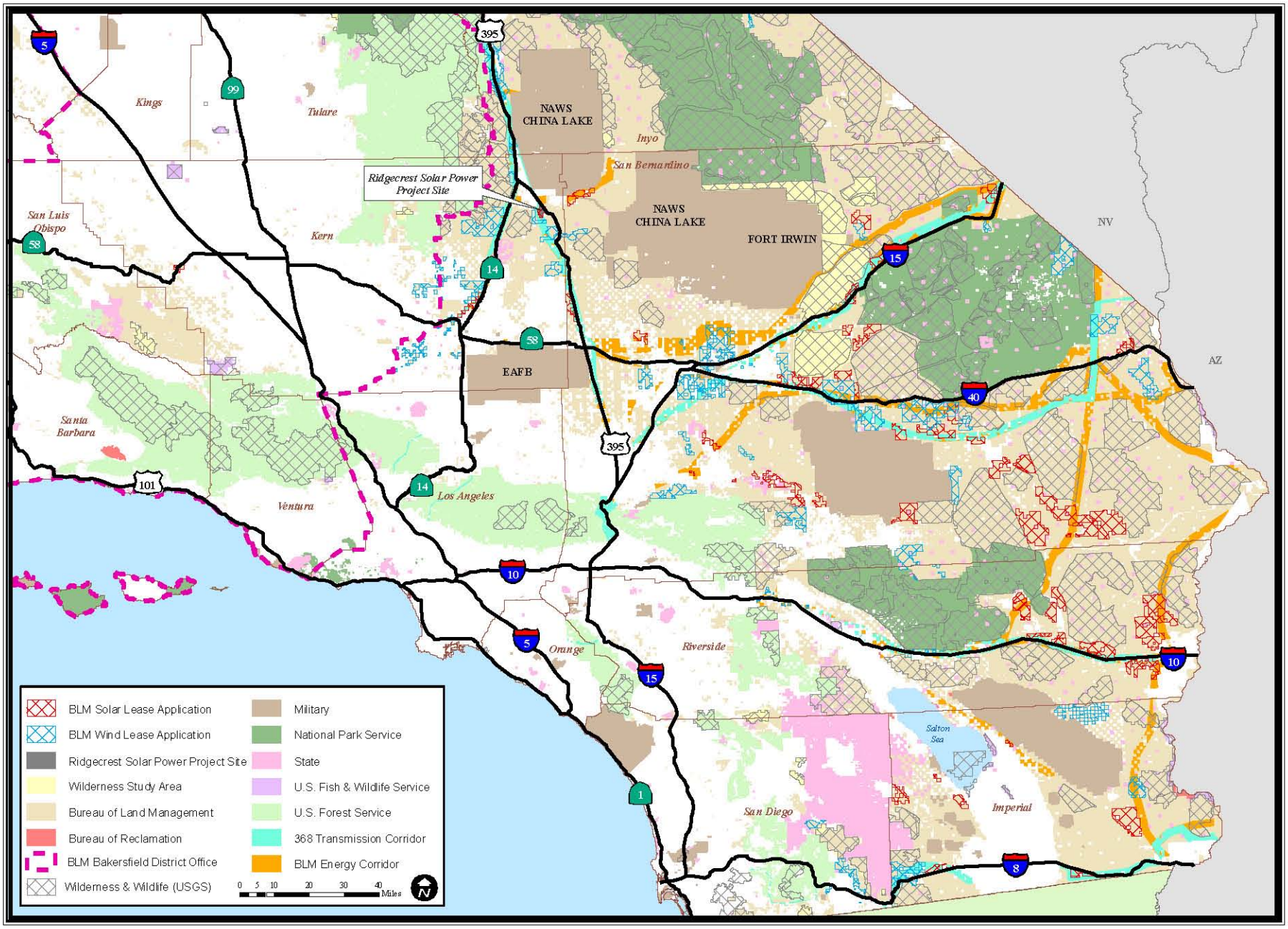
CUMULATIVE IMPACTS - FIGURE 1

Ridgecrest Solar Power Project - Renewable Energy Applications in the California Desert District

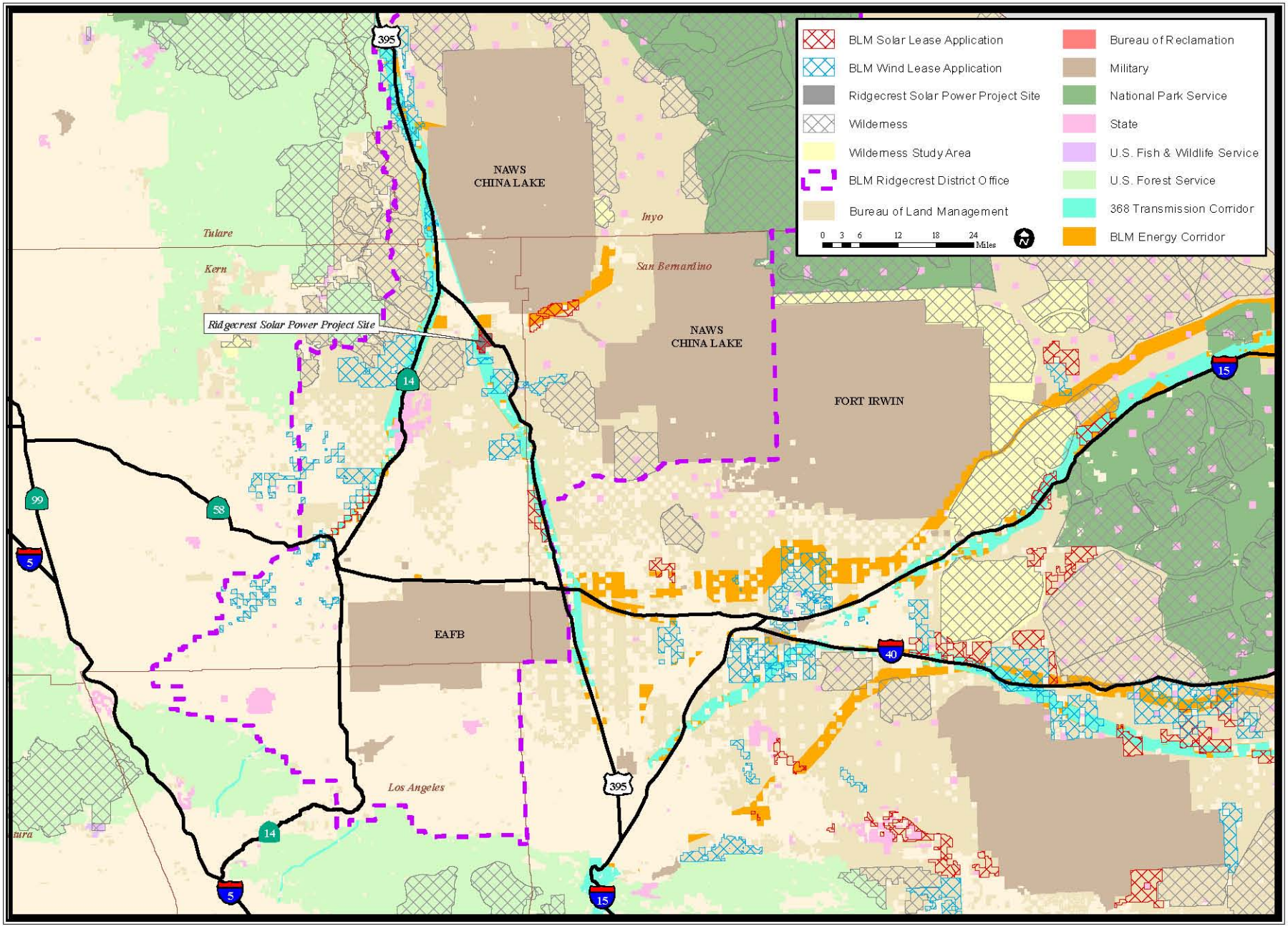


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: California Energy Commission, Bureau of Land Management

CUMULATIVE IMPACTS - FIGURE 2

Ridgecrest Solar Power Project - Renewable Energy Applications in the Ridgecrest District Area

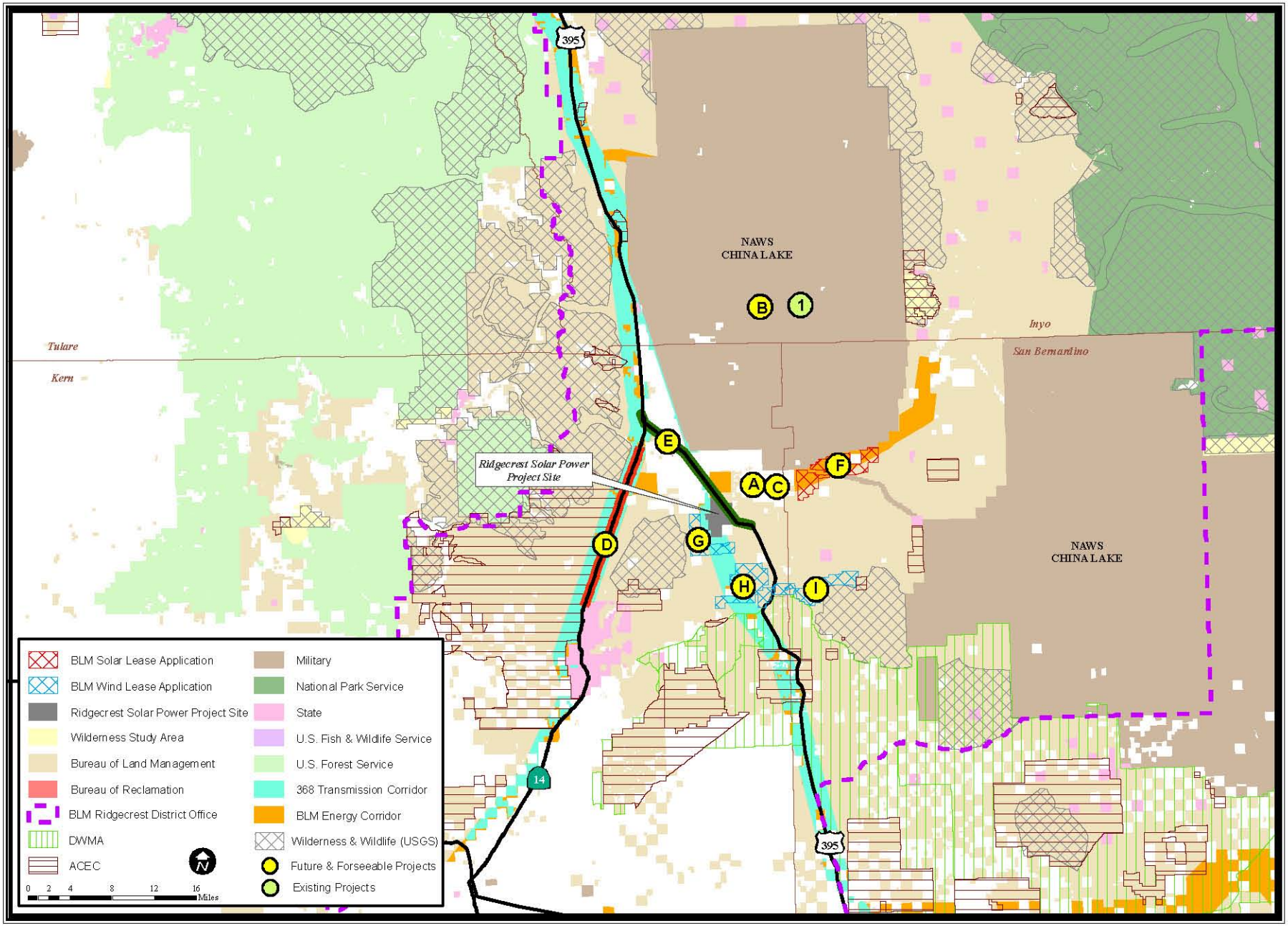


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: California Energy Commission, Bureau of Land Management

CUMULATIVE IMPACTS - FIGURE 3

Ridgecrest Solar Power Project - Existing and Future/Forseeable Projects in the Ridgecrest Area



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: California Energy Commission, Bureau of Land Management

C. ENVIRONMENTAL ANALYSIS

C.1 AIR QUALITY

Testimony of Tao Jiang and William Walters, P.E.

C.1.1 SUMMARY OF CONCLUSIONS

California Energy Commission staff[1] (hereinafter referred to as "staff") find that with the adoption of the attached conditions of certification the proposed Ridgecrest Solar Power Project would comply with all applicable laws, ordinances, regulations, and standards and would not result in any significant California Environmental Quality Act air quality impacts. These Conditions of Certification meet the Energy Commission's responsibility to comply with the California Environmental Quality Act and Bureau of Land Management's responsibility to comply with the National Environmental Policy Act.

Staff have concluded that the proposed project would not have the potential to exceed Prevention of Significant Deterioration emission threshold levels during direct source operation and the facility is not considered a major stationary source with potential to cause adverse National Environmental Policy Act air quality impacts. However, without adequate control, the fugitive dust emissions from construction would have the potential to exceed Prevention of Significant Deterioration particulate emission threshold levels. This potential exceedance of a federal air quality emission threshold would be considered a direct, adverse impact under National Environmental Policy Act. This impact would be less than adverse with the proposed mitigation measures controlling fugitive dust emissions during construction.

Staff have concluded that without adequate control, the proposed project's emissions from operation would have the potential to exceed the General Conformity applicability threshold for PM10. This impact would be less than adverse with the proposed mitigation measures controlling fugitive dust during operation. Staff have also concluded that the project does have the potential, after mitigation, to exceed the General Conformity applicability threshold for PM10 during construction. The U.S. Bureau of Land Management will be required to complete a General Conformity analysis for the selected project alternative prior to completing the project's Record of Decision. Staff concludes, based on the modeling analysis contained in this Staff Assessment/Draft Plan Amendment/Draft Environmental Impact Statement (herein after referred to as "SA/DPA/DEIS") that the U.S. Bureau of Land Management BLM will be able to determine that the selected project alternative conforms to the applicable State Implementation Plan.

The Ridgecrest Solar Power Project would emit substantially lower greenhouse gas[2] emissions per megawatt-hour than fossil fueled generation resources in California. The Ridgecrest Solar Power Project, as a renewable energy generation facility, is

[1] This analysis has been completed solely by Energy Commission staff and has been reviewed by BLM.

[2] Greenhouse gas (GHG) emissions are not criteria pollutants, but they affect global climate change. In that context, staff evaluates the GHG emissions from the proposed project (Appendix Air-1), presents information on GHG emissions related to electricity generation, and describes the applicable GHG standards and requirements.

determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]).

C.1.2 INTRODUCTION

Solar Millennium, LLC (hereinafter referred to as the applicant) submitted an Application for Transmission and Utility Systems and Facilities on Federal Lands to the BLM on March 23, 2007 (CACA 049016) and an Application for Certification (AFC) to the California Energy Commission on September 1, 2009 to construct and operate a solar power plant in the Kern County, California. The project is immediately south of U.S. Highway 395 approximately five miles southwest of the city of Ridgecrest. An application has been filed with BLM for a right-of-way (ROW) grant of approximately 3,995 acres. The total area that would be disturbed by project construction and operation is about 2,002 acres.

This analysis evaluates the expected air quality impacts from the emissions of criteria air pollutants from both the construction and operation of the Ridgecrest Solar Power Project (RSPP or proposed project). Criteria air pollutants are defined as air contaminants for which the state and/or federal governments, per the California Clean Air Act and the federal Clean Air Act, have established ambient air quality standards to protect public health.

The criteria pollutants analyzed within this section are nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), and particulate matter (PM). Lead is not analyzed as a criteria pollutant, but lead and other toxic air pollutant emissions impacts are analyzed in the Public Health Section of this SA/DPA/DEIS. Two subsets of particulate matter are inhalable particulate matter (less than 10 microns in diameter, or PM10) and fine particulate matter (less than 2.5 microns in diameter, or PM2.5). Nitrogen oxides (NOx, consisting primarily of nitric oxide [NO] and NO_2) and volatile organic compounds (VOC) emissions readily react in the atmosphere as precursors to ozone and, to a lesser extent, particulate matter. Sulfur oxides (SOx) readily react in the atmosphere to form particulate matter and are major contributors to acid rain. Global climate change and greenhouse gas (GHG) emissions from the proposed project are discussed in an **APPENDIX AIR-1** and analyzed in the context of cumulative impacts.

In carrying out this analysis, the California Energy Commission (Energy Commission) staff evaluated the following four major issues:

- Whether the RSPP is likely to conform with applicable federal, state, and Kern County Air Pollution Control District (KCAPCD or District) air quality laws, ordinances, regulations and standards (Title 20, California Code of Regulations, section 1744 (b));
- Whether RSPP is likely to cause new violations of ambient air quality standards or contribute substantially to existing violations of those standards (Title 20, California Code of Regulations, section 1743);

- Whether mitigation measures proposed for RSPP are adequate to lessen potential impacts under the California Environmental Quality Act (CEQA) to a level of insignificance (Title 20, California Code of Regulations, section 1742 (b)); and
- Whether the RSPP would exceed regulatory benchmarks identified by and used by staff to analyze National Environmental Policy Act (NEPA) air quality impacts, before or after implementation of recommended mitigation measures.

C.1.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

The analysis of proposed project effects must comply with both CEQA and NEPA requirements given the respective power plant licensing and land use jurisdictions of the California Energy Commission and U.S. Bureau of Land Management (BLM). Because this document is intended to meet the requirements of both NEPA and CEQA, the methodology used for determining environmental impacts of the proposed project includes a consideration of guidance provided by both laws. A significant impact is defined under CEQA as "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project" (Cal.Code Regs., tit.14 [hereinafter CEQA Guidelines] Section 15382). Questions used in evaluating significance of air quality impacts are based on Appendix G of the CEQA Guidelines (CCR 2006). The specific approach used by Energy Commission staff in determining CEQA significance is discussed in more detail below.

Similarly, NEPA states that "'Significantly' as used in NEPA requires considerations of both context and intensity…" (40 CFR 1508.27). Under NEPA, the agency considers three regulatory benchmarks in determining whether a project action would result in an adverse environmental impact when evaluated against the baseline. NEPA requires that an Environmental Impact Statement (EIS) be prepared when the proposed federal action (project) as a whole has the potential to "significantly affect the quality of the human environment." The three regulatory benchmarks that are used to assess impacts under NEPA are discussed in more detail below.

C.1.3.1 LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

The federal, state, and local laws and policies applicable to the control of criteria pollutant emissions and mitigation of air quality impacts for the RSPP are summarized in **Air Quality Table 1**. Staff's analysis examines the proposed project's compliance with these requirements.

Air Quality Table 1
Laws, Ordinances, Regulations, and Standards

Applicable LORS	Description
Federal	
40 Code of Federal Regulations (CFR) Part 52	Nonattainment New Source Review (NSR) requires a permit and requires Best Available Control Technology (BACT) and Offsets. Permitting and enforcement delegated to Kern County Air Pollution Control District (KCAPCD). Prevention of Significant Deterioration (PSD) requires major sources or major modifications to major sources to obtain permits for attainment pollutants. The RSPP is a new source that does not have a rule listed emission source thus the PSD trigger levels are 250 tons per year for NOx, VOC, SO_2, PM2.5 and CO.
40 CFR Part 60	New Source Performance Standards (NSPS), Subpart Dc Standards of Performance for Small Industrial-Commercial-Institutional Steam Generation Units. Establishes recordkeeping and reporting requirements for natural gas (including propane) fired steam generating units. Subpart IIII Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. Establishes emission standards for compressions ignition internal combustion engines, including emergency generator and fire water pump engines.
40 CFR Part 93 General Conformity	Requires determination of conformity with State Implementation Plan for Projects requiring federal approvals if project annual emissions are above specified levels.
State	
Health and Safety Code (HSC) Section 40910-40930	Permitting of source needs to be consistent with Air Resource Board (ARB) approved Clean Air Plans.
HSC Section 41700	Restricts emissions that would cause nuisance or injury.
California Code of Regulations (CCR) Section 93115	Airborne Toxics Control Measure for Stationary Compression Ignition Engines. Limits the types of fuels allowed, established maximum emission rates, establishes recordkeeping requirements on stationary compression ignition engines, including emergency generator and fire water pump engines.
Local (Kern County Air Pollution Control District)	
Rule 201 - Permits Required	Establishes the requirement to obtain a Permit to Operate (PTO) for emission sources.
Rule 210.1 - New and Modified Stationary Source Review	Establishes the requirements that must be met to obtain a PTO, including the requirement to comply with Best Available Control Technology (BACT), provide emission offsets for emission increase above specified thresholds, provide a dispersion modeling analysis, an alternatives analysis, and a compliance certification (if applicable).

Applicable LORS	Description
Rule 401 - Visible Emissions	Limits visible emissions from emissions sources, including stationary source exhausts and fugitive dust emission sources.
Rule 402 - Fugitive Dust	Limits fugitive emissions from certain bulk storage, earthmoving, construction and demolition, and manmade conditions resulting in wind erosion.
Rule 404.1 - Particulate Matter Concentration	The rule limits particulate matter (PM) emissions to less than 0.1 grains per standard cubic foot of gas at standard conditions.
Rule 407 - Sulfur Compounds	Limits discharge into the atmosphere of sulfur compounds exceeding 0.2% by volume concentration calculated as SO2.
Rule 409 - Fuel Burning Equipment - Combustion Contaminants	Limits discharge into the atmosphere from fuel burning equipment combustion contaminants exceeding in concentration at the point of discharge, 0.1 grain per cubic foot of gas calculated to 12% of carbon dioxide (CO2) at standard conditions.
Rule 411 – Storage of Organic Liquids	Sets standards for storage of organic liquids with a true vapor pressure of 1.5 pounds per square inch or greater.
Rule 414.2 – Soil Decontamination	Sets requirements for the VOC emissions from the handling and decontamination activities of VOC contaminated soils.
Rule 419 - Nuisance	Restricts emissions that would cause nuisance or injury to people or property (identical to California Health and Safety Code 41700.
Rule 422 - New Source Performance Standards	Incorporates the Federal NSPS (40 CFR 60) rules by reference.
Rule 425.2 - Boilers, Steam Generators and Process Boilers (Oxides of Nitrogen)	This rule limits NOx emissions from boilers, steam generators, and process heaters to levels consistent with Reasonably Available Control Technology (RACT).
Rule 429.1 - Cooling Towers (Hexavalent Chromium)	Prohibits the use of hexavalent chromium-bearing compounds in cooling towers.

C.1.3.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Energy Commission staff assesses four kinds of primary and secondary[3] impacts: construction, operation, closure and decommissioning, and cumulative. Construction impacts result from the onsite and offsite emissions occurring during site preparation and construction of the proposed project. Operation impacts result from the emissions of the proposed project during operation, which includes all of the onsite auxiliary equipment emissions (boiler, heater, emergency engines, etc.), the onsite maintenance vehicle emissions, and the offsite employee and material delivery trip emissions. Closure and decommissioning impacts occur from the onsite and offsite emissions that would result from dismantling the facility and restoring the site. Cumulative impacts analysis assesses the impacts that result from the proposed project's incremental effect

[3] Primary impacts potentially result from facility emissions of NOx, SOx, CO and PM10/2.5. Secondary impacts result from air contaminants that are not directly emitted by the facility but formed through reactions in the atmosphere that result in ozone, and sulfate and nitrate PM10/PM2.5.

viewed over time, together with other closely related past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project. (Pub. Resources Code § 21083; Cal. Code Regs., tit. 14, §§ 15064(h), 15065(c), 15130, and 15355.)

C.1.3.3 METHOD AND THRESHOLD FOR DETERMINING CEQA SIGNIFICANCE

Energy Commission staff evaluates potential impacts per Appendix G of the CEQA Guidelines (CCR 2006) . A CEQA significant adverse impact is determined to occur if potentially significant CEQA impacts cannot be mitigated through the adoption of Conditions of Certification. Specifically, Energy Commission staff uses health-based ambient air quality standards (AAQS) established by the ARB and the U.S.EPA as a basis for determining whether a project's emissions will cause a significant adverse impact under CEQA. The standards are set at levels that include a margin of safety and are designed to adequately protect the health of all members of the public, including those most sensitive to adverse air quality impacts such as the aged, people with existing illnesses, children, and infants. Staff evaluates the potential for significant adverse air quality impacts by assessing whether the project's emissions of criteria pollutants and their precursors (NOx, VOC, PM10 and SO_2) could create a new AAQS exceedance (emission concentrations above the standard), or substantially contribute to an existing AAQS exceedance.

Staff evaluates both direct and cumulative impacts. Staff will find that a project or activity will create a direct adverse impact when it causes an exceedance of an AAQS. Staff will find that a project's effects are cumulatively considerable when the project emissions in conjunction with ambient background, or in conjunction with reasonably foreseeable future projects, substantially contribute to ongoing exceedances of an AAQS. Factors considered in determining whether contributions to ongoing exceedences are substantial include:

1. The duration of the activity causing adverse air quality impacts;

2. The magnitude of the project emissions, and their contribution to the air basin's emission inventory and future emission budgets established to maintain or attain compliance with AAQS;

3. The location of the project site, i.e., whether it is located in an area with generally good air quality where non-attainment of any ambient air quality standard is primarily or solely due to pollutant transport from other air basins;

4. The meteorological conditions and timing of the project impacts, i.e., do the project's maximum modeled pollutant impacts occur when ambient concentrations are high (such as during high wind periods, or seasonally);

5. The modeling methods, and how refined or conservative the impact analysis modeling methods and assumptions were and how that may affect the determined adverse impacts;

6. The project site location and nearest receptor locations; and whether the identified adverse impacts would also occur at the maximum impacted receptor location; and,

7. Potential for future cumulative impacts; and whether appropriate mitigation is being recommended to address the potential for impacts associated with likely future projects.

C.1.3.4 NEPA AIR QUALITY ANALYSIS METHODOLOGY

The NEPA air quality analysis[4] considers the following three regulatory benchmarks:

- The project would exceed General Conformity applicability thresholds for federal nonattainment pollutants. This regulatory threshold applies to both project construction and operation emissions.
- The project would exceed PSD permit applicability thresholds for federal attainment pollutants. This regulatory threshold only applies to project operation.
- The project would cause, for federal attainment pollutants, air quality impacts in exceedance of the NAAQS.

If the proposed project were to exceed either of the first two of these regulatory benchmarks then the impacts would be considered potentially adverse and would require a further refined impact and mitigation analysis in order to demonstrate that the proposed project would not result in an adverse impact based on the potential to cause exceedances of the NAAQS. However, regardless of the NEPA requirements for the proposed project, a refined impact and mitigation analysis has been conducted per CEQA requirements, and that analysis and the resulting NEPA findings are described in detail in this document.

C.1.3.5 IMPACTS FROM CLOSURE AND DECOMMISSIONING

Impacts from closure and decommissioning, as a one-time limited duration event, are evaluated with the same methods as construction emissions as discussed above.

C.1.4 PROPOSED PROJECT

C.1.4.1 SETTING AND EXISTING CONDITIONS

Climate and Meteorology

The project site is located in the Mojave Desert, which has a typical desert climate characterized by low precipitation, hot summers, mild winters, low humidity, and strong temperature inversions. Total rainfall in Inyokern averages 4.18 inches per year with about 77% of the total rainfall occurring during the winter rainy season (November to March) and 14% occurring during late summer and early fall (July to September) thunderstorms (WRCC 2010a). May and June are usually the driest months.

[4] This is CEC staff's analysis approach that goes beyond the minimum procedural requirements of NEPA.

The highest monthly average high temperature is 102.7°F in July and August and the lowest average monthly low temperature is 59.6°F in January and December (WRCC 2010a). The applicant provided quarterly wind roses from the City of Mojave, China Lake, and Trona for the years 2000 to 2004 (SM 2010a), and staff also reviewed wind rose data available for nearby Laural Mountain (WRCC 2010a). This wind data indicates the highest wind speeds typically occur in the spring and summer and that wind directions are highly dependent on the local topography[5].

Sensitive Receptors

The general population includes many sensitive subgroups that may be at greater risk from exposure to emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses. In addition, the location of the population in the area surrounding a project site may have a large bearing on health risk. Four sensitive receptors were identified within a three-mile radius of the Project site boundary. The nearest sensitive receptor (Mountain View Christian Academy) is located approximately 1.6 miles northeast of the Project. The other sensitive receptors are: Faller Elementary School (2.8 miles), Sanderson's Residential Care Home (2.8 miles), and Cerro Coso Childhood Development Center (3 miles). The nearest residential receptor is located approximately 2,000 feet west of the northwestern boundary of the northern solar field (SM 2009a, SM 2010a).

Existing Ambient Air Quality

The Federal Clean Air Act and the California Clean Air Act both require the establishment of standards for ambient concentrations of air pollutants, called ambient air quality standards (AAQS). The state AAQS, established by the California Air Resources Board, are typically lower (more protective) than the federal AAQS, which are established by the United States Environmental Protection Agency (U.S.EPA). The state and federal air quality standards are listed in **Air Quality Table 2**. The averaging times for the various air quality standards, the times over which they are measured, range from one-hour to an annual average. The standards are read as a concentration, in parts per million (ppm), or as a weighted mass of material per a volume of air, in milligrams or micrograms of pollutant in a cubic meter of air (mg/m^3 or $\mu g/m^3$, respectively).

In general, an area is designated as attainment if the concentration of a particular air contaminant does not exceed the standard. Likewise, an area is designated as non-attainment for an air contaminant if that contaminant standard is violated. In circumstances where there is not enough ambient data available to support designation as either attainment or non-attainment, the area can be designated as unclassified. The

[5] The closest of these meteorological monitoring sites, Laurel Mountain, is approximately six miles south southeast from the project site but is also on a mountain about 1,700 feet in elevation above the project site. Therefore, the wind speeds from Laural Mountain are likely higher than the site but the wind directions are likely the most representative of any of the four sites. The Laural Mountain wind roses show winds that are the more predominant in two separate and nearly opposite arcs, the primary arc being from the south to southwest and the secondary arc being from north northeast to north northwest. The overall wind frequency for these two arcs is almost 70%. There is a large hill to the southwest of the site that may influence the most predominant wind direction arcs by shifting them counterclockwise, perhaps 30 to 45 degrees, from those that occur at Laurel Mountain.

unclassified area is normally treated the same as an attainment area for regulatory purposes. An area could be attainment for one air contaminant while non-attainment for another, or attainment for the federal standard and non-attainment for the state standard for the same air contaminant.

The project site is located in the Mojave Desert Air Basin (MDAB) and is under the jurisdiction of the Kern County Air Pollution Control District. The Indian Wells Valley portion of Kern County within the Mojave Air Basin is designated as non-attainment for the state ozone and PM10 standards, and attainment for all other state standards and all federal standards. **Air Quality Table 3** summarizes the area's attainment status for various applicable state and federal standards.

Ambient air quality monitoring data for ozone, PM10, PM2.5, CO, NO_2, and SO_2, compared to most restrictive applicable standards for the years between 2003 through 2008 (the last year that the complete annual data is currently available) at the most representative monitoring stations for each pollutant are shown in **Air Quality Table 4** and the available 1-hour and 8-hour ozone, and 24-hour PM10 and PM2.5 data for the years 1999 through 2008 are shown in **Air Quality Figure 1**. All PM10 and PM2.5 data shown are from the Ridgecrest 100 West California Avenue monitoring station. All ozone, NO_2, and SO_2 data shown are from the Trona Athol and Telegraph monitoring station. All CO data are from the Lancaster-43301 Division Street monitoring station.

Ozone

Ozone is not directly emitted from stationary or mobile sources, but is formed as the result of chemical reactions in the atmosphere between directly emitted nitrogen oxides (NOx) and hydrocarbons (Volatile Organic Compounds [VOC]) in the presence of sunlight to form ozone. Pollutant transport from the South Coast Air Basin (Los Angeles Area) and San Joaquin Valley are considered the major source of the ozone pollution experienced in the eastern Kern County portion of the MDAB (KCAPCD 2005).

As **Air Quality Table 4** and **Air Quality Figure 1** indicate, the 1-hour and 8-hour ozone concentrations measured in Trona have been very stable over the past ten years. The collected air quality data (not shown) indicate that the ozone violations occurred primarily during the sunny and hot periods typical during May through September.

Air Quality Table 2
Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Standard	California Standard
Ozone (O_3)	8 Hour	0.075 ppm [a] (147 µg/m^3)	0.070 ppm (137 µg/m^3)
	1 Hour	—	0.09 ppm (180 µg/m^3)
Carbon Monoxide (CO)	8 Hour	9 ppm (10 mg/m^3)	9.0 ppm (10 mg/m^3)
	1 Hour	35 ppm (40 mg/m^3)	20 ppm (23 mg/m^3)
Nitrogen Dioxide (NO_2)	Annual	0.053 ppm (100 µg/m^3)	0.03 ppm (57 µg/m^3)
	1 Hour	0.100 ppm[b]	0.18 ppm (339 µg/m^3)
Sulfur Dioxide (SO_2)	Annual	0.030 ppm (80 µg/m^3)	—
	24 Hour	0.14 ppm (365 µg/m^3)	0.04 ppm (105 µg/m^3)
	3 Hour	0.5 ppm (1300 µg/m^3)	—
	1 Hour	—	0.25 ppm (655 µg/m^3)
Particulate Matter (PM10)	Annual	—	20 µg/m^3
	24 Hour	150 µg/m^3	50 µg/m^3
Fine Particulate Matter (PM2.5)	Annual	15 µg/m^3	12 µg/m^3
	24 Hour	35 µg/m^3	—
Sulfates (SO_4)	24 Hour	—	25 µg/m^3
Lead	30 Day Average	—	1.5 µg/m^3
	Calendar Quarter	1.5 µg/m^3	—
Hydrogen Sulfide (H_2S)	1 Hour	—	0.03 ppm (42 µg/m^3)
Vinyl Chloride (chloroethene)	24 Hour	—	0.01 ppm (26 µg/m^3)
Visibility Reducing Particulates	8 Hour	—	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70%.

Source: ARB 2010a.
Notes:
[a] The 2008 standard is shown above, but as of September 16, 2009 this standard is being reconsidered. The 1997 8-hour standard is 0.08 ppm.
[b] The U.S. EPA is in the process of implementing this new standard, which is proposed to become effective April 12, 2010. This standard is based on the 3-year average of the 98th%ile of the yearly distribution of 1-hour daily maximum concentrations. Due to this regulation not yet being effective, with a corresponding lack of guidance on impact analysis and existing background concentrations, staff has not completed an impact assessment for compliance with this standard.

Air Quality Table 3
Federal and State Attainment Status
Indian Wells Valley Portion of the Mojave Desert Air Basin

Pollutant	Attainment Status [a]	
	Federal	State
Ozone	Attainment [b]	Moderate Nonattainment
CO	Attainment	Attainment
NO_2	Attainment [c]	Attainment
SO_2	Attainment	Attainment
PM10	Attainment [b]	Nonattainment
PM2.5	Attainment	Attainment

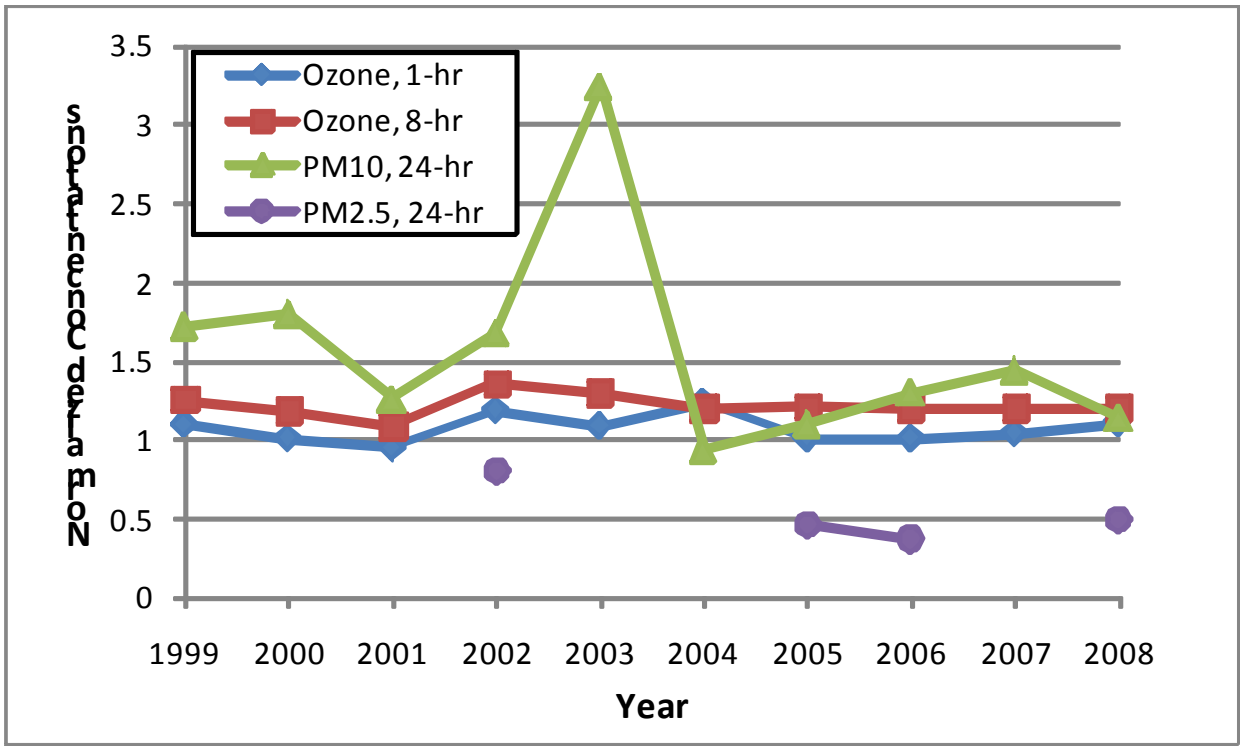
Source: ARB 2010b, U.S. EPA 2010a.
[a] Attainment = Attainment or Unclassified, where Unclassified is treated the same as Attainment for regulatory purposes.
[b] Attainment status is for the site area only, not the entire Kern County or MDAB area. Additionally, the Indian Wells Valley is currently a federal PM10 maintenance area.
[c] Nitrogen dioxide attainment status for the new federal 1-hour NO_2 standard is scheduled to be determined by January 2012.

Air Quality Table 4
Criteria Pollutant Summary
Maximum Ambient Concentrations (ppm or µg/m^3)

Pollutant	Averaging Period	Units	2003	2004	2005	2006	2007	2008	Limiting AAQS[b]
Ozone	1 hour	ppm	0.098	0.111	0.091	0.091	0.094	0.1	0.09
Ozone	8 hours	ppm	0.091	0.084	0.085	0.084	0.084	0.084	0.07
PM10 [a]	24 hours	µg/m^3	162	47	55	65	72	57	50
PM10	Annual	µg/m^3	21.5	--	--	--	--	22.0	20
PM2.5 [a]	24 hours	µg/m^3	--	--	16.2	13.0	--	17.2	35
PM2.5	Annual	µg/m^3	--	--	6.9	6.2	--	7.0	12
CO	1 hour	ppm	3.2	2.9	2.9	3.2	2.5	2.2	20
CO	8 hours	ppm	1.88	1.72	1.54	1.60	1.25	1.04	9.0
NO_2	1 hour	ppm	0.052	0.055	0.053	0.05	0.055	0.062	0.18
NO_2	Annual	ppm	0.005	0.005	0.005	0.005	0.004	0.004	0.03
SO_2	1 hour	ppm	0.008	0.019	0.018	0.033	0.014	0.036	0.25
SO_2	1 hour	ppm	0.005	0.010	0.011	0.017	0.009	0.007	0.5
SO_2	24 hours	ppm	0.003	0.005	0.004	0.004	0.005	0.005	0.04
SO_2	Annual	ppm	0.001	0.001	0.001	0.001	0.001	0.001	0.03

Source: ARB 2010c, U.S.EPA 2010b
Notes:
[a] Exceptional PM concentration events, such as those caused by wind storms are not shown where excluded by U.S.EPA; however, some exceptional events may still be included in the data presented.
[b] The limiting AAQS is the most stringent of the CAAQS or NAAQS for that pollutant and averaging period.

Air Quality Figure 1
1999-2008 Historical Ozone and PM Air Quality Data[a,b,c]



Source: ARB 2010c, U.S.EPA 2010b
Notes:
[a] The highest measured ambient concentrations of various criteria air contaminants were divided by their applicable standard and provided as a graphical point. Any point on the chart that is greater than one means that the measured concentrations of such air contaminant exceed the standard, and any point that is less than one means that the respective standard is not exceeded for that year. For example the 1-hour ozone concentration in 2007 is 0.094 ppm/0.09 ppm standard = 1.04.
[b] All ozone data are from the Trona monitoring station.
[c] All PM data are from the Ridgecrest monitoring station. The completeness of the 24-hr PM2.5 data is limited where only years 2002, 2005, 2006, and 2008 have 98th%ile values for comparison with the federal standard.

Nitrogen Dioxide

The entire air basin is classified as attainment for the state 1-hour and annual and federal annual NO_2 standards. The nitrogen dioxide attainment standard could change due to the new federal 1-hour standard, although a review of the air basin wide monitoring data suggest this would not occur for the MDAB.

Approximately 90% of the NOx emitted from combustion sources is nitric oxide (NO), while the balance is NO_2. NO is oxidized in the atmosphere to NO_2, but some level of photochemical activity is needed for this conversion. The highest concentrations of NO_2 typically occur during the fall. The winter atmospheric conditions can trap emissions near the ground level, but lacking substantial photochemical activity (sun light), NO_2 levels are relatively low. In the summer the conversion rates of NO to NO_2 are high, but the relatively high temperatures and windy conditions disperse pollutants, preventing the accumulation of NO_2. The NO_2 concentrations in the project area are well below the state and federal ambient air quality standards.

Carbon Monoxide

The area is classified as attainment for the state and federal 1-hour and 8-hour CO standards. The highest concentrations of CO occur when low wind speeds and a stable atmosphere trap the pollution emitted at or near ground level. These conditions occur frequently in the wintertime late in the afternoon, persist during the night and may extend one or two hours after sunrise. The project area, in comparison with major urban areas, has a lack of substantial mobile source emissions and based on the Lancaster monitoring site data, the local CO concentrations are expected to be well below the state and federal ambient air quality standards.

Particulate Matter (PM10) and Fine Particulate Matter (PM2.5)

PM10 can be emitted directly or it can be formed many miles downwind from emission sources when various precursor pollutants interact in the atmosphere.

The project site area is non-attainment for the state PM10 standards. **Air Quality Table 4** and **Air Quality Figure 1** shows recent PM10/PM2.5 concentrations from the nearby Ridgecrest monitoring station. The figure shows fluctuating maximum 24-hour concentrations patterns, and shows clear exceedances of the state 24-hour PM10 standard. It should be noted that exceedance does not necessarily mean violation or nonattainment, as exceptional events do occur and some of those events, which do not count as violations, may be included in the data.

Fine particulate matter, or PM2.5, is derived mainly from either the combustion of materials, or from precursor gases (SOx, NOx, and VOC) through complex reactions in the atmosphere. PM2.5 consists mostly of sulfates, nitrates, ammonium, elemental carbon, and a small portion of organic and inorganic compounds.

Portions of the MDAB are classified as non attainment for the federal PM10 standards and the state and federal PM2.5 standards; however, the project site area is in attainment of these standards, but is a federal PM10 maintenance area[6]. This divergence in the PM10 and PM2.5 concentration levels and attainment status indicate that a substantial fraction of the ambient particulate matter levels are most likely due to localized fugitive dust sources, such as vehicle travel on unpaved roads, agricultural operations, or wind-blown dust[7].

Sulfur Dioxide

The entire air basin is classified as attainment for the state and federal SO_2 standards. Sulfur dioxide is typically emitted as a result of the combustion of a fuel containing sulfur. Sources of SO_2 emissions within the MDAB come from a wide variety of fuels: gaseous, liquid and solid; however, the total SO_2 emissions within the northwestern

[6] A maintenance area is a former nonattainment area that is still subject to federal attainment planning requirements and General Conformity regulations.

[7] Fugitive dust, unlike combustion source particulate and secondary particulate, is composed of a much higher fraction of larger particles than smaller particles, so the PM2.5 fraction of fugitive dust is much smaller than the PM10 fraction. Therefore, when PM10 ambient concentrations are significantly higher than PM2.5 ambient concentrations this tends to indicate that a large proportion of the PM10 are from fugitive dust emission sources, rather than from combustion particulate or secondary particulate emission sources.

MDAB are limited due to the limited number of major stationary sources and California's and U.S. EPA's substantial reduction in motor vehicle fuel sulfur content. The project area's SO_2 concentrations are well below the state and federal ambient air quality standards.

Summary

In summary, staff recommends the background ambient air concentrations in **Air Quality Table 5** for use in the modeling and impacts analysis. The recommended background concentrations are based on the maximum criteria pollutant concentrations from the past three years of available data collected at the most representative monitoring stations surrounding the project site.

Air Quality Table 5
Staff Recommended Background Concentrations (µg/m^3)

Pollutant	Averaging Time	Recommended Background	Limiting AAQS[b]	Percent of Standard
NO_2	1 hour	116.8	339	34%
	Annual	9.5	57	17%
CO	1 hour	3,680	23,000	16%
	8 hour	1,778	10,000	18%
PM10	24 hour	72	50	144%
	Annual	22	20	110%
PM2.5	24 hour [a]	17.2	35	49%
	Annual	7.0	12	58%
SO_2	1 hour	94.3	665	14%
	3 hour	44.2	1,300	3%
	24 hour	13.1	105	13%
	Annual	2.7	80	3%

Source: ARB 2010c, U.S.EPA 2010b and Energy Commission Staff Analysis
Note:
[a] PM2.5 24-hour data shown in **Air Quality Table 4** are 98th%ile values which is the basis of the ambient air quality standard and the basis for determination of the recommended background concentration.
[b] The limiting AAQS is the most stringent of the CAAQS or NAAQS for that pollutant and averaging period.

Where possible, staff prefers that the recommended background concentration measurements come from nearby monitoring stations with similar characteristics. For this project, the Ridgecrest (PM10 and PM2.5) monitoring station is located reasonably close to the project site and should be fairly representative of the more rural nature of the project site. The Lancaster (CO) monitoring station is located in a more populated area and is located much closer to the influence of the South Coast Air Basin, so this monitoring location should provide conservatively high background concentrations for the project site. The Trona (ozone, NOx and SO_2) monitoring station, while located in a more remote area, has two very large nearby emission sources of NOx and SOx

(Searles Valley Minerals and Ace Cogeneration Company) so this monitoring station location should also provide conservatively high NOx and SOx background concentrations for the project site.

The background concentrations for PM10 are well above the most restrictive existing ambient air quality standards, while the background concentrations for the other pollutants are all below the most restrictive existing ambient air quality standards.

The pollutant modeling analysis was limited to the pollutants listed above in **Air Quality Table 5**; therefore, recommended background concentrations were not determined for the other criteria pollutants (ozone, lead, visibility, etc.).

C.1.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff provided a number of data requests regarding the construction and operations emission estimates and air dispersion modeling analysis (CEC 2009k), which the applicant responded to by providing revised emissions estimates and substantially revised and more robust dispersion modeling analysis (SM 2010a). Staff has reviewed the revised emission estimates and air dispersion modeling analysis[8] and finds them to be reasonable considering the level of emissions mitigation now stipulated to by the applicant.

Project Description

The proposed RSPP is a 250 megawatts (MW) solar electric generating facility with two separate solar fields totaling approximately 1,440 acres. The project would utilize solar parabolic trough technology to generate electricity. The project would use a right-of-way (ROW) grant of approximately 3,995 acres from BLM. The total area that would be disturbed by project construction and operation is about 1,944 acres for the main power area and 58 acres for the transmission line interconnection.

The power plant would have two solar fields, each composed of solar collector piping loops arranged in parallel groups connected to supply and return header piping to a single central power block area. The power block would be located north of Brown Road. The power block would be composed of its own administration, control, warehouse, maintenance, and lab buildings; the Heat Transfer Fluid[9] (HTF) pumping and freeze protection system; solar steam generator (SSG); a propane fired auxiliary boiler; one steam turbine generator (STG); an air-cooled condenser (ACC); generator step-up (GSU) transformer, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, auxiliary cooling tower, diesel-powered emergency generator and firewater pump engines, and firewater system).

[8] This includes a review of the emission source inputs, including the type of source (point, volume, area) and the variables used to describe each source (emissions, height, location, temperature, etc. as appropriate).

[9] The heat transfer fluid in this case is Therminol® VP-1, an organic fluid composed of biphenyl and diphenyl oxide. During active operation the HTF cycles between a cold side temperature of approximately 440°F and a hot side temperature of 750°F.

In addition to the main power generating facility, the project would also include the construction of a new 0.75 mile 230kV transmission line, main access road construction, and installation of a 5-mile, 16-inch water supply pipe line from the municipal water supply district. The 230 KV transmission line from the proposed project's new switchyard would interconnect with Southern California Edison's (SCE) existing 230 kV Inyo-Kern/Kramer Junction transmission line to the west of the project site.

Project Emissions

Project Construction

The total duration of project construction for RSPP is estimated to be approximately 28 months. Different areas within the project site and the construction laydown areas would be disturbed at different times over the period. Total construction disturbance area would be approximately 1,944 acres. Combustion emissions would result from the off-road construction equipment, including diesel construction equipment used for site grading, excavation, and construction of onsite structures, and water and soil binder spray trucks used to control construction dust emissions. Fuel combustion emissions also would result from exhaust of on-road construction vehicles, including heavy duty diesel trucks used to deliver materials, other diesel trucks used during construction, and worker personal vehicles and pickup trucks used to transport workers to and from and around the construction site. Fugitive dust emissions would result from site grading/excavation activities, installation of new transmission lines, water pipelines, construction of power plant facilities, roads, and substations, and vehicle travel on paved/unpaved road.

The annual emissions for the shorter duration offsite construction activities are based on the following construction durations:

- Access Road Construction – four months
- Water Pipeline Construction – six months
- Transmission Line Construction – six months

The applicant's mitigated maximum daily and annual construction emission estimates are provided below in **Air Quality Tables 6** and **7**.

Air Quality Table 6
RSPP Construction - Maximum Daily Emissions (lbs/day)

	NOx	VOC	CO	PM10	PM2.5	SOx
Onsite Construction Emissions						
Main Power Block						
Off-road Equipment Exhaust	766.31	84.79	412.14	33.96	25.67	1.70
On-road Vehicles (onsite only)	22.19	2.11	14.95	0.83	0.76	0.03
Asphaltic Paving	--	0.00	--	--	--	--
Fugitive Dust from Paved Roads	--	--	--	2.82	1.28	--
Fugitive Dust from Unpaved Roads	--	--	--	430.16	43.03	--
Fugitive Dust from Constr. Activities	--	--	--	436.36	138.88	--
Subtotal - Power Block Onsite Emissions	**788.50**	**86.90**	**427.09**	**904.14**	**209.64**	**1.73**
Power Block On-road Equipment (offsite)	493.99	57.11	432.44	79.55	44.69	0.82
Access Road Construction (offsite)	270.55	29.91	140.51	169.31	58.29	0.57
Water Pipeline Construction (offsite)	3.95	0.41	4.65	0.45	0.28	0.01
Transmission Line Construction (offsite)	12.63	1.61	16.55	18.79	6.21	0.03

Source: SM2010a, Table E.1-7, Table E.1-10, Table E.1-12, Table E.1-14
Note: Emissions that were not added may not be additive due to occurring at different times during the construction schedule, and all emissions include fugitive dust as appropriate.

Air Quality Table 7
RSPP Construction - Maximum Annual Emissions (tons/year)

	NOx	VOC	CO	PM10	PM2.5	SOx
Construction Emissions						
Main Power Block Construction						
Off-road Equipment Exhaust	88.01	9.89	46.76	4.05	3.06	0.20
On-road Vehicles (onsite only)	2.71	0.25	1.77	0.10	0.09	0.00
Asphaltic Paving	--	0.02	--	--	--	--
Fugitive Dust from Paved Roads	--	--	--	0.33	0.14	--
Fugitive Dust from Unpaved Roads	--	--	--	49.75	4.83	--
Fugitive Dust from Constr. Activities	--	--	--	51.81	16.86	--
Subtotal - Power Block Emissions	**90.72**	**10.15**	**48.53**	**106.03**	**24.99**	**0.20**
Power Block On-road Equipment (offsite)	50.36	6.49	51.45	9.44	5.18	0.09
Access Road Construction (offsite)	10.42	1.18	5.23	6.41	2.21	0.02
Water Pipeline Construction (offsite)	0.26	0.03	0.31	0.03	0.02	0.00
Transmission Line Construction (offsite)	0.60	0.08	0.89	0.84	0.28	0.00

Source: SM2010a, Table E.1-7, Table E.1-10, Table E.1-12, Table E.1-14
Note: Emissions that were not added may not be additive due to occurring at different times during the construction schedule, and all emissions include fugitive dust as appropriate.

Air Quality Table 7 shows that the maximum annual (12-month) emissions are above the General Conformity Rule applicability thresholds for PM10 (100 tons)[10].

Project Operation

The RSPP facility would be a nominal 250 Megawatt (MW) solar electrical generating facility. The direct air pollutant emissions from power generation are negligible; however, there are required auxiliary equipment and maintenance activities necessary to operate and maintain the facility.

The following are the stationary and mobile emission source operating assumptions that were used to develop the operation emissions estimates for RSPP.

Stationary emission sources:

- Auxiliary Boiler: 35 MMBtu per hour propane-fired auxiliary boiler used for startup. Daily operation would be limited to 15 hours per day at 25% load and two hours per day at full load. Annual operation would be limited to 5,000 hours (500 hours at a full load and 4,500 hours at 25% load).
- HTF Heater: 35 MMBtu per hour propane-fired HTF heater used for freeze protection. The HTF heater would be limited to 10 hours per day and 500 hours per year.
- Emergency fire water pump engine: 300 hp diesel-fired engine. Tested once a week, up to one-hour test, not to exceed 50 hours per year.
- Emergency generator engine: 2,922 hp diesel-fired engine. Tested once a week, up to one-hour test, not to exceed 50 hours per year.
- One two-cell cooling tower: Circulation rate of 6,034 gallons per minute, 2000 milligrams per liter Total Dissolved Solids (TDS), drift eliminator with drift losses of less than or equal to 0.0005%, max run time of 16 hr/day and 3,700 hr/year.
- One HTF expansion/ullage system; VOC control efficiency of 98%, limited to 0.75 lb/hr or 1.5 lb/day, operation is estimated at 2 hours per day and 400 hrs/year.
- HTF piping system. Assumes 3,050 valves, 4 pump seals, 7,594 connectors, and 10 pressure relief valves. Emissions based on U.S. EPA 1995 Oil and Gas Production (Heavy Oil) leakage rate factors[11].

[10] The emissions that would need to be included to determine General Conformity applicability are those emissions inside of the nonattaintment/maintenance area in question. For the proposed project that would include all emissions within the Indian Wells Valley PM10 maintenance area which would include all of the onsite construction emissions; and for those emission that overlap within the worst case year, most of the access road, water pipeline, and transmission line offsite construction emissions. Additionally, a small portion of the Power Block On-road Equipment offsite emissions would need to be included, but most of those emissions would be emitted outside of the Indian Wells Valley.

[11] Staff is currently in the process of determining a consistent approach for HTF piping component emission factors with other local agencies that are currently permitting thermal solar facilities, where light liquid Synthetic Organic Chemical Manufacturing Industry (SOCMI) factors are being used to estimate VOC emissions for other projects that also use Therminol® VP-1 HTF. Staff will provide a revised emission estimate for this and other emission consistency issues related to the FDOC in the SA/DPA/DEIS Errata/Final Environmental Impact Statement (SAE/FEIS), if necessary.

Mobile emissions sources:

- Staff has included emissions for employee trips, assuming 84 employees per day averaging 50 miles round trip per employee.
- Mobile emissions sources required for operation and maintenance were estimated by the applicant based on vehicle miles traveled (VMT) and operating hours. For example, a mirror washing cycle or event can be completed in 10 days, which would allow for approximately 36 washing events per year, but it was assumed that washing would only be required once a month during October through March and twice a month during April through September, for a total of 18 washing events per year (AECOM 2010a, DR-AIR-13). Each mobile source type has a different basis for emissions estimates as provided in the applicant's revised emission estimate spreadsheets (AECOM 2010a).

The RSPP onsite stationary and onsite and offsite mobile source emissions are estimated and summarized in **Air Quality Tables 8** and **9**.

Air Quality Table 8
RSPP Operations - Maximum Daily Emissions (lbs/day)

	NOx	VOC	CO	PM10	PM2.5	SOx
Onsite Operation Emissions						
Auxiliary Boilers	2.24	1.01	7.56	2.01	2.01	2.27
HTF Heaters	3.89	1.75	13.15	3.50	3.50	3.96
Emergency Fire Pump Engines	1.88	0.10	1.72	0.10	0.10	0.003
Emergency Generators	29.35	1.54	16.73	0.97	0.97	0.032
Auxiliary Cooling Towers	---	---	---	0.48	0.48	---
HTF Vents	---	1.50	---	---	--	---
HTF Piping Fugitives	--	4.4	--	---	--	--
Onsite Maintenance Vehicles	0.36	0.04	0.38	282.22	42.14	0.01
Subtotal of Onsite Emissions	**37.71**	**10.32**	**39.54**	**289.28**	**49.20**	**6.27**
Offsite Emissions						
Delivery Vehicles	22.62	1.67	6.39	1.72	1.23	0.03
Employee Vehicles	2.99	3.13	29.79	6.17	2.89	0.05
Subtotal of Offsite Emissions	**25.61**	**4.80**	**36.18**	**7.89**	**4.11**	**0.07**
Total Maximum Daily Emissions	**63.32**	**15.12**	**75.72**	**297.17**	**53.31**	**6.34**

Source: SM2010a, Table E.2-8b and Table E.2-7e, and staff estimate for employee vehicles

Air Quality Table 9
RSPP Operations - Maximum Annual Emissions (tons/yr)

	NOx	VOC	CO	PM10	PM2.5	SOx
Onsite Operation Emissions						
Auxiliary Boilers	0.32	0.14	1.07	0.28	0.28	0.32
HTF Heaters	0.10	0.04	0.33	0.09	0.09	0.10
Emergency Fire Pump Engines	0.05	0.00	0.04	0.00	0.00	0.00
Emergency Generators	0.73	0.04	0.42	0.02	0.02	0.00
Auxiliary Cooling Towers	--	--	--	0.06	0.06	--
HTF Vents	--	0.15	--	---	--	--
HTF Fugitives	--	0.80	--	---	--	--
Onsite Maintenance Vehicles	0.04	0.00	0.02	19.33	2.18	0.00
Subtotal of Onsite Emissions	**1.23**	**1.18**	**1.88**	**19.78**	**2.64**	**0.42**
Offsite Emissions						
Delivery Vehicles	0.49	0.04	0.14	0.04	0.03	0.00
Employee Vehicles	0.55	0.57	5.44	1.13	0.53	0.01
Subtotal of Offsite Emissions	**1.04**	**0.61**	**5.57**	**1.16**	**0.55**	**0.01**
Total Maximum Annual Emissions	**2.27**	**1.79**	**7.45**	**20.94**	**3.19**	**0.43**

Source: SM2010a, Table E.2-8e and Table E.2-7e, and staff estimate for employee vehicles

Air Quality Table 9 shows that the maximum annual operation emissions, after mitigation, are well below the General Conformity Rule applicability threshold for PM10 (100 tons). However, without appropriate mitigation of unpaved road dust and windblown dust the annual PM10 emissions could exceed 100 tons per year[12].

Initial Commissioning

Initial commissioning refers to a period prior to beginning commercial operation when the equipment undergoes initial tests. Because of this proposed project's use of a non-fuel fired generating technology, staff does not expect major changes in emissions from the facility commissioning activities compared to that of normal operation.

Dispersion Modeling Assessment

While the emissions are the actual mass of pollutants emitted from the proposed project, the impacts are the concentration of pollutants from the proposed project that reach the ground level. When emissions are expelled at a high temperature and velocity through a relatively tall stack, the pollutants would be greatly diluted by the time they reach ground level. For this proposed project there are no very tall emission stacks, but the construction and maintenance vehicles and emergency engine do have high

[12] The applicant's revised emission estimate assumes that there is no net increase in wind erosion emissions for the site, which would only happen with soil stabilization mitigation, and also assumed that the mitigation efficiency for unpaved road travel (the bulk of the onsite emissions) would be 80%. Therefore, the unmitigated fugitive dust PM10 emission potential is over 100 tons/year.

temperature and velocity exhausts; and the boiler and heater also have relatively high exhaust temperatures and velocities. The emissions from the proposed project, both stationary source and onsite mobile source emissions, are analyzed through the use of air dispersion models to determine the probable impacts at ground level.

Air dispersion models provide a means of predicting the location and ground level magnitude of the impacts of a new emissions source. These models consist of several complex series of mathematical equations, which are repeatedly calculated by a computer for many ambient conditions to provide theoretical maximum offsite pollutant concentrations short-term (1-hour, 3-hour, 8-hour, and 24-hour) and annual periods. The model results are generally described as maximum concentrations, often described as a unit of mass per volume of air, such as micrograms per cubic meter ($\mu g/m^3$).

The applicant used the U.S.EPA guideline ARMS/EPA Regulatory Model (AERMOD) model to estimate ambient impacts from project construction and operation. The construction emission sources for the site were grouped into two categories: equipment (off-road equipment); and vehicles (on-road equipment), where the exhaust and fugitive dust emissions for each type were calculated for particulate matter modeling. Emissions from onsite equipment engines and fugitive dust emission sources were modeled as area sources. Similar modeling procedures were used by the applicant to determine impacts from the operating maintenance vehicle exhaust and fugitive dust emissions, while the stationary sources (boilers, engines, cooling towers) were modeled as point sources.

The inputs for the air dispersion models include stack information (exhaust flow rate, temperature, and stack dimensions), specific engine and vehicle emission data and meteorological data, such as wind speed, atmospheric conditions, and site elevation. For this project, the meteorological data used as inputs to the model included hourly wind speeds and directions measured at the Mojave air monitoring station during 2002 through 2004[13].

For the determination of one-hour average and annual average construction NOx concentrations the Ozone Limiting Method (OLM) was used to determine worst-case near field NO_2 impacts. The NOx emissions from internal combustion sources, such as diesel engines, are primarily in the form of nitric oxide (NO) rather than NO_2. The NO converts into NO_2 in the atmosphere, primarily through the reaction with ambient ozone, and NOx OLM assumes full conversion of stack NO emission with the available ambient ozone. The NOx OLM method was used assuming an initial NO_2/NOx ratio of 0.1 for all

[13] This meteorological data was approved for use by the KCAPCD (SM 2010a, DR-AIR-22). However, staff is concerned that the difference in wind speeds and directions between Mojave and Ridgecrest may cause underestimation of the downwind impacts. For example the wind rose data from Laural Mountain shows that the predominant wind direction arc to be shifted approximately 90 degrees counterclockwise from the predominant wind direction arc for Mojave, and staff believes that at the site it may be shifted another 30 to 45 degrees due to the local topography. This difference in predominant wind directions would affect the annual modeling results most strongly, as the worst-case short term conditions for any two three-year meteorological data sets would likely be reasonably similar regardless of the differences in long-term wind speed and wind direction frequencies. Staff may complete a separate modeling analysis using one year of more representative meteorological data if that data can be obtained, and if so would provide a summary of that analysis in the SA addendum/FEIS.

NOx emission sources. Actual monitored hourly background ozone concentration data (2002 to 2004 from the Mojave air monitoring station data that corresponds with the meteorological files) were used to calculate maximum potential NO to NO_2 conversion to determine the maximum hourly NO_2 impacts.

Staff revised the background concentrations provided by the applicant, replacing them with the available highest ambient background concentrations from the last three years at the most representative monitoring stations as show in **Air Quality Table 5**. Staff added the modeled impacts to these background concentrations and then compared the results with the ambient air quality standards for each respective air contaminant to determine whether the proposed project's emission impacts would cause a new exceedance of an ambient air quality standard or would contribute to an existing exceedance.

The U.S. Environmental Protection Agency (U.S. EPA) is implementing a new, 1-hour NO_2 standard is scheduled to become effective April 12, 2010. This new standard is expressed as a 3-year average of the 98th percentile of the *daily maximum* 1-hour concentration (i.e., the 8th highest of daily highest 1-hour concentrations). The new standard requires "first tier" ambient NO_2 monitoring near major roadways as defined in the implementing language and "second tier" monitoring for regional NO_2 concentrations. Although U.S. EPA has specified NO_2 monitoring requirements and a schedule for determining attainment status relative to this new standard, it has not yet developed modeling software to generate the statistics in a form that can be used in a compliance demonstration. Therefore, the analyses described below do not include this project's impact on the new federal 1-hour NO_2 standard and the conclusions reached likewise do not include this impact.

The following sections discuss the proposed project's short-term direct construction and operation ambient air quality impacts, as estimated by the applicant, and describes appropriate mitigation measures.

Construction Impacts and Mitigation

Construction Modeling Analysis

Using estimated peak hourly, daily and annual construction equipment exhaust emissions, the applicant modeled the proposed project's construction emissions to determine impacts (SM 2010a). To determine the construction impacts on ambient standards (i.e. 1-hour through annual) it was assumed that the emissions would occur during a daily construction schedule of 10 hour days from March through September (7 am to 5 pm) and eight hour days from October through February (8 am to 4 pm). The predicted proposed project pollutant concentration levels were added to conservatively estimated worst-case maximum background emission concentration levels (**Air Quality Table 5**) to determine the cumulative effect. The results of the applicant's modeling analysis are presented in **Air Quality Table 10**. The construction emissions modeling analysis, including both the onsite fugitive dust and vehicle tailpipe emission sources (with applicant-proposed control measures) are summarized in **Air Quality Tables 6** and **7**.

Air Quality Table 10
Maximum Project Construction Impacts

Pollutants	Avg. Period	Project Impact ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	Standard ($\mu g/m^3$)	Percent of Standard
NO_2	1-hr.	193.8	116.8	310.6	339	92%
	Annual	6.3	9.5	15.8	57	28%
CO	1-hr	738	3,680	4,418	23,000	19%
	8-hr	153	1,778	1,931	10,000	19%
PM10	24	61.2	72	133.2	50	266%
	Annual	5.6	22	27.6	20	138%
PM2.5	24	17.4	17.2	34.6	35	99%
	Annual	0.7	7.0	7.7	12	64%
SO_2	1-hr	2.9	94.3	97.2	665	15%
	3-hr	1.0	44.2	45.2	1,300	3%
	24-hr	0.2	13.1	13.3	105	13%
	Annual	0.01	2.7	2.7	80	3%

Source: SM2010a, Table DR-AIR-6-3 revised.

This modeling analysis indicates, with the exception of PM10 that the proposed project would not create new exceedances or contribute to existing exceedances for any of the modeled air pollutants. The conditions that would create worst-case project modeled impacts (low wind speeds) are not the same conditions when worst-case background is expected. Additionally, the worst-case PM10 impacts occur at the fence line and drop off quickly with distance from the fence line. In light of the existing PM10 non-attainment status for the project site area, staff considers the construction PM10 emissions to be potentially CEQA significant and recommends that the off-road equipment and fugitive dust PM10 emissions be mitigated pursuant to CEQA.

In light of the existing ozone non-attainment status for the project site area, staff considers the construction NOx and VOC emissions to be potentially CEQA significant and recommends that the off-road equipment NOx and VOC emissions be mitigated pursuant to CEQA.

Staff concludes with implementation of staff-proposed mitigation measures the construction impacts would not contribute substantially to exceedances of PM10 or ozone standards.

The modeling analysis shows that, after implementation of the recommended emission mitigation measures, the proposed project's construction is not predicted to cause new exceedances of the NAAQS. Therefore, staff determined that no adverse NEPA impacts would occur after implementation of the recommended mitigation measures.

Construction Mitigation

Applicant's Proposed Mitigation

To mitigate the impacts due to construction of the facility, the applicant has stipulated to staff's previously recommended construction mitigation measures **AQ-SC1** through **AQ-SC5** for other large solar projects (SM 2009a, Section 5.2.5.1).

Adequacy of Proposed Mitigation

Staff generally concurs with the applicant's proposed stipulation to staff conditions **AQ-SC1** through **AQ-SC5**.

Staff Proposed Mitigation

Staff recommends the applicant's proposed construction mitigation be formalized, with minor modifications that update the measures to meet current staff recommendations, in staff Conditions of Certification **AQ-SC1** through **AQ-SC5**. Staff has determined that the proposed conditions of certification would mitigate all construction air quality impacts of the proposed project to less than significant levels pursuant to CEQA.

Staff has considered the minority population surrounding the site (see **Socioeconomics Figure 1**). Since the proposed project's direct air quality impacts have been reduced to less than significant, there is no environmental justice issue for air quality.

Operation Impacts and Mitigation

The following section discusses the proposed project's direct operating ambient air quality impacts, as estimated by the applicant, and evaluated by staff. Additionally, this section discusses the recommended mitigation measures.

Operation Modeling Analysis

Using estimated peak hourly, daily and annual operating emissions, the applicant modeled the proposed project's operation emissions to determine impacts (SM 2010a). The predicted proposed project pollutant concentration levels for all pollutants except 1-hour NO_2, were added to conservatively estimated worst-case maximum background concentration levels (**Air Quality Table 5**) to determine the cumulative effect. For 1-hour NO_2 the applicant provided modeling results for the nine highest modeled hourly concentrations (all of the modeled hours that would exceed the State 1-hour standard if matched with the absolute worst-case background concentration) with the actual matching hourly background NO_2 concentration to estimate the worst-case cumulative concentration. **Air Quality Table 11** presents the results of the applicant's modeling analysis. The operation modeling analysis includes emissions from the stationary sources and the onsite fugitive dust and vehicle tailpipe emission sources estimated by the applicant, which all include the applicant's proposed control measures, and that are summarized in **Air Quality Tables 8** and **9**.

Air Quality Table 11
Project Operation Emission Impacts

Pollutants	Avg. Period	Project Impact ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	Standard ($\mu g/m^3$)	Percent of Standard
NO_2	1-hr.	302.0	11.3	313.2	339	92%
	Annual	0.1	9.5	9.6	57	17%
CO	1-hr	1,605	3,680	5,285	23,000	23%
	8-hr	359	1,778	2137	10,000	21%
PM10	24	39.2	72	111.2	50	222%
	Annual	3.0	22	25	20	125%
PM2.5	24	4.9	17.2	22.1	35	63%
	Annual	0.3	7	7.3	12	61%
SO_2	1-hr	11.3	94.3	105.6	665	16%
	3-hr	7.8	44.2	52.0	1,300	4%
	24-hr	0.6	13.1	13.7	105	13%
	Annual	0.04	2.7	2.74	80	3%

Source: SM2010a, Table DR-AIR-6-3 revised, and Table DR-AIR-6-5.

This modeling analysis indicates, with the exception of 24-hour and annual PM10 impacts that the proposed project would not create new exceedances or contribute to existing exceedances for any of the modeled air pollutants. The conditions that would create worst-case project modeled impacts (low wind speeds) are not the same conditions when worst-case background is expected for PM10/PM2.5. Additionally, the worst-case PM2.5 and PM10 impacts occur at the fence line and drop off quickly with distance from the fence line. Therefore, staff concludes that the operation impacts, when considering staff's mitigation measures, would not contribute substantially to exceedances of the PM10 CAAQS.

Staff also notes that the proposed project's maximum modeled 1-hour NO_2 concentration, using the NOx OLM modeling procedure, is almost entirely from the fire pump engine that is tested infrequently and the maximum impact occurs at the facility fence line, only 30 meters from the engine stack. The NOx OLM method assumes immediate, full conversion of NO to NO_2 in proportion to the amount of available ozone for that hour regardless of time or distance from the stack. In this case that assumption is overly conservative and overstates the 1-hour NO_2 impacts from the proposed project and fire water pump engine because the actual NO to NO_2 conversion in such a short distance from the stack would be essentially zero.

However, in light of the existing PM10 and ozone non-attainment status for the project site area, staff considers the operation NOx, VOC, and PM emissions to be potentially CEQA significant and recommends that the off-road equipment and fugitive dust emissions be mitigated pursuant to CEQA.

The modeling analysis shows that, after implementation of the recommended emission mitigation measures, the proposed project's operation is not predicted to cause new

exceedances of the NAAQS. Therefore, it has been determined that no adverse NEPA impacts would occur after implementation of the recommended mitigation measures.

Operation Mitigation

Applicant's Proposed Mitigation

Emission Controls

As discussed in the air quality section of the AFC and Data Reponses (SM2009a, SM2010a), the applicant proposes the following Best Available Control Technology (BACT) emission controls on the stationary equipment associated with the RSPP:

Auxiliary Boiler

The applicant has proposed one 35 MMBtu per hour auxiliary boiler, which would be fired on propane, and would be equipped with an ultra-low NOx burner. The daily operation the boiler is limited to 15 hours per day at 25% load and two hours per day at full load. Annual operation of the boiler is limited to 5,000 hours per year with a duty cycle of 10% (500 hours) at full load and 90% (4,500 hours) at 25% load. The proposed boiler would have the following emission limits:

- NOx: 0.39 lb/hour (9 ppm @ 3% Oxygen)
- CO: 1.31 lb/hour (50 ppm @ 3% Oxygen)
- VOC: 0.18 lb/hour
- PM10/PM2.5: 0.35 lb/hour
- SO2: 0.40 lb/hour

HTF Heater

The applicant has proposed one 35 MMBtu per hour HTF heater, which would be fired on propane, and would be equipped with an ultra-low NOx burner. The operation of each HTF heater is limited to 10 hours per day and 500 hours per year. The proposed heater would have the following emission limits:

- NOx: 0.39 lb/hour (9 ppm @ 3% Oxygen)
- CO: 1.31 lb/hour (50 ppm @ 3% Oxygen)
- VOC: 0.18 lb/hour
- PM10/PM2.5: 0.35 lb/hour
- SO2: 0.40 lb/hour

Emergency Generator Engine

The applicant has proposed one 2,922 brake horsepower (bhp) emergency generator engine, which would be fired on ARB diesel fuel. The applicant has proposed an ARB/EPA Tier 2 engine, compliant with the New Source Performance Standards,

Subpart IIII Standards of Performance for Stationary Compression Ignition Internal Combustion Engines, for the emergency generator engine. The proposed ARB/EPA Tier 2 engine would have the following emission guarantees:

- NMHC + NOx: 4.8 gram/bhp-hour
- CO: 2.6 gram/bhp-hour
- PM10/PM2.5: 0.20 gram/bhp-hour
- SOx ARB diesel fuel (15 ppm sulfur)

Fire Water Pump Engine

The applicant has proposed one 300 bhp fire water pump engine, which would be fired on ARB diesel fuel. The applicant has proposed an ARB/EPA Tier 3 engine, compliant with the New Source Performance Standards, Subpart IIII Standards of Performance for Stationary Compression Ignition Internal Combustion Engines, for the fire water pump engine. The proposed ARB/EPA Tier 3 engine would have the following emission guarantees:

- NMHC + NOx: 3.0 gram/bhp-hour
- CO: 2.6 gram/bhp-hour
- PM10/PM2.5: 0.15 gram/bhp-hour
- SOx ARB diesel fuel (15 ppm sulfur)

Cooling Tower

The applicant has proposed one two-cell cooling tower, which is used for auxiliary equipment cooling. The cooling tower would have a high efficiency drift eliminator guaranteed to control drift to 0.0005% of the water recirculation rate. Additionally, the cooling tower recirculating water would be controlled to a maximum total dissolved solids content of 2,000 ppm. The cooling tower would have the following emission limits:

- PM10/PM2.5: 0.03 lb/hour, 0.48 lb/day, 0.06 tons/year

HTF Expansion Tank Vent

The applicant has proposed one HTF ullage tank system for the project. The HTF breaks down over time and these breakdown products need to be released to maintain the working composition of the HTF. The breakdown products are a mixture of higher and lower boiling organic compounds (VOC) that are vented in order to remove them from the HTF mixture. The VOC emissions would be controlled with two carbon canisters in series with an efficiency of 98%. VOC emissions would be limited to a maximum of 0.75 lb/hr after control, and the HTF ullage tank would be vented a maximum of two hours per day and 400 hours/year:

- VOC: 98% control efficiency (0.75 lb/hour, 1.50 lb/day, 0.15 tons/yr)

HTF Piping Systems

The HTF piping system is composed of a number of piping components (pump seals, valves, pressure relief vents, flanges, etc.). These components would leak hot HTF that

would evaporate and cause VOC emissions. The applicant is proposing maintenance inspections and repair of the piping system to reduce HTF leaks.

Operation and Maintenance Vehicles

The applicant has stipulated to conditions recommended by staff on other recent large solar power projects to control maintenance vehicle emissions, which states the following vehicle requirements:

- The project owner will use gasoline powered light trucks, equivalent of the Ford F150 model, for facility maintenance, except for mirror washing, welding rigs, or other specific activities which require a larger vehicle;
- Only new trucks meeting California on-road vehicle emission standards will be purchased for use at the site; and
- In addition, only electrical powered all-terrain vehicles or other low-emission vehicles will be used to support the maintenance crew within the facility.

The applicant has also stipulated to staff's previously recommended fugitive dust control condition for operation that includes the same mitigation measures as required during construction, as appropriate.

Adequacy of Proposed Mitigation

Staff concurs with the District's preliminary determination that the proposed project's stationary source proposed emission controls/emission levels for criteria pollutants meet regulatory requirements and that the proposed stationary source emission levels are reduced adequately.

Additionally, staff generally agrees that the applicant's proposed fugitive dust mitigation measures would provide adequate fugitive dust emission control.

Staff Proposed Mitigation

As mentioned earlier in the discussions of the ozone and PM10 impacts, staff concludes that the proposed project's direct stationary source ozone precursor and PM10 emissions are minimal, but when combined with the maintenance vehicles emissions could be significant. Additionally, staff believes that a solar renewable project, which would have a 30-year life in a setting likely to continue to be impacted by both local and upwind emission sources, should address its contribution to the potentially ongoing nonattainment of the PM10 and ozone standards. Staff concludes that the applicant's proposed mitigation measures, that mirror staff's current mitigation requirements for other large solar projects, would adequately mitigate the proposed project's stationary source, mobile equipment, and fugitive dust emissions. Therefore, staff recommends the operating mitigation be formalized, with minor modifications to meet current staff recommendations, in staff Conditions of Certification **AQ-SC6** and **AQ-SC7**.

Staff is also proposing Condition of Certification **AQ-SC8** to ensure that the Energy Commission license is amended as necessary to incorporate changes to the air quality permits.

Staff has determined that the proposed emission controls and emission levels, along with the applicant proposed and staff recommended emission mitigation measures, would mitigate all proposed project air quality impacts to less than significant pursuant to CEQA.

Staff has considered the minority population surrounding the site (see **Socioeconomics Figure 1**). Since the proposed project's direct air quality impacts have been reduced to less than significant, there is no environmental justice issue for air quality.

Indirect Pollutant and Secondary Pollutant Impacts

The proposed project would have direct emissions of chemically reactive pollutants (NOx, SOx, and VOC), but would also have indirect emission reductions associated with the reduction of fossil-fuel fired power plant emissions due to the proposed project displacing the need for their operation, since solar renewable energy facilities would operate on a must-take basis[14]. However, the exact nature and location of such reductions is not known, so the discussion below focuses on the direct emissions from the proposed project within the Indian Wells Valley portion of the Mojave Desert Air Basin.

Ozone Impacts

There are air dispersion models that can be used to quantify ozone impacts, but they are used for regional planning efforts where hundreds or even thousands of sources are input into the model to determine ozone impacts. There are no regulatory agency models approved for assessing single source ozone impacts. However, because of the known relationship of NOx and VOC emissions to ozone formation, it can be said that the emissions of NOx and VOC from the RSPP do have the potential (if left unmitigated) to contribute to higher ozone levels in the region. These impacts would be cumulatively significant under CEQA because they would contribute to ongoing violations of the state ozone ambient air quality standards.

PM2.5 Impacts

Secondary particulate formation, which is assumed to be 100% PM2.5, is the process of conversion from gaseous reactants to particulate products. The process of gas-to-particulate conversion, which occurs downwind from the point of emission, is complex and depends on many factors, including local humidity and the presence of air pollutants. The basic process assumes that the SOx and NOx emissions are converted into sulfuric acid and nitric acid first and then react with ambient ammonia to form sulfate and nitrate. The sulfuric acid reacts with ammonia much faster than nitric acid and converts completely and irreversibly to particulate form. Nitric acid reacts with ammonia to form both a particulate and a gas phase of ammonium nitrate. The particulate phase would tend to fall out; however, the gas phase can revert back to ammonia and nitric acid. Thus, under the right conditions, ammonium nitrate and nitric acid establish a balance of concentrations in the ambient air. There are two conditions that are of interest, described as *ammonia rich* and *ammonia poor*. The term ammonia

[14] This refers to the fact that the contract between the owner of this solar power facility and the utility will require that the utility take all generation from this facility with little or no provisions for the utility to direct turn down of generation from the facility.

rich indicates that there is more than enough ammonia to react with all the sulfuric acid and to establish a balance of nitric acid-ammonium nitrate. Further ammonia emissions in this case would not necessarily lead to increases in ambient PM2.5 concentrations. In the case of an ammonia poor environment, there is insufficient ammonia to establish a balance and thus additional ammonia would tend to increase PM2.5 concentrations.

The Kern County Portion of the Mojave Desert Air Basin has not undergone the rigorous secondary particulate studies that have been performed in other areas of California, such as the San Joaquin Valley, that have more serious fine particulate pollution problems. However, the available chemical characterization data shows that the annual ammonium nitrate and ammonium sulfate fine particulate concentrations in China Lake, Edwards, and Mojave during 2000 comprised approximately 40% of the total PM2.5 (ARB 2005), which for Ridgecrest would be approximately 25% of the state annual ambient PM2.5 standard. Because of the known relationship of NOx and SOx emissions to PM2.5 formation, it can be said that the emissions of NOx and SOx from the RSPP do have the potential (if left unmitigated) to contribute to higher PM2.5 levels in the region; however, the region is in attainment with PM2.5 standards and the low level of NOx and SOx emissions from this project would not significantly impact that status.

Impact Summary

The applicant is proposing to mitigate the proposed project's stationary source NOx, VOC, SO_2, and PM10/PM2.5 emissions through the use of Best Available Control Technology (BACT) and reduce the proposed project's mobile source emissions by using lower emitting new vehicles. With the applicant's stipulated vehicle emission mitigation, which is formalized in Staff Condition of Certification **AQ-SC6,** staff concludes that the proposed project would not cause significant secondary pollutant impacts.

C.1.4.3 CEQA LEVEL OF SIGNIFICANCE

Project Construction

Staff considers the unmitigated construction NOx, VOC, and PM emissions to be potentially CEQA significant and, therefore, staff is recommending that the NOx, VOC, and PM emission be mitigated pursuant to CEQA. Staff is recommending several mitigation measures (**AQ-SC1** through **AQ-SC5**), that also include the applicant's stipulated construction mitigation measures, to limit exhaust emissions and fugitive dust emissions during project construction to the extent feasible.

Therefore, while there would be adverse CEQA air quality impacts during construction, they are expected to be less than significant after implementation of the applicant's stipulated and staff's recommended mitigation measures.

Project Operation

Staff considers the unmitigated operation and maintenance NOx, VOC, and PM emissions to be potentially CEQA significant and, therefore, staff is recommending that the NOx, VOC, and PM emissions be mitigated pursuant to CEQA. Staff is recommending two mitigation measures (**AQ-SC6** and **AQ-SC7**), that also include the

applicant's stipulated operations emission mitigation, to limit exhaust emissions and fugitive dust emissions during project operation to the extent feasible.

Therefore, while there would be adverse CEQA air quality impacts during operation, they are expected to be less than significant after implementation of the applicant's stipulated and staff's recommended mitigation measures.

Closure and Decommissioning

Eventually the facility would close, either at the end of its useful life or due to some unexpected situation such as a natural disaster or catastrophic facility breakdown. When the facility closes, all sources of air emissions would cease to operate and thus impacts associated with those emissions would no longer occur. The only other expected emissions would be equipment exhaust and fugitive particulate emissions from the dismantling activities. These activities would be of a much shorter duration than construction of the proposed project, equipment are assumed to have much lower comparative emissions due to technology advancement, and fugitive dust emissions would be required to be controlled in a manner at least equivalent to that required during construction. Therefore, while there would be adverse CEQA air quality impacts during decommissioning, they are expected to be less than significant.

C.1.5 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project as defined by the applicant. This alternative is analyzed because (1) it eliminates about 42% of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources (desert tortoise and Mohave ground squirrel), cultural resources, and recreational uses, and (2) avoids constructing a solar facility in the Mohave Ground Squirrel Conservation Area (MGSCA). The Northern Unit Alternative is shown in **Alternatives Figure 1**.

C.1.5.1 SETTING AND EXISTING CONDITIONS

The Northern Unit Alternative would consist of 167 solar collector array loops with a net generating capacity of approximately 146 MW. The total disturbance area would be approximately 1,134 acres of land. This alternative would retain 58% of the proposed solar array loops and would affect 58% of the land of the proposed 250 MW project.

The setting and existing conditions for this alternative are the same as the proposed project. The existing ambient air quality does not change and the facility would still be within the same air basin and subject to the same air quality LORS.

C.1.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Northern Unit Alternative would reduce the total construction and operation emissions of the proposed project by somewhat less than 42%, due to reduced efficiencies of the somewhat smaller project. However, the maximum daily and annual construction emissions are assumed to be similar to the project assuming the same level of maximum activity with a reduction in the overall construction schedule. Therefore, the maximum construction emissions would be approximately the same as

the emissions shown in **Air Quality Tables 6** and **7**; and the maximum daily and annual operation emissions would be somewhat more than 58% of those shown in **Air Quality Tables 8** and **9**.

The maximum short-term and maximum annual construction pollutant concentration impacts for the Northern Unit Alternative could be as high as but no higher than that estimated for the proposed project, assuming the same maximum daily and annual construction activities. Therefore, the worst-case short-term and annual construction pollutant concentration impacts for this alternative are likely to be similar to or somewhat lower than those shown for the proposed project in **Air Quality Table 10**.

The maximum short-term and maximum annual operation pollutant concentration impacts for the Northern Unit Alternative are likely to be somewhat less than that for the proposed project as shown in **Air Quality Table 11**. However, the amount of reduction in impacts is uncertain as the worst case impacts are based on factors such as proximity to receptors and terrain as well as total emissions.

The results of the Northern Unit Alternative would be the following:

- The worst-case short-term construction emissions and ground level pollutant concentration impacts would be similar to the proposed project and would require the same level of mitigation. The total construction period and total construction emissions would be reduced from those required to construct the proposed project.
- The operation emissions and ground level pollutant concentration impacts would be lower than the proposed project, but the same level of mitigation would be required.
- The benefits of the proposed project in displacing fossil fuel fired generation and reducing associated, but mainly out of air basin, criteria pollutant emissions would be reduced.

If the Northern Unit Alternative were approved, other renewable projects may be developed on other sites in the in the Indian Wells Valley, Kern County, the Mojave Desert, or in adjacent states to fill the 104 MW gap not supplied by the proposed project as developers strive to provide renewable power that complies with utility requirements and State/Federal mandates[15].

C.1.5.3 CEQA LEVEL OF SIGNIFICANCE

The level of significance under CEQA for the Northern Unit Alternative would be the same as for the proposed project, with the same significance rationale, where if left unmitigated there is the potential for significant PM10 and ozone precursor (NOx and VOC) emission impacts during the Alternative project's construction and operation. The mitigation that would be proposed for the Northern Unit Alternative would be the same as that proposed for the proposed project (staff and KCAPCD recommended conditions of certification).

[15] Such as the State of California 33% Renewable Portfolio Standard (RPS) mandated under Executive Order S-14-08.

C.1.6 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would essentially be a 104 MW facility located within the boundaries of the proposed project as defined by the applicant. This alternative is analyzed because it eliminates about 58% of the proposed project area so all impacts are reduces, especially those related to desert washes, biological resources, and cultural resources. The boundaries of the Southern Unit Alternative are shown in **Alternatives Figure 2**.

C.1.6.1 SETTING AND EXISTING CONDITIONS

The Southern Unit Alternative would consist of 119 solar collector array loops with a net generating capacity of approximately 104 MW. The total disturbance area would be approximately 908 acres of land. This alternative would retain 42% of the proposed solar array loops and would affect 42% of the land of the proposed 250 MW project.

The setting and existing conditions for this alternative are the same as the proposed project. The existing ambient air quality does not change and the facility would still be within the same air basin and subject to the same air quality LORS.

C.1.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Southern Unit Alternative would reduce the total construction and operation emissions of the proposed project by somewhat less than 58%, due to reduced efficiencies of the somewhat smaller project. However, the maximum daily and annual construction emissions are assumed to be similar to the project assuming the same level of maximum activity with a reduction in the overall construction schedule. Therefore, the maximum construction emissions would be approximately the same as the emissions shown in **Air Quality Tables 6** and **7**; and the maximum daily and annual operation emissions would be somewhat more than 42% of those shown in **Air Quality Tables 8** and **9**.

The maximum short-term and maximum annual construction pollutant concentration impacts for the Southern Unit Alternative could be as high but no higher as that estimated for the proposed project, assuming the same maximum daily and annual construction activities. Therefore, the worst-case short-term and annual construction pollutant concentration impacts for this alternative are likely to be similar to or somewhat lower than those shown for the proposed project in **Air Quality Tables 10**.

The maximum short-term and maximum annual operation pollutant concentration impacts for the Southern Unit Alternative are likely to be somewhat less than that for the proposed project as shown in **Air Quality Table 11**. However, the amount of reduction in impacts is uncertain as the worst case impacts are based on factors such as proximity to receptors and terrain as well as total emissions.

The results of the Southern Unit Alternative would be the following:

- The worst-case short-term construction emissions and ground level pollutant concentration impacts would be similar to the proposed project and would require the same level of mitigation. The total construction period and total construction emissions would be reduced from those required to construct the proposed project.

- The operation emissions and ground level pollutant concentration impacts would be lower than the proposed project, but the same level of mitigation would be required.
- The benefits of the proposed project in displacing fossil fuel fired generation and reducing associated, but mainly out of air basin, criteria pollutant emissions would be reduced.

If the Southern Unit Alternative were approved, other renewable projects may be developed on other sites in the in Kern, the Mojave Desert, or in adjacent states to fill the 146 MW gap not supplied by the proposed project as developers strive to provide renewable power that complies with utility requirements and State/Federal mandates.

C.1.6.3 CEQA LEVEL OF SIGNIFICANCE

The level of significance under CEQA for the Southern Unit Alternative would be the same as for the proposed project, with the same significance rationale, where if left unmitigated there is the potential for significant PM10 and ozone precursor (NOx and VOC) emission impacts during the Alternative project's construction and operation. The mitigation that would be proposed for the Southern Unit Alternative would be the same as that proposed for the proposed project (staff and KCAPCD recommended conditions of certification).

C.1.7 ORIGINAL PROPOSED PROJECT ALTERNATIVE

The Original Proposed Alternative would be a 250 MW solar facility as originally proposed by the applicant. This alternative is analyzed because (1) It would reduce the amount of land developed within the Mohave Ground Squirrel Conservation Area, and (2) it could transmit the full 250 MW of power that the applicant has requested. The boundaries of the Original Proposed Project Alternative are shown in **Alternatives Figure 3**.

C.1.7.1 SETTING AND EXISTING CONDITIONS

The Original Proposed Project Alternative would consist of 278 solar array loops with a net generating capacity of 250 MW. The total disturbance area would approximately 1,794 acres of land, which is 208 acres smaller than the Proposed Project.

The setting and existing conditions for this alternative are the same as the proposed project. The existing ambient air quality does not change and the facility would still be within the same air basin and subject to the same air quality LORS.

C.1.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Original Proposed Project Alternative would require approximately the same amount of construction and would have the same operating equipment and nearly identical operating maintenance requirements. Staff assumes that the construction and operation emissions are approximately the same, or just slightly lower due to a more efficient site layout, as those for the proposed project. Therefore, the construction and operation emissions would be similar to those shown in **Air Quality Tables 6** and **7**, and **Air Quality Tables 8** and **9**, respectively.

The maximum daily and maximum annual construction and operation emissions and emission impacts for the Original Proposed Project Alternative are likely to be as high as that estimated for the proposed project, assuming the same maximum daily and annual construction activities. Therefore, the worst-case short-term and annual construction and operation pollutant concentration impacts for this alternative are likely to be similar to those shown for the proposed project in **Air Quality Tables 10** and **11**, respectively.

The results of the Original Proposed Project Alternative would be the following:

- The worst-case short-term construction emissions and ground level pollutant concentration impacts would be nearly the same as the proposed project and would require the same level of mitigation. The total construction period and total construction emissions and long-term ground level pollutant concentration impacts would be similar to those required to construct the proposed project.
- The operation emissions and ground level pollutant concentration impacts would be nearly identical to the proposed project and would require the same level of mitigation.
- This alternative would provide the same benefits of the proposed project in displacing fossil fuel fired generation and reducing associated, but mainly out of air basin, criteria pollutant emissions.

C.1.7.3 CEQA LEVEL OF SIGNIFICANCE

The level of significance under CEQA for the Original Proposed Project Alternative would be the same as for the proposed project, with the same significance rationale, where if left unmitigated there is the potential for significant PM10 and ozone precursor (NOx and VOC) emission impacts during the Alternative project's construction and operation. The mitigation that would be proposed for the Original Proposed Project Alternative would be the same as that proposed for the proposed project (staff and KCAPCD recommended conditions of certification).

C.1.8 NO ACTION ALTERNATIVE

C.1.8.1 NO ACTION ON PROPOSED PROJECT APPLICATION AND ON CDCA LAND USE PLAN AMENDMENT

Under this alternative, the proposed RSPP would not be approved by the CEC and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

The results of the No Project/No Action Alternative would be the following:

- The impacts of the proposed project would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another renewable energy project.

- The benefits of the proposed project in reducing fossil fuel use and greenhouse gas emissions from gas-fired generation would not occur. Both State and Federal law support the increased use of renewable power generation (see **APPENDIX AIR-1 - GREENHOUSE GAS EMISSIONS** for details).

If the proposed project is not approved, renewable projects would likely be developed on other sites in the Indian Wells Valley, Kern County, Mojave Desert, or in adjacent states as developers strive to provide renewable power that complies with utility requirements and State/Federal mandates. For example, as shown on **Cumulative Impacts Figure 1** and in **Table 1**, several dozen solar and wind development applications for use of BLM land, 21 within the jurisdiction of the BLM Ridgecrest Field office alone, have been submitted. Additional BLM lands in Nevada and Arizona also have applications for solar and wind projects.

C.1.8.2 NO ACTION ON PROPOSED PROJECT AND AMEND THE CDCA LAND USE PLAN TO MAKE THE AREA AVAILABLE FOR FUTURE SOLAR DEVELOPMENT

Under this alternative, the proposed RSPP would not be approved by the CEC and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. As a result, air pollutant emissions and impacts would result from the construction and operation of the solar technology and would likely be similar to the air quality impacts from the proposed project. Different solar technologies require different amounts of construction and operations maintenance; however, the benefits of the proposed project in displacing fossil fuel fired generation and reducing associated pollutant emissions could occur with a different solar technology at this site and therefore with this alternative. As such, this No Project/No Action Alternative could result in air quality impacts and benefits similar to the impacts under the proposed project.

C.1.8.3 NO ACTION ON PROPOSED PROJECT APPLICATION AND AMEND THE CDCA LAND USE PLAN TO MAKE THE AREA UNAVAILABLE FOR FUTURE SOLAR DEVELOPMENT

Under this alternative, the proposed RSPP would not be approved by the CEC and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the air quality of the site is not expected to change noticeably from existing conditions and, as such, this No Project/No Action Alternative would not result in air quality impacts under the proposed project nor would it result in the air quality benefits

from the proposed project. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.1.9 COMPARISON OF ALTERNATIVES AND PROPOSED PROJECT

Air Quality Table 12 provides a comparison of the project alternatives

Air Quality Table 12
Comparison of Proposed Project and Alternatives

	Proposed Project (250 MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250 MW)	No Project/No Action[a]
Exceeds PSD Emission Thresholds	Less than Adverse [b]	Less than Adverse [b]	Less than Adverse [b]	Less than Adverse [b]	No Impact
Exceeds General Conformity Emission Thresholds	Exceeds PM10 Threshold[c]	Exceeds PM10 Threshold[c]	Exceeds PM10 Threshold[c]	Exceeds PM10 Threshold[c]	No Impact
NAAQS Exceedance Impacts	Less than Adverse	Less than Adverse	Less than Adverse	Less than Adverse	No Impact

Notes:
[a] All No Project/No Action alternatives assume that the RSPP project would not be built on the proposed site.
[b] With staff recommended construction fugitive dust mitigation measures (**AQ-SC1** through **AQ-SC4**).
[c] Exceeds PM10 threshold for federal PM10 maintenance areas during construction (100 tons/year). A General Conformity analysis will need to be completed for the project alternative selected for approval.

C.1.10 CUMULATIVE IMPACTS

Cumulative impacts are defined by CEQA as "two or more individual effects which, when considered together, are considerable or . . . compound or increase other environmental impacts." (CEQA Guidelines, § 15355.) A cumulative impact consists of an impact that is created as a result of a combination of the project evaluated in the EIR together with other projects causing related impacts." (CEQA Guidelines, § 15130(a)(1).) Such impacts may be relatively minor and incremental, yet still be significant because of the existing environmental background, particularly when one considers other closely related past, present, and reasonably foreseeable future projects.

Cumulative effects are defined by the Council on Environmental Quality NEPA regulations as "…the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions" (40 CFR 1508.7).

This analysis is concerned with criteria air pollutants. Such pollutants have impacts that are usually (though not always) cumulative by nature. Rarely would a project by itself cause a violation of a federal or state criteria pollutant standard. However, a new source of pollution may contribute to violations of criteria pollutant standards because of the

existing background sources or foreseeable future projects. Air districts attempt to attain the criteria pollutant standards by adopting attainment plans, which comprise a multi-faceted programmatic approach to such attainment. Depending on the air district, these plans typically include requirements for air offsets and the use of Best Available Control Technology (BACT) for new sources of emissions, and restrictions of emissions from existing sources of air pollution.

Thus, much of the preceding discussion is concerned with cumulative impacts. The "Existing Ambient Air Quality" subsection describes the air quality background in the Indian Wells Valley portion of the Mojave Desert Air Basin, including a discussion of historical ambient levels for each of the significant criteria pollutants. The "Construction Impacts and Mitigation" subsection discusses the proposed project's contribution to the local existing background caused by project construction. The "Operation Impacts and Mitigation" subsection discusses the proposed project's contribution to the local existing background caused by project operation. The following subsection includes two additional analyses:

- A summary of projections for criteria pollutants by the air district and the air district's programmatic efforts to abate such pollution; and
- An analysis of the proposed project's *localized cumulative impacts*, the proposed project's direct operating emissions combined with other local major emission sources;

C.1.10.1 SUMMARY OF PROJECTIONS

The KCAPCD is the agency with principal responsibility for air quality attainment planning in the portion of the MDAB surrounding the project site. The Indian Wells Valley portion of eastern Kern County is designated as attainment[16] for all federal air quality standards and nonattainment of the State ozone and PM10 standards. The eastern Kern County portion of the MDAB (outside of Indian Wells Valley) is designated as non-attainment for the federal (8-hour) ozone standard. Kern County is considered to be in attainment and/or unclassified of all other criteria pollutants (NO_2, and SO_2, and PM2.5) State and federal standards.

Ozone

The KCAPCD developed an ozone redesignation request and maintenance plan for the federal 1-hour ozone standard in 2003 (KCAPCD 2003). The eastern portion of Kern County was determined to be in attainment of the 1-hour ozone standard by the USEPA in 2004 and deemed a maintenance area (FR 2004). The District is in the process for being reclassified for the 8-hour ozone standard, and U.S.EPA is reconsidering the level of the federal 8-hour ozone standard, so the initial 8-hour ozone standard attainment plan is not yet due to USEPA. The 1-hour ozone maintenance plan remains in force until such time as the 8-hour attainment plan is approved. The 1-hour ozone maintenance plan requires no new control measures for maintaining attainment of the 1-hour standard.

[16] The Indian Well Valley is a federal PM10 maintenance area.

The KCAPCD California Clean Air Act Ozone Air Quality Attainment Plan was approved by the California Air Resources Board (CARB) on February 18, 1993. KCAPCD's most recent Annual Implementation Progress Report for this attainment plan was completed in 2005 (KCAPCD 2005), and will likely be updated at the same time as the initial federal 8-hour ozone attainment plan is due. The implementation progress report notes that the area is overwhelmingly impacted by upwind transport, with the majority of the ambient ozone pollution in the area being due to pollutants that are transported by the wind from the San Joaquin Valley and South Coast Air Basins. The implementation progress report indicates that no additional control measures are required for attainment of the ozone CAAQS, attainment will occur by reducing the pollution in these adjacent air basins.

Therefore, both the federal and State ozone management plans require no new control measures that would affect the proposed Project and compliance with existing KCAPCD rules and regulations during construction and operation would ensure conformance with the approved KCAPCD air quality management plans.

Particulate Matter

The KCAPCD developed a PM10 maintenance plan for the Indian Wells Valley that was approved by U.S. EPA in 2003 (Federal Register Volume 68, Number 88, pages 24368-24370). The Reasonably Available Control Measures that are part of this approved plan do not impact the construction or operation of the proposed project beyond compliance with existing KCAPCD rules and regulations (specifically Rules 401, 404.1, 405). The State of California submitted District Rule 402 – Fugitive Dust to U.S. EPA on January 13, 2005 as a revision to the California State Implementation Plant (SIP). In 2008, the U.S. EPA found complete California Air Resource Board's (CARB) submittal of Rule 402. However, U.S. EPA has not incorporated Rule 402 into the SIP and the Indian Wells Valley PM10 Maintenance Plan does not rely on Rule 402 as a PM10 control measure.

KCAPCD adopted a final staff report on September 13, 2007 for the rule development schedule to comply with Senate Bill 656 (Sher) to reduce public exposure to PM10 and PM2.5. Eight appropriate PM control strategies are identified for future rule development, which will only require modifying existing District Rule 402 and creating new rules for the control of windblown dust, which are not part of the Indian Well Valley PM10 Maintenance Plan. The proposed project would conform to these control strategies with the incorporation of staff's recommended conditions of certification.

The proposed project, with incorporation of staff's and the Districts recommended conditions, would comply with all existing District rules; therefore, conformance with the Indian Wells PM10 Maintenance Plan is expected.

Summary of Conformance with Applicable Air Quality Plans

The applicable air quality plans do not outline any new control measures applicable to the proposed project's operating emission sources. Therefore, compliance with existing District rules and regulations would ensure compliance with those air quality plans.

C.1.10.2 LOCALIZED CUMULATIVE IMPACTS

Since the power plant air quality impacts can be reasonably estimated through air dispersion modeling (see the "Operation Modeling Analysis" subsection) the proposed project contributions to localized cumulative impacts can be estimated. To represent *past* and, to an extent, *present projects* that contribute to ambient air quality conditions, the Energy Commission staff recommends the use of ambient air quality monitoring data (see the "Existing Ambient Air Quality" subsection), referred to as the *background*. The staff takes the following steps to estimate what are additional appropriate "present projects" that are not represented in the background and "reasonably foreseeable projects":

- First, the Energy Commission staff (or the applicant) works with the air district to identify all projects that have submitted, within the last year of monitoring data, new applications for an authority to construct (ATC) or permit to operate (PTO) and applications to modify an existing PTO within six miles of the project site. Based on staff's modeling experience, beyond six miles there is no statistically significant concentration overlap for non-reactive pollutant concentrations between two stationary emission sources.
- Second, the Energy Commission staff (or the applicant) works with the air district and local counties to identify any new area sources within six miles of the project site. As opposed to point sources, area sources include sources like agricultural fields, residential developments or other such sources that do not have a distinct point of emission. New area sources are typically identified through draft or final Environmental Impact Reports (EIRs) that are prepared for those sources. The initiation of the EIR process is a reasonable basis on which to determine what is "reasonably foreseeable" for new area sources.
- The data submitted, or generated from the applications with the air district for point sources or initiating the EIR process for area sources, provides enough information to include these new emission sources in air dispersion modeling. Thus, the next step is to review the available EIR(s) and permit application(s), determine what sources must be modeled and how they must be modeled.
- Sources that are not new, but may not be represented in ambient air quality monitoring are also identified and included in the analysis. These sources include existing sources that are co-located with or adjacent to the proposed source (such as an existing power plant). In most cases, the ambient air quality measurements are not recorded close to the proposed project, thus a local major source might not be well represented by the background air monitoring. When these sources are included, it is typically a result of there being an existing source on the project site and the ambient air quality monitoring station being more than two miles away.
- The modeling results must be carefully interpreted so that they are not skewed towards a single source, in high impact areas near that source's fence line. It is not truly a cumulative impact of RSPP if the high impact area is the result of high fence line concentrations from another stationary source and RSPP is not providing a substantial contribution to the determined high impact area.

Once the modeling results are interpreted, they are added to the background ambient air quality monitoring data and thus the modeling portion of the cumulative assessment

is complete. Due to the use of air dispersion modeling programs in staff's cumulative impacts analysis, the applicant must submit a modeling protocol, based on information requirements for an application, prior to beginning the investigation of the sources to be modeled in the cumulative analysis. The modeling protocol is typically reviewed, commented on, and eventually approved in the Data Adequacy phase of the licensing procedure. Staff typically assists the applicant in finding sources (as described above), characterizing those sources, and interpreting the results of the modeling. However, the actual modeling runs are usually left to the applicant to complete. There are several reasons for this: modeling analyses take time to perform and require significant expertise, the applicant has already performed a modeling analysis of the proposed project alone (see the "Operation Modeling Analysis" subsection), and the applicant can act on its own to reduce stipulated emission rates and/or increase emission control requirements as the results warrant. Once the cumulative project emission impacts are determined, the necessity to mitigate the proposed project emissions can be evaluated, and the mitigation itself can be proposed by staff and/or the applicant (see the "Operation Mitigation" subsection).

The applicant, in consultation with KCAPCD confirmed that there are no projects within a six mile radius from the RSPP site that are under construction or have received permits to be built or operate in the foreseeable future. Therefore, it has been determined that no stationary sources requiring a cumulative modeling analysis exist within a six mile radius of the proposed project site. However, there are several pending solar and wind projects being considered in the Ridgecrest area, including a total of 21 solar and wind projects being considered within the service area of the Ridgecrest BLM Field Office. This potential for significant additional development within the air basin and corresponding increase in air basin emissions is a major part of staff's rationale for recommending Conditions of Certification **AQ-SC6** and **AQ-SC7** that are designed to mitigate the proposed project's cumulative impacts by reducing the dedicated on-site vehicle emissions and fugitive dust emissions during site operation. With these recommended CEQA-only mitigation measures, staff has concluded that the CEQA cumulative air quality impacts are less than significant.

Staff has considered the minority population surrounding the site (see **Socioeconomics Figure 1**). Since the proposed project's cumulative air quality impacts have been mitigated to less than significant, there is no environmental justice issue for air quality.

C.1.11 COMPLIANCE WITH LORS

The Kern County Air Pollution Control District issued a Preliminary Determination of Compliance (PDOC) for the RSPP on February 18, 2010 (KCAPCD 2010a), and will issue a Final Determination of Compliance after a 30 day public notice period. Compliance with all District rules and regulations was demonstrated to the District's satisfaction in the PDOC. The District's PDOC conditions are presented in the Conditions of Certification (**AQ-1** to **AQ-106**).

Staff has submitted an official PDOC comment letter and expects that the FDOC may contain revisions to conditions due to Energy Commission, applicant, or third party

comments, and staff will provide any revised FDOC findings or conditions of certification in the SA/DPA/DEIS Errata/Final Environmental Impact Statement (SAE/FEIS) or subsequent addendum after receipt of the FDOC.

C.1.11.1 FEDERAL

The District is responsible for issuing the federal New Source Review (NSR) permit and has been delegated enforcement of the applicable New Source Performance Standard (Subparts Dc and IIII). However, this proposed project does not require a federal NSR or Title V permit and this proposed project would not require a PSD permit from U.S.EPA prior to initiating construction.

The proposed project is located in a federal nonattainment or maintenance area and requires the approval of a federal agency (BLM). Therefore, the proposed project is subject to the General Conformity regulations (40 CFR Part 93). The Indian Wells Valley portion of the MDAB is currently classified as attainment for all federal ambient air quality standards, but is a former PM10 nonattainment area that is now a maintenance area. The General Conformity emissions applicability thresholds for this classification is 100 tons/year of direct and indirect PM10 emissions, and 100 tons/year of direct and indirect PM10 precursors identified as major PM10 contributors in the SIP. The currently applicable PM10 SIP does not identify secondary pollutants (NOx, SOx, and VOC) as major contributors to ambient PM10 concentrations and focuses on fugitive dust emissions from unpaved roads and other sources.

Since the proposed project's PM10 emission estimates for construction have been determined to be above the applicable General Conformity applicability thresholds (see **Air Quality Table 7**), the BLM will be required to complete a conformity analysis for the project prior to completing the Record of Decision (ROD). Based on the construction impact modeling analysis for this project that shows no violations of the federal standards, staff concludes that the conformity analysis will be able to demonstrate that the preferred project alternative would conform to the State Implementation Plan.

C.1.11.2 STATE

The project owner will demonstrate that the proposed project will comply with Section 41700 of the California State Health and Safety Code, which restricts emissions that would cause nuisance or injury, with the issuance of the District's Final Determination of Compliance and the Energy Commission's affirmative finding for the project.

The emergency generator and fire water pump engines are also subject to the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines. This measure limits the types of fuels allowed, establishes maximum emission rates, and establishes recordkeeping requirements. The proposed Tier 2 emergency engine and Tier 3 fire water pump engine meet the current emission limit requirements of this measure. This measure would also limit the engines' testing and maintenance operation to no more than 50 hours per year.

C.1.11.3 LOCAL

The District rules and regulations specify the emissions control and offset requirements for new sources such as the RSPP. Best Available Control Technology would be

implemented, and emission reduction credits (ERCs) are not required to offset the proposed project's emissions by District rules and regulations based on the permitted stationary source emission levels for the proposed project. Compliance with the District's new source requirements would ensure that the proposed project would be consistent with the strategies and future emissions anticipated under the District's air quality attainment and maintenance plans.

The applicant provided an air quality permit application to the KCAPCD and the District issued a PDOC (KCAPCD 2010a) on February 18, 2010. The PDOC states that the proposed project is expected to comply with all applicable District rules and regulations. The DOC evaluates whether and under what conditions the proposed project would comply with the District's applicable rules and regulations, as described below.

Regulation II – Permits

Rule 210.1 – New and Modified Stationary Source Review

This rule establishes the stationary source[17] requirements that must be met to obtain a Permit to Operate (PTO), including the requirement to comply with best available control technology (BACT), provide emission offsets for emission increase above specified thresholds; and provide a dispersion modeling analysis, an alternatives analysis, and a compliance certification (if applicable). In the PDOC, the District has determined that the proposed controls for the boiler, HTF heater, cooling tower, HTF tank vent system, emergency generator engine, and firewater pump engine all meet BACT requirements. The District has also determined that an inspection and maintenance program limiting VOC leaks on the HTF Piping Network component to less than 100 ppm would be BACT.

The RSPP, as a minor stationary source, does not require offsets, require a dispersion modeling analysis, or require a compliance certification per District Rule 210.1.

Regulation IV – Prohibitions

Rule 401 - Visible Emissions

This rule limits visible emissions from emissions sources, including stationary source exhausts and fugitive dust emission sources. In the PDOC, the District has determined that the facility is expected to comply with this rule.

Rule 402 - Fugitive Dust

This rule limits fugitive emissions from certain bulk storage, earthmoving, construction and demolition, and manmade conditions resulting in wind erosion. With the implementation of recommended staff condition **AQ-SC7** the facility is expected to comply with this rule.

Rule 404.1 - Particulate Matter Concentration

The rule limits particulate matter (PM) emissions to less than 0.1 grains per standard cubic foot of gas at standard conditions. In the PDOC, the District has determined that

[17] The maintenance vehicles are not stationary sources and are not subject to District rules.

the applicable equipment's (boiler, fire pump engine, cooling tower) PM emission concentration are less than 0.001 gr/scf and so would be well below the limits established by this rule.

Rule 407 - Sulfur Compounds

This rule limits discharge into the atmosphere of sulfur compounds exceeding 0.2% by volume concentration calculated as SO_2. In the PDOC, the District has determined that the use of California standard liquefied petroleum gas (including liquefied propane) and California diesel fuel in the boiler and fire pump engine, respectively, would ensure compliance with this rule.

Rule 409 - Fuel Burning Equipment - Combustion Contaminants

This rule limits discharge into the atmosphere from fuel burning equipment combustion contaminants exceeding in concentration at the point of discharge, 0.1 grain per cubic foot of gas calculated to 12% of carbon dioxide (CO_2) at standard conditions. In the PDOC, the District has determined that the applicable equipment's (boiler and fire pump engine) PM emission concentration are less than 0.001 gr/scf and so would be well below the limits established by this rule.

Rule 411 – Storage of Organic Liquids

This rule sets standards for storage of organic liquids with a true vapor pressure of 1.5 pounds per square inch or greater. The heat transfer fluid (Therminol® VP-1) would be stored at temperatures where it would exceed the vapor pressure trigger of this rule. The District has provided conditions for the HTF system to ensure compliance with this rule.

The proposed project would also store insulating mineral oil (transformers), hydraulic oil (steam turbine and other equipment), lubricating oil, and diesel fuel on site, all of which have a true vapor pressure less than 1 psia. Therefore, the requirements of this rule do not apply to these organic liquids.

Rule 414.2 – Soil Decontamination

This rule sets requirements for the VOC emissions from the handling and decontamination activities of VOC contaminated soils. The applicant is proposing bioremediation (also referred to as land farming) of HTF-contaminated soils for the soil decontamination plan. In addition, the requirements of this rule do not apply to soil contaminated solely by an organic liquid having an initial boiler point of 302°F or higher, and HTF has an initial boiling point of 495°F. Therefore, this rule does not apply to the proposed project.

Rule 419 – Nuisance

This rule restricts emissions that would cause nuisance or injury to people or property (identical to California Health and Safety Code 41700). In the PDOC, the District has determined that, due to control devices and inspection and maintenance requirements contained in the District conditions, compliance with this rule is expected.

Rule 422 - New Source Performance Standards

This rule incorporates the Federal NSPS (40 CFR 60) rules by reference. The proposed boilers are subject to subpart Dc. The District conditions would ensure compliance with the requirements of this rule.

The proposed Tier 2 and Tier 3 engines meet the current emission limit requirements of NSPS Subpart IIII. The exact model and size of the engines are only estimated at this time and it is uncertain exactly when the emergency engines would be purchased and whether Tier 4 engine emission limits may apply at that time. So, staff has added a requirement to the verification of District Condition of Certification (**AQ-75** and **AQ-89**) to require the applicant to provide documentation that demonstrates that the engines purchased meet the appropriate NSPS standards for new engines at the time of purchase.

Rule 425.2 - Boilers, Steam Generators and Process Boilers (Oxides of Nitrogen)

This rule limits NOx emissions from boiler, steam generators, and process heaters to levels consistent with Reasonably Available Control Technology (RACT). The project's proposed boiler BACT emission controls provide emission levels in compliance with this Rule's RACT requirements.

Rule 429.1 - Cooling Towers (Hexavalent Chromium)

This rule prohibits the use of hexavalent chromium-bearing compounds in cooling towers. Enforcement of District Condition **AQ-27** will ensure compliance with this regulation.

C.1.12 NOTEWORTHY PUBLIC BENEFITS

Renewable energy facilities, such as RSPP, are needed to meet California's mandated renewable energy goals. While there are no local area air quality public benefits[18] resulting from the proposed project, it would indirectly reduce criteria pollutant emissions within the Southwestern U.S. by reducing fossil fuel fired generation.

C.1.13 MITIGATION MEASURES/ PROPOSED CONDITIONS OF CERTIFICATION

C.1.13.1 STAFF CONDITIONS OF CERTIFICATION

Staff conditions **AQ-SC1** through **AQ-SC4** and **AQ-SC7** are both CEQA and NEPA mitigation conditions. Staff conditions **AQ-SC5**, **AQ-SC6**, and **AQ-SC8** are CEQA-only conditions.

AQ-SC1 Air Quality Construction Mitigation Manager (AQCMM): The project owner shall designate and retain an on-site AQCMM who shall be responsible for directing and documenting compliance with Conditions of Certification **AQ-**

[18] Air quality benefits should not be confused with greenhouse gas/climate change benefits, which are discussed in Appendix AIR-1.

SC3, **AQ-SC4** and **AQ-SC5** for the entire project site and linear facility construction. The on-site AQCMM may delegate responsibilities to one or more AQCMM Delegates. The AQCMM and AQCMM Delegates shall have full access to all areas of construction on the project site and linear facilities, and shall have the authority to stop any or all construction activities as warranted by applicable construction mitigation conditions. The AQCMM and AQCMM Delegates may have other responsibilities in addition to those described in this condition. The AQCMM shall not be terminated without written consent of the Compliance Project Manager (CPM).

Verification: At least 60 days prior to the start of ground disturbance, the project owner shall submit to the BLM's Authorized Officer and CPM for approval, the name, resume, qualifications, and contact information for the on-site AQCMM and all AQCMM Delegates.

AQ-SC2 Air Quality Construction Mitigation Plan (AQCMP): The project owner shall provide an AQCMP, for approval, which details the steps that will be taken and the reporting requirements necessary to ensure compliance with Conditions of Certification **AQ-SC3**, **AQ-SC4,** and **AQ-SC5**.

Verification: At least 60 days prior to the start of any ground disturbance, the project owner shall submit the AQCMP to the BLM's Authorized Officer and CPM for approval. The AQCMP shall include effectiveness and environmental data for the proposed soil stabilizer. The BLM's Authorized Officer or CPM will notify the project owner of any necessary modifications to the plan within 30 days from the date of receipt.

AQ-SC3 Construction Fugitive Dust Control: The AQCMM shall submit documentation to the BLM's Authorized Officer and CPM in each Monthly Compliance Report that demonstrates compliance with the Air Quality Construction Mitigation Plan (AQCMP) mitigation measures for the purposes of minimizing fugitive dust emission creation from construction activities and preventing all fugitive dust plumes from leaving the project. Any deviation from the AQCMP mitigation measures shall require prior BLM Authorized Officer and CPM notification and approval.

Verification: The AQCMM shall provide the BLM's Authorized Officer and the CPM a Monthly Compliance Report (**COMPLIANCE-8**) to include the following to demonstrate control of fugitive dust emissions:

A. A summary of all actions taken to maintain compliance with this condition;

B. Copies of any complaints filed with the District in relation to project construction; and

C. Any other documentation deemed necessary by the BLM Authorized Officer, CPM, and AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

The following fugitive dust mitigation measures shall be included in the Air Quality Construction Mitigation Plan (AQCMP) required by **AQ-SC2**.

a. The main access roads through the facility to the power block areas will be either paved or stabilized using soil binders, or equivalent methods, to provide a stabilized

surface that is similar for the purposes of dust control to paving, that may or may not include a crushed rock (gravel or similar material with fines removed) top layer, prior to initiating construction in the main power block area, and delivery areas for operations materials (chemicals, replacement parts, etc.) will be paved prior to taking initial deliveries.

b. All unpaved construction roads and unpaved operation site roads, as they are being constructed, shall be stabilized with a non-toxic soil stabilizer or soil weighting agent that can be determined to be as efficient as or more efficient for fugitive dust control than ARB approved soil stabilizers, and that shall not increase any other environmental impacts including loss of vegetation. All other disturbed areas in the project and linear construction sites shall be watered as frequently as necessary during grading; and after active construction activities shall be stabilized with a non-toxic soil stabilizer or soil weighting agent, or alternative approved soil stabilizing methods, in order to comply with the dust mitigation objectives of Condition of Certification **AQ-SC4**. The frequency of watering can be reduced or eliminated during periods of precipitation.

c. No vehicle shall exceed 10 miles per hour on unpaved areas within the construction site, with the exception that vehicles may travel up to 25 miles per hour on stabilized unpaved roads as long as such speeds do not create visible dust emissions.

d. Visible speed limit signs shall be posted at the construction site entrances.

e. All construction equipment vehicle tires shall be inspected and washed as necessary to be cleaned free of dirt prior to entering paved roadways.

f. Gravel ramps of at least 20 feet in length must be provided at the tire washing/cleaning station.

g. All unpaved exits from the construction site shall be graveled or treated to prevent track-out to public roadways.

h. All construction vehicles shall enter the construction site through the treated entrance roadways, unless an alternative route has been submitted to and approved by the CPM and BLM Authorized Officer.

i. Construction areas adjacent to any paved roadway below the grade of the surrounding construction area or otherwise directly impacted by sediment from site drainage shall be provided with sandbags or other equivalently effective measures to prevent run-off to roadways, or other similar run-off control measures as specified in the Storm Water Pollution Prevention Plan (SWPPP), only when such SWPPP measures are necessary so that this condition does not conflict with the requirements of the SWPPP.

j. All paved roads within the construction site shall be swept daily or as needed (less during periods of precipitation) on days when construction activity occurs to prevent the accumulation of dirt and debris.

k. At least the first 500 feet of any paved public roadway exiting the construction site or exiting other unpaved roads en route from the construction site or construction staging areas shall be swept as needed (less during periods of precipitation) on days when construction activity occurs or on any other day when dirt or runoff resulting from the construction site activities is visible on the public paved roadways.

l. All soil storage piles and disturbed areas that remain inactive for longer than 10 days shall be covered, or shall be treated with appropriate dust suppressant compounds.

m. All vehicles that are used to transport solid bulk material on public roadways and that have potential to cause visible emissions shall be provided with a cover, or the materials shall be sufficiently wetted and loaded onto the trucks in a manner to provide at least one foot of freeboard.

n. Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) shall be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition shall remain in place until the soil is stabilized or permanently covered with vegetation.

AQ-SC4 Dust Plume Response Requirement: The AQCMM or an AQCMM Delegate shall monitor all construction activities for visible dust plumes. Observations of visible dust plumes that have the potential to be transported (A) off the project site and within 400 feet upwind of any regularly occupied structures not owned by the project owner or (B) 200 feet beyond the centerline of the construction of linear facilities indicate that existing mitigation measures are not resulting in effective mitigation. The AQCMP shall include a section detailing how the additional mitigation measures will be accomplished within the time limits specified. The AQCMM or Delegate shall implement the following procedures for additional mitigation measures in the event that such visible dust plumes are observed:

Step 1: The AQCMM or Delegate shall direct more intensive application of the existing mitigation methods within 15 minutes of making such a determination.

Step 2: The AQCMM or Delegate shall direct implementation of additional methods of dust suppression if Step 1, specified above, fails to result in adequate mitigation within 30 minutes of the original determination.

Step 3: The AQCMM or Delegate shall direct a temporary shutdown of the activity causing the emissions if Step 2, specified above, fails to result in effective mitigation within one hour of the original determination. The activity shall not restart until the AQCMM or Delegate is satisfied that appropriate additional mitigation or other site conditions have changed so that visual dust plumes will not result upon restarting the shutdown source. The owner/operator may appeal to the CPM or BLM Authorized Officer any directive from the AQCMM or Delegate to shut down an activity, if the shutdown shall go into effect within one hour of the original determination, unless overruled by the CPM or BLM Authorized Officer before that time.

Verification: The AQCMM shall provide the BLM's Authorized Officer and the CPM a Monthly Compliance Report (**COMPLIANCE-7**) to include:

A. A summary of all actions taken to maintain compliance with this condition;

B. Copies of any complaints filed with the District in relation to project construction; and

C. Any other documentation deemed necessary by the CPM and AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

AQ-SC5 Diesel-Fueled Engine Control: The AQCMM shall submit to the CPM, in the Monthly Compliance Report, a construction mitigation report that demonstrates compliance with the AQCMP mitigation measures for purposes of controlling diesel construction-related emissions. Any deviation from the AQCMP mitigation measures shall require prior and CPM notification and approval.

Verification: The AQCMM shall include in the Monthly Compliance Report (**COMPLIANCE-7**) the following to demonstrate control of diesel construction-related emissions:

A. A summary of all actions taken to control diesel construction related emissions;

B. A list of all heavy equipment used on site during that month, including the owner of that equipment and a letter from each owner indicating that equipment has been properly maintained; and

C. Any other documentation deemed necessary by the CPM, and the AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

The following off-road diesel construction equipment mitigation measures shall be included in the Air Quality Construction Mitigation Plan (AQCMP) required by **AQ-SC2**.

a. All diesel-fueled engines used in the construction of the facility shall have clearly visible tags issued by the on-site AQCMM showing that the engine meets the conditions set forth herein.

b. All construction diesel engines with a rating of 50 hp or higher shall meet, at a minimum, the Tier 3 California Emission Standards for Off-Road Compression-Ignition Engines, as specified in California Code of Regulations, Title 13, section 2423(b)(1), unless a good faith effort to the satisfaction of the CPM that is certified by the on-site AQCMM demonstrates that such engine is not available for a particular item of equipment. In the event that a Tier 3 engine is not available for any off-road equipment larger than 100 hp, that equipment shall be equipped with a Tier 2 engine, or an engine that is equipped with retrofit controls to reduce exhaust emissions of nitrogen oxides (NOx) and diesel particulate matter (DPM) to no more than Tier 2 levels unless certified by engine manufacturers or the on-site AQCMM

that the use of such devices is not practical for specific engine types. For purposes of this condition, the use of such devices is "not practical" for the following, as well as other, reasons.

1. There is no available retrofit control device that has been verified by either the California Air Resources Board or U.S. Environmental Protection Agency to control the engine in question to Tier 2 equivalent emission levels and the highest level of available control using retrofit or Tier 1 engines is being used for the engine in question; or

2. The construction equipment is intended to be on site for five days or less.

3. The CPM may grant relief from this requirement if the AQCMM can demonstrate a good faith effort to comply with this requirement and that compliance is not practical.

c. The use of a retrofit control device may be terminated immediately, provided that the CPM is informed within 10 working days of the termination and that a replacement for the equipment item in question meeting the controls required in item "b" occurs within 10 days of termination of the use, if the equipment would be needed to continue working at this site for more than 15 days after the use of the retrofit control device is terminated, if one of the following conditions exists :

   1. The use of the retrofit control device is excessively reducing the normal availability of the construction equipment due to increased down time for maintenance, and/or reduced power output due to an excessive increase in back pressure.

   2. The retrofit control device is causing or is reasonably expected to cause engine damage.

   3. The retrofit control device is causing or is reasonably expected to cause a substantial risk to workers or the public.

   4. Any other seriously detrimental cause which has the approval of the CPM prior to implementation of the termination.

d. All heavy earth-moving equipment and heavy duty construction-related trucks with engines meeting the requirements of (b) above shall be properly maintained and the engines tuned to the engine manufacturer's specifications.

e. All diesel heavy construction equipment shall not idle for more than five minutes. Vehicles that need to idle as part of their normal operation (such as concrete trucks) are exempted from this requirement.

f. Construction equipment will employ electric motors when feasible.

AQ-SC6 The project owner, when obtaining dedicated on-road or off-road vehicles for mirror washing activities and other facility maintenance activities, shall only

obtain new model year vehicles that meet California on-road vehicle emission standards or appropriate U.S.EPA/California off-road engine emission standards for the model year when obtained.

Verification: At least 60 days prior to the start commercial operation, the project owner shall submit to the CPM a copy of the plan that identifies the size and type of the on-site vehicle and equipment fleet and the vehicle and equipment purchase orders and contracts and/or purchase schedule. The plan shall be updated every other year and submitted in the Annual Compliance Report (**COMPLIANCE-8**).

AQ-SC7 The project owner shall provide a site Operations Dust Control Plan, including all applicable fugitive dust control measures identified in the verification of **AQ-SC3** that would be applicable to minimizing fugitive dust emission creation from operation and maintenance activities and preventing all fugitive dust plumes from leaving the project site that:

A. describes the active operations and wind erosion control techniques such as windbreaks and chemical dust suppressants, including their ongoing maintenance procedures, that shall be used on areas that could be disturbed by vehicles or wind anywhere within the project boundaries; and

B. identifies the location of signs throughout the facility that will limit traveling on unpaved portion of roadways to solar equipment maintenance vehicles only. In addition, vehicle speed shall be limited to no more than 10 miles per hour on these unpaved roadways, with the exception that vehicles may travel up to 25 miles per hour on stabilized unpaved roads as long as such speeds do not create visible dust emissions.

The site operations fugitive dust control plan shall include the use of durable non-toxic soil stabilizers on all regularly used unpaved roads and disturbed off-road areas, or alternative methods for stabilizing disturbed off-road areas, within the project boundaries, and shall include the inspection and maintenance procedures that will be undertaken to ensure that the unpaved roads remain stabilized. The soil stabilizer used shall be a non-toxic soil stabilizer or soil weighting agent that can be determined to be as efficient as or more efficient for fugitive dust control than ARB approved soil stabilizers, and that shall not increase any other environmental impacts including loss of vegetation.

The performance and application of the fugitive dust controls shall also be measured against and meet the performance requirements of condition **AQ-SC4**. The measures and performance requirements of **AQ-SC4** shall also be included in the operations dust control plan.

Verification: At least 60 days prior to start of commercial operation, the project owner shall submit to the BLM's Authorized Officer and the CPM for review and approval a copy of the site Operations Dust Control Plan that identifies the dust and erosion control procedures, including effectiveness and environmental data for the proposed soil stabilizer, that will be used during operation of the project and that identifies all locations of the speed limit signs. At least 60 days after commercial operation, the project owner shall provide to the BLM's Authorized Officer and the CPM

a report identifying the locations of all speed limit signs, and a copy of the project employee and contractor training manual that clearly identifies that project employees and contractors are required to comply with the dust and erosion control procedures and on-site speed limits.

AQ-SC8 The project owner shall provide the CPM copies of all District issued Authority-to-Construct (ATC) and Permit-to-Operate (PTO) documents for the facility.

The project owner shall submit to the CPM for review and approval any modification proposed by the project owner to any project air permit. The project owner shall submit to the CPM any modification to any permit proposed by the District or U.S. Environmental Protection Agency (U.S. EPA), and any revised permit issued by the District or U.S. EPA, for the project.

Verification: The project owner shall submit any ATC, PTO, and proposed air permit modifications to the CPM within five working days of its submittal either by 1) the project owner to an agency, or 2) receipt of proposed modifications from an agency. The project owner shall submit all modified air permits to the CPM within 15 days of receipt.

C.1.13.2 DISTRICT CONDITIONS

DISTRICT FINAL DETERMINATION OF COMPLIANCE CONDITIONS (KCAPCD 2010a)

District conditions **AQ-1** through **AQ-106** are CEQA-only required conditions.

ATC No. 0368001 (35.0-MMBtu/hr Propane Fueled Boiler)

Equipment Description

35.0-MMBtu/hr Propane Fueled boiler with low-NOx burner system.

Design Conditions

AQ-1 Boiler shall be fueled exclusively with propane classified as HD-10 or higher. (Rule 210.1)

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-2 Boiler described above shall be equipped with low NOx burner and be in accordance with manufacturer's specifications. (Rule 210.1)

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-3 Boiler exhaust stack shall be equipped with provisions for collection of pollutant samples in manner consistent with U. S. EPA test methods. (Rule 210.1)

Verification: The project owner shall provide facilities, utilities, and safety equipment for source testing and inspections upon request of the District, ARB, and the Energy Commission.

Operational Conditions

AQ-4 Visible emissions from boiler exhaust stack shall not exceed 5% opacity or Ringelmann No. 1/4. (Rule 210.1 BACT Requirement)

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-5 Boiler operation shall not exceed 5000-hours/year without prior District approval. (Rule 210.1)

Verification: The project owner shall submit to the CPM the boiler operating data demonstrating compliance with this condition as part of the Annual Operation Report (**COMPLIANCE-8**).

AQ-6 Boiler exhaust concentration of sulfur oxides (calculated as SO_2) shall not exceed 2000 parts per million on a volume basis (ppmv). (Rule 407)

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-7 Volume of propane used as fuel for boiler shall not exceed 1.91-million gallons per year. (Rule 210.1)

Verification: The project owner shall submit to the CPM the boiler fuel use data demonstrating compliance with this condition as part of the Annual Operation Report (**COMPLIANCE-8**).

AQ-8 Operator shall comply with applicable monitoring, testing, and recordkeeping requirements of Rule 425.2. (Rule 425.2)

Verification: The project owner shall complete and submit to the CPM a compliance plan that provides a list of the Rule 425.2 and 40 CFR 60 Subpart A and Dc plans, tests, and recordkeeping requirements and their compliance schedule dates as applicable for the boiler at least 30 days prior to first fire of the boiler or earlier as necessary for compliance with Rule 425.3 and 40 CFR 60 Subpart A and Dc.

AQ-9 Operator shall maintain annual records of fuel use. (Rule 425.2)

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-10 Equipment shall be maintained according to manufacturer's specifications to ensure compliance with emissions limitations. (Rules 209 and 210.1)

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-11 No emission resulting from use of this equipment shall cause injury, detriment, nuisance, annoyance to or endanger comfort, repose, health or safety of any considerable number of persons or public. (Rule 419 and CH & SC 41700)

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

Compliance Testing Requirements

AQ-12 Boiler stack shall be equipped with sampling ports (in accordance with California Air Resources Board Standards), sampling platform, access to sampling platforms, and utilities for sampling equipment to perform source-sampling operations. (Rule 108.1)

Initial compliance with NOx emission limits shall be verified by compliance test utilizing test methods listed in Subsection VI.B of Rule 425.2 within 60-days of District initial start-up inspection. (Rule 210.1)

Initial testing for Rule 425.2 shall commence within 60-days after annual boiler heat attains or exceeds 90,000 therms (9,000-MMBtu). Boiler shall be tested in accordance with test methods listed in Subsection VI.B and in accordance to schedule in Subsection VI.C of Rule 425.2. (Rule 425.2)

Should inspection reveal conditions indicative of non-compliance, compliance with any emission limitations shall be verified, within 60 days of District request. Test results shall be submitted to KCAPCD within 30 days after test completion. (Rule 108.1 and 210.1)

Verification: The project owner shall notify the District and the CPM within fifteen working days before the execution of the compliance test required in this condition. The test results shall be submitted to the District and to the CPM within 30 days after test completion.

Emission Limits

AQ-13 Emissions rate of each air contaminant from this unit shall not exceed following limits:

Particulate Matter (PM10):	0.27	lb/hr
	4.02	lb/day
	0.67	ton/yr
Sulfur Oxides (SOx as SO_2):	0.01	lb/hr
	0.11	lb/day
	0.02	ton/yr
Oxides of Nitrogen (NO_2):	9	ppmv @ 3% O_2 (Rule 210.1 BACT Rqmt.)
	0.39	lb/hr
	5.78	lb/day
	0.96	ton/yr
Volatile Organic Compounds (VOC): (as defined in Rule 210.1)	0.31	lb/hr
	4.59	lb/day
	0.77	ton/yr
Carbon Monoxide:	50	ppmv
	1.30	lb/hr
	19.43	lb/day
	3.24	ton/yr

(Emissions limits established pursuant to Rule 210.1, unless otherwise noted.)

Compliance with maximum daily emission limits shall be verified by source operator (with appropriate operational data and recordkeeping to document maximum daily emission rate) each day source is operated and such documentation of compliance shall be retained and made readily available to District for period of three years. (Rules 209 and 210.1)

Verification: As part of the Annual Compliance Report (**COMPLIANCE-8**), the project owner shall include information demonstrating compliance with boiler operating emission rates.

ATC Nos. 0368002 (35.0-MMBtu/hr Propane Fueled Heater)

Equipment Description

35.0-MMBtu/hr Propane Fueled heater with low-NOx burner system.

Design Conditions

AQ-14 Heater shall be fueled exclusively with propane classified as HD-10 or higher. (Rule 210.1)

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-15 Heater described above shall be equipped with low NOx burner and be in accordance with manufacturer's specifications. (Rule 210.1)

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-16 Heater exhaust stack shall be equipped with provisions for collection of pollutant samples in manner consistent with U. S. EPA test methods. (Rule 210.1)

Verification: The project owner shall provide facilities, utilities, and safety equipment for source testing and inspections upon request of the District, ARB, and the Energy Commission.

Operational Conditions

AQ-17 Visible emissions from heater exhaust stack shall not exceed 5% opacity or Ringelmann No. 1/4. (Rule 210.1 BACT Requirement)

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-18 Heater operation shall not exceed 500-hours/year without prior District approval. (Rule 210.1)

Verification: The project owner shall submit to the CPM the boiler operating data demonstrating compliance with this condition as part of the Annual Operation Report (**COMPLIANCE-8**).

AQ-19 Heater exhaust concentration of sulfur oxides (calculated as SO_2) shall not exceed 2000 parts per million on a volume basis (ppmv). (Rule 407)

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-20 Volume of propane used as fuel for heater shall not exceed 191,257-gallons per year. (Rule 210.1)

Verification: The project owner shall submit to the CPM the heater fuel use data demonstrating compliance with this condition as part of the Annual Operation Report (**COMPLIANCE-8**)..

AQ-21 Operator shall comply with applicable monitoring, testing, and recordkeeping requirements of Rule 425.2. (Rule 425.2)

Verification: The project owner shall complete and submit to the CPM a compliance plan that provides a list of the Rule 425.2 and 40 CFR 60 Subpart A and Dc plans, tests, and recordkeeping requirements and their compliance schedule dates as applicable for the heater at least 30 days prior to first fire of the heater or earlier as necessary for compliance with Rule 425.3 and 40 CFR 60 Subpart A and Dc.

AQ-22 Operator shall maintain annual records of fuel use. (Rule 425.2)

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-23 Equipment shall be maintained according to manufacturer's specifications to ensure compliance with emissions limitations. (Rules 209 and 210.1)

Verification: The project owner shall submit maintenance reports for all equipment to the CPM as part of Annual Compliance Report. As part of the Annual Compliance Report, the project owner shall include information on any maintenance performed on the heater.

AQ-24 No emission resulting from use of this equipment shall cause injury, detriment, nuisance, annoyance to or endanger comfort, repose, health or safety of any considerable number of persons or public. (Rule 419 and CH & SC 41700)

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

Compliance Testing Requirements

AQ-25 Heater stack shall be equipped with sampling ports (in accordance with California Air Resources Board Standards), sampling platform, access to sampling platforms, and utilities for sampling equipment to perform source-sampling operations. (Rule 108.1)

Initial compliance with NOx emission limits shall be verified by compliance test utilizing test methods listed in Subsection VI.B of Rule 425.2 within 60-days of District initial start-up inspection. (Rule 210.1)

Initial testing for Rule 425.2 shall commence within 60-days after annual heater heat attains or exceeds 90,000 therms (9,000-MMBtu). Heater shall be tested in accordance with test methods listed in Subsection VI.B and in accordance to schedule in Subsection VI.C of Rule 425.2. (Rule 425.2)

Should inspection reveal conditions indicative of non-compliance, compliance with any emission limitations shall be verified, within 60 days of District request. Test results shall be submitted to KCAPCD within 30 days after test completion. (Rule 108.1 and 210.1)

Verification: The project owner shall notify the District and the CPM within fifteen working days before the execution of the compliance test required in this condition. The test results shall be submitted to the District and to the CPM within 30 days after test completion.

Emission Limits

AQ-26 Emissions rate of each air contaminant from this unit shall not exceed following limits:

Particulate Matter (PM10):	0.27	lb/hr
	2.68	lb/day
	0.07	ton/yr
Sulfur Oxides (SOx as SO_2):	0.01	lb/hr
	0.08	lb/day
	0.002	ton/yr
Oxides of Nitrogen (NO_2):	9	ppmv @ 3% O_2 (Rule 210.1 BACT Rqmt.)
	0.39	lb/hr
	3.85	lb/day
	0.10	ton/yr
Volatile Organic Compounds (VOC): (as defined in Rule 210.1)	0.31	lb/hr
	3.06	lb/day
	0.08	ton/yr
Carbon Monoxide:	50	ppmv
	1.30	lb/hr
	12.95	lb/day
	0.32	ton/yr

(Emissions limits established pursuant to Rule 210.1, unless otherwise noted.)

Compliance with maximum daily emission limits shall be verified by source operator (with appropriate operational data and recordkeeping to document maximum daily emission rate) each day source is operated and such documentation of compliance shall be retained and made readily available to District for period of three years. (Rules 209 and 210.1)

Verification: As part of the Annual Compliance Report (**COMPLIANCE-8**), the project owner shall include information demonstrating compliance with heater operating emission rates.

ATC No. 0368005 (Forced Draft Auxiliary Cooling Tower with 2 Cells and High Efficiency Drift Eliminator)

Equipment Description

A. Two 30.5-MMBtu (3,017-gpm) Cooling Tower Cells

B. Two 30-hp Cooling Tower Fans

C. Two 30-hp (1,765-gpm) Cooling Water Pumps

D. Make-Up Water Tank

C. 10-hp Make-Up Water Pump

AQ-27 No hexavalent chromium containing compounds shall be added to cooling tower circulating water. (Rule 429.1)

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-28 Drift eliminator drift rate shall not exceed 0.0005%. (Rule 210.1)

Verification: The manufacturer guarantee data for the drift eliminator, showing compliance with this condition, shall be provided to the CPM and the District 30 days prior to cooling tower operation.

AQ-29 Cooling tower total dissolved solids (TDS) shall not exceed 2000-ppm (0.01670-lb/gal). (Rule 210.1)

Verification: The cooling tower recirculating water TDS content shall be tested as required in Condition **AQ-35** and those tests shall be provided in the Annual Compliance Report (**COMPLIANCE-8**). The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-30 Cooling water volumetric flow rate shall not exceed 6,100-gal/minute. (Rule 210.1)

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-31 Compliance with daily PM10 emission rate shall be determined by the product of the following factors: circulating water rate (gallons per day), total dissolved solids in blowdown water (lb/gal), and design drift rate (%). (Rule 210.1)

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-32 Operator shall comply with applicable monitoring, testing, and recordkeeping requirements of Rule 429.1. (Rule 429.1)

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-33 Equipment shall be maintained according to manufacturer's specifications to ensure compliance with emissions limitations. (Rules 209 and 210.1)

Verification: The project owner shall submit maintenance reports for all equipment to the CPM as part of Annual Compliance Report (**COMPLIANCE-8**). As part of the Annual Compliance Report, the project owner shall include information on the date, time, and duration of any violation of this permit condition.

AQ-34 No emission resulting from use of this equipment shall cause injury, detriment, nuisance, annoyance to or endanger comfort, repose, health or safety of any considerable number of persons or public. (Rule 419 and CH & SC 41700)

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-35 Compliance with PM_{10} emission limits shall be determined by continuous conductivity monitoring of blowdown water with results available to District staff upon request. Additionally, annual calibration verification shall be available to District staff upon request. In-lieu of continuous conductivity monitoring, tests of total solids in blowdown water sample analysis shall be completed at a minimum of once per week by independent laboratory. (Rule 210.1)

Verification: The cooling tower recirculating water TDS content test results and resulting emission estimates shall be shall be provided in the Annual Compliance Report (**COMPLIANCE-8**). The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

Compliance Testing Requirements

AQ-36 Should inspection reveal conditions indicative of non-compliance, compliance with any emission limitations shall be verified, within 60 days of District request. Test results shall be submitted to KCAPCD within 30 days after test completion. (Rule 108.1, 210.1, and 429.1)

Verification: The project owner shall provide an emissions calculation and water sample testing protocol to the District for approval and CPM for review at least 30 days prior to initial operation of the cooling tower. The project owner shall notify the District and the CPM within fifteen working days before the execution of any compliance tests required under this condition. The test results shall be submitted to the District and to the CPM within 30 days of the completion of the tests.

Emission Limits

AQ-37 Emissions rate of each air contaminant from this unit shall not exceed following limits:

Particulate Matter (PM_{10}):	0.03 lb/hr 0.49 lb/day 0.09 ton/yr

(Emissions limits established pursuant to Rule 210.1, unless otherwise noted.)

Compliance with maximum daily emission limits shall be verified by source operator (with appropriate operational data and recordkeeping to document maximum daily emission rate) each day source is operated and such documentation of compliance shall be retained and made readily available to District for period of three years. (Rules 209 and 210.1)

Verification: As part of the Annual Compliance Report (**COMPLIANCE-8**) the project owner shall include information on operating emission rates to demonstrate compliance with this condition. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

ATC No. 0368003 (Two 18,000-Gallon Heat Transfer Fluid (HTF) Expansion Tank Vented To Vapor Control System, Including HTF Piping Network)

Equipment Description

A. Two 18,000 Gallon HTF Expansion Tanks (No. 1 and 2) each with PV vent valve,

B. 4 – 1,250-gal HTF Overflow tanks north solar field,

C. 4 – 1,250-gal HTF Overflow tanks south solar field,

B. 25-hp Expansion tank pump,

C. HTF Fluid pumps (400-hp),

D. Nitrogen blanket system,

E. HTF piping header,

F. HTF ullage system,

G. Solar field piping,

H. Solar generating system piping, and

I. Piping from expansion tank to vapor control system.

Design Conditions

AQ-38 Each HTF tank shall be connected to a volatile organic compound (VOC) vapor control system (Permit No. 0368004). (Rule 210.1)

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-39 Volume of each tank shall not exceed 18,000-gallons without prior District approval. (Rule 210.1)

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

Operational Conditions

AQ-40 HTF expansion vessel shall be gas tight and vent to vapor control system (Permit No. 0368004). (Rule 210.1 BACT Requirement)

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-41 The project owner shall establish an inspection and maintenance program to determine, repair, and log leaks in HTF piping network and expansion tanks. Inspection and maintenance program and related logs shall be available to District staff upon request. (Rule 210.1 BACT Requirement)

a. All pumps, compressors and pressure relief devices (pressure relief valves or rupture disks) shall be electronically, audio, or visually inspected once every operating period.

b. All accessible valves, fittings, pressure relief devices (PRDs), hatches, pumps, compressors, etc. shall be inspected quarterly using a leak detection device such as a Foxboro OVA 108 calibrated for methane.

c. VOC leaks greater than 100-ppmv shall be repaired within seven calendar days of detection.

d. VOC leaks greater than 10,000-ppmv shall be repaired within 24-hours of detection.

e. The project owner shall maintain a log of all VOC leaks exceeding 10,000-ppmv, including location, component type, and repair made.

f. The project owner shall maintain record of the amount of HTF replaced on a monthly basis for a period of five years.

g. Any leak detected by District inspection(s) exceeding 100-ppmv and not repaired in 7-days and 10,000-ppmv not repaired within 24-hours shall constitute a violation of this Authority to Construct (ATC)/Permit to Operate (PTO).

h. Pressure sensing equipment shall be installed that will be capable of sensing a major rupture or spill within the HTF network.

Verification: The project owner shall prepare an Inspection and Maintenance Plan that shall be submitted to the CPM for review and approval at least 30 days before taking delivery of the HTF. The project owner shall make the site available for inspection

of HTF piping Inspection and Maintenance Program records and HTF system equipment by representatives of the District, ARB, and the Energy Commission.

AQ-42 The following component count shall be utilized to determine fugitive emissions.

Equipment	Count	Service	Hrs/day	Service	Hrs/day
Valves	3050	Light Liquid	16	Heavy Liquid	8
Pump Seals	4	Light Liquid	16	Heavy Liquid	8
Connectors	7594	Light Liquid	16	Heavy Liquid	8
Pressure Relief Valve	10	Gas	16	Heavy Liquid	8

Verification: The project owner shall provide the District for approval and the CPM for review any requested revisions to the component count listed in this condition 30 days prior to utilizing such component counts for fugitive emission calculations, and shall keep a record of approved changes in the component count in the inspection and maintenance program documentation kept at the site.

AQ-43 Each expansion tank shall have fixed roof without holes, tears, or other such openings, except pressure/vacuum (PV) valves, in the cover which allow the emission of VOC. (Rule 210.1)

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-44 All expansion tank and overflow tank hatch shall be kept closed and gap-free, except during maintenance, inspection, or repair. (Rule 210.1)

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-45 Tank roof appurtenances shall not exhibit emissions exceeding 10,000-ppmv as methane measured with an instrument calibrated with methane and conducted in accordance with U.S. EPA Method 21. (Rule 411)

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-46 Each tank shall be maintained leak-free. A "leak" is defined as the dripping of liquid volatile organic compounds at a rate of three or more drops per minute, or vapor volatile organic compounds in excess of 10,000-ppm as equivalent methane as determined by U.S. EPA Test Method 21. (Rule 210.1)

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-47 Equipment shall be maintained according to manufacturer's specifications to ensure compliance with emissions limitations. (Rules 210.1 and 209)

Verification: The project owner shall submit maintenance reports for all HTF piping and venting equipment to the CPM as part of Annual Compliance Report (**COMPLIANCE-8**).

AQ-48 Compliance with all operational conditions shall be verified by appropriate recordkeeping, including records of operational data needed to demonstrate compliance. Such records shall be kept on site in readily available format. (Rule 210.1)

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-49 No emission resulting from use of this equipment shall cause injury, detriment, nuisance, annoyance to or endanger comfort, repose, health, or safety of any considerable number of persons or public. (Rule 419 and CH&SC Sec 41700)

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-50 The District shall be notified of any breakdown conditions in accordance with Rule 111 (Equipment Breakdown). (Rule 111)

Verification: The project owner shall provide equipment breakdown notification as required by District Rule 111 and shall provide such data to the CPM within five days of District notification and shall provide equipment breakdown records in the Annual Compliance Report (**COMPLIANCE-8**).

Compliance Testing Requirements

AQ-51 Should inspection reveal conditions indicative of non-compliance, compliance with hourly and concentration emission limits for VOC shall be verified pursuant to Rule 108.1 and KCAPCD Guidelines for Compliance Testing, within 60 days of District request.

Verification: The project owner shall provide a test protocol to District for approval and CPM for review of any compliance tests proposed to be conducted as required under this condition at least 30 days prior to conducting such tests. The project owner shall notify the District and the CPM within fifteen working days before the execution of any compliance tests required under this condition. The test results shall be submitted to the District and to the CPM within 30 days of the completion of the tests.

Emission Limits

AQ-52 Emissions rate of each air contaminant from this unit shall not exceed following limits:

Volatile Organic Compounds (VOC):	46.43	lb/day
(as defined in Rule 210.1)	8.47	ton/yr

VOC Emissions from HTF Expansion Assessed on Permit No. 0368004

(Emissions limits established pursuant to Rule 210.1, unless otherwise noted.)

Compliance with maximum daily emission limits shall be verified by source operator (with appropriate operational data and recordkeeping to document maximum daily emission rate) each day source is operated and such documentation of compliance shall be retained and made readily available to District for period of three years. (Rules 209 and 210.1)

Verification: As part of the Annual Compliance Report (**COMPLIANCE-8**) the project owner shall include information on operating emission rates to demonstrate compliance with this condition. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

ATC No. 0368004 (Vapor Control System)

Equipment Description

A. Piping from expansion tanks (Permit Nos. 0368003) to vapor control system, and

B. Two Granular Activated Carbon (GAC) adsorption units in series each with 1,000-lb GAC vessel, and sampling ports at entrance and exhaust.

Design Conditions

AQ-53 Vapor control system shall serve HTF expansion tanks and HTF piping system listed on Permit No. 0368003. (Rule 210.1)

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-54 Carbon adsorption system shall have provisions for monitoring between carbon beds and exhaust of carbon adsorption system. (Rule 210.1)

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

Operational Conditions

AQ-55 Carbon adsorption system shall be operated during heat transfer fluid (HTF) expansion system operation and during operation of HTF Ullage system. (Rule 210.1)

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-56 Control efficiency of carbon adsorption vessels shall be at least 95%. (Rule 210.1)

Verification: The project owner shall provide the District and CPM carbon adsorption manufacturer guarantee data showing compliance with this condition at least 30 days prior to the installation of the carbon adsorption vessels.

AQ-57 Vapor samples shall be taken monthly between carbon beds and at the exhaust carbon adsorption system and tested for carbon breakthrough. (Rule 210.1)

Verification: The project owner shall keep the monthly vapor sample data at the site and shall provide a summary of the vapor sample data as part of the Annual Compliance Report (**COMPLIANCE-8**). The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-58 Carbon breakthrough shall be defined as VOC concentration of 10-ppmv as hexane measured after primary carbon bed measured with a flame ionization detector (FID) or photo ionization detector (PID). (Rule 210.1)

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-59 Primary carbon bed shall be replaced upon indication of carbon breakthrough. (Rule 210.1)

Verification: The project owner shall keep primary carbon bed replacement records on site and shall provide such records as part of the Annual Compliance Report (**COMPLIANCE-8**). The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-60 Operation of this equipment shall be conducted in compliance with all data and specifications submitted with application under which this permit is issued. (Rule 210.1)

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-61 Equipment shall be maintained according to manufacturer's specifications to ensure compliance with emissions limitations. (Rules 209 and 210.1)

Verification: The project owner shall submit maintenance reports for all equipment to the CPM as part of Annual Compliance Report (**COMPLIANCE-8**).

AQ-62 No emission resulting from use of this equipment shall cause injury, detriment, nuisance, annoyance to or endanger comfort, repose, health, or safety of any considerable number of persons or public. (Rule 419 and CH&SC, Sec 41700)

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

Compliance Testing Requirements

AQ-63 Should inspection reveal conditions indicative of non-compliance, compliance with any emission limitations shall be verified, within 60 days of District request. Test results shall be submitted to KCAPCD within 30 days after test completion. (Rule 108.1 and 210.1)

Verification: The project owner shall provide a test protocol to District for approval and CPM for review of any compliance tests proposed to be conducted as required under this condition at least 30 days prior to conducting such tests. The project owner shall notify the District and the CPM within fifteen working days before the execution of

any compliance tests required under this condition. The test results shall be submitted to the District and to the CPM within 30 days of the completion of the tests.

Emission Limits

AQ-64 Emissions rate of each air contaminant from this unit shall not exceed the following emissions limits:

Volatile Organic Compounds (VOC):	3.13 lb/hr
(as defined in Rule 210.1)	6.26 lb/day
	1.14 ton/yr

(Emissions limits established pursuant to Rule 210.1 unless otherwise noted)

Compliance with maximum daily emission limits shall be verified by source operator (with appropriate operational data and record keeping to document maximum daily emission rate) each day the source is operated and such documentation of compliance shall be retained and made readily available to District for period of three years. (Rules 210.1 and 209)

Verification: As part of the Annual Compliance Report (**COMPLIANCE-8**) the project owner shall include information on operating emission rates to demonstrate compliance with this condition. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

ATC No. 0368007 (2000-kW Emergency Generator Set Driven with 2922-Bhp Diesel Fueled Piston Engine)

Equipment Description

2000-kW Cummins electrical generator set Model DQKC, driven by 2922-bhp Cummins Tier 2, Model QSK60-G6 (60.2L), diesel fueled piston engine

Design Conditions

AQ-65 Engine shall be equipped with turbocharger and aftercooler. (Rule 210.1 BACT Requirement)

Verification: The project owner shall submit the final engine specifications documenting compliance with this condition at least 30 days prior to installation of the engine.

AQ-66 Elapsed time meter shall be installed and maintained indicating cumulative hours of engine operating time. (Rule 210.1)

Verification: At least thirty (30) days prior to the installation of the engine, the project owner shall provide the District and the CPM the specification of the hour timer.

Operational Conditions

AQ-67 Visible emissions from engine exhaust after engine has reached normal operating temperature shall not equal or exceed 5% opacity or Ringelmann No. ¼ for more than three minutes in any one hour. (Rule 210.1 BACT Requirement)

Verification: The project owner shall make the site available for inspection of equipment and records by representatives of the District, ARB, and the Energy Commission.

AQ-68 Exhaust gas particulate matter concentration shall not exceed 0.1 grains/ft^3 of gas at standard conditions. (Rule 404.1)

Verification: The project owner shall make the site available for inspection of equipment and records by representatives of the District, ARB, and the Energy Commission.

AQ-69 Fuel for diesel piston engine shall conform to California Air Resources Board standards for reformulated diesel fuel (low sulfur, 0.0015% by weight and low aromatic hydrocarbon, 20% by weight). (Rule 210.1 BACT Requirement)

Verification: The project owner shall make the site available for inspection of equipment and fuel purchase records by representatives of the District, ARB, and the Energy Commission.

AQ-70 Equipment shall be maintained according to manufacturer's specifications to ensure compliance with emissions limitations. (Rule 210.1 and Rule 209)

Verification: The project owner shall make the site available for inspection of equipment and records by representatives of the District, ARB, and the Energy Commission.

AQ-71 Compliance with all operational conditions shall be verified by appropriate recordkeeping, including records of operational data needed to demonstrate compliance. Such records shall be kept on site in readily available format. (Rule 209)

Verification: The project owner shall make the site available for inspection of equipment and records by representatives of the District, ARB, and the Energy Commission.

AQ-72 Operating record of this equipment shall be maintained in format approved in writing by District, kept for minimum of two years, and made available upon request of District personnel. Record shall include, at minimum, days and hours of operation, location of operation, amount of fuel oil supplied to this engine, and date(s), check(s) and certification(s) of injection timing. (Rules 209 and 210.1)

Verification: The project owner shall make the site available for inspection of equipment and records by representatives of the District, ARB, and the Energy Commission.

AQ-73 No emission resulting from use of this equipment shall cause injury, detriment, nuisance, annoyance to or endanger comfort, repose, health or safety of any considerable number of persons or public. (Rule 419 and CH&SC 41700)

Verification: The project owner shall make the site available for inspection of equipment and records by representatives of the District, ARB, and the Energy Commission.

AQ-74 Engine operation shall not exceed 200 hours per year without prior District approval. (Rule 210.1)

Verification: As part of the Annual Compliance Report (**COMPLIANCE-8**) the project owner shall include information on annual engine operating hours to demonstrate compliance with this condition including **a photograph showing the annual reading of engine hours**. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-75 Diesel engine driving emergency generator shall comply with Tier 2 emissions standards and Air Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines. (California Code of Regulations 93115, Title 17)

Verification: The project owner shall submit the engine specifications at least 30 days prior to purchasing the engines for review and approval demonstrating that the engines meet the requirements of this condition as well as comply with the NSPS Subpart IIII emission limit requirements at the time of engine purchase.

AQ-76 Engine operation for maintenance and testing shall not exceed 50 hours per year without prior District approval. (Rule 210.1)

Verification: As part of the Annual Compliance Report (**COMPLIANCE-8**) the project owner shall include information on annual engine operating hours to demonstrate compliance with this condition including **a photograph showing the annual reading of engine hours**. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

Compliance Testing Requirements

AQ-77 Should inspection reveal conditions indicative of non-compliance, compliance with any emission limitations shall be verified, within 60 days of District request. Test results shall be submitted to KCAPCD within 30 days after test completion. (Rule 108.1 and 210.1)

Verification: The project owner shall provide a test protocol to District for approval and CPM for review of any compliance tests proposed to be conducted as required under this condition at least 30 days prior to conducting such tests. The project owner shall notify the District and the CPM within fifteen working days before the execution of any compliance tests required under this condition. The test results shall be submitted to the District and to the CPM within 30 days of the completion of the tests.

Emission Limits

AQ-78 Emissions rate of each air contaminant from this unit shall not exceed following limits:

Particulate Matter (PM10):	0.15 gm/bhp-hr
	0.97 lb/hr
	23.19 lb/day
	0.01 ton/yr
Sulfur Oxides (SOx as SO_2):	0.03 lb/hr
	0.75 lb/day
	0.00 ton/yr
Oxides of Nitrogen (NOx as NO_2):	4.5 gm/bhp-hr
	28.99 lb/hr
	695.85 lb/day
	2.90 ton/yr
Volatile Organic Compounds (VOC):	1.93 Lb/hr
(as defined in Rule 210.1)	46.39 lb/day
	0.19 ton/yr
Carbon Monoxide:	16.75 lb/hr
	402.04 lb/day
	1.68 ton/yr

(Emissions limits established pursuant to Rule 210.1, unless otherwise noted.)

Compliance with maximum daily emission limits shall be verified by source operator (with appropriate operational data and recordkeeping to document maximum daily emission rate) each day source is operated and such documentation of compliance shall be retained and made readily available to District for period of three years. (Rules 209 and 210.1)

Verification: As part of the Annual Compliance Report (**COMPLIANCE-8**) the project owner shall include information on operating emission rates to demonstrate compliance with this condition. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

ATC No. 0368008 (Emergency Firewater Pump Driven with 300-Bhp Diesel Fueled Piston Engine)

Equipment Description

Clarke firewater pump driven by 300-bhp John Deere Tier 3 diesel fueled piston engine.

Design Conditions

AQ-79 Engine shall be equipped with turbocharger and aftercooler. (Rule 210.1 BACT Requirement)

Verification: The project owner shall submit the final engine specifications documenting compliance with this condition at least 30 days prior to installation of the engine.

AQ-80 Elapsed time meter shall be installed and maintained indicating cumulative hours of engine operating time. (Rule 210.1)

Verification: At least thirty (30) days prior to the installation of the engine, the project owner shall provide the District and the CPM the specification of the hour timer.

Operational Conditions

AQ-81 Visible emissions from engine exhaust after engine has reached normal operating temperature shall not equal or exceed 5% opacity or Ringelmann No. ¼ for more than three minutes in any one hour. (Rule 210.1 BACT Requirement)

Verification: The project owner shall make the site available for inspection of equipment and records by representatives of the District, ARB, and the Energy Commission.

AQ-82 Exhaust gas particulate matter concentration shall not exceed 0.1 grains/ft^3 of gas at standard conditions. (Rule 404.1)

Verification: The project owner shall make the site available for inspection of equipment and records by representatives of the District, ARB, and the Energy Commission.

AQ-83 Fuel for diesel piston engine shall conform to California Air Resources Board standards for reformulated diesel fuel (low sulfur, 0.0015% by weight and low aromatic hydrocarbon, 20% by weight). (Rule 210.1 BACT Requirement)

Verification: The project owner shall make the site available for inspection of equipment and fuel purchase records by representatives of the District, ARB, and the Energy Commission.

AQ-84 Equipment shall be maintained according to manufacturer's specifications to ensure compliance with emissions limitations. (Rule 210.1 and Rule 209)

Verification: The project owner shall make the site available for inspection of equipment and records by representatives of the District, ARB, and the Energy Commission.

AQ-85 Compliance with all operational conditions shall be verified by appropriate recordkeeping, including records of operational data needed to demonstrate compliance. Such records shall be kept on site in readily available format. (Rule 209)

Verification: The project owner shall make the site available for inspection of equipment and records by representatives of the District, ARB, and the Energy Commission.

AQ-86 Operating record of this equipment shall be maintained in format approved in writing by District, kept for minimum of two years, and made available upon request of District personnel. Record shall include, at minimum, days and hours of operation, location of operation, amount of fuel oil supplied to this engine, and date(s), check(s) and certification(s) of injection timing. (Rules 209 and 210.1)

Verification: The project owner shall make the site available for inspection of equipment and records by representatives of the District, ARB, and the Energy Commission.

AQ-87 No emission resulting from use of this equipment shall cause injury, detriment, nuisance, annoyance to or endanger comfort, repose, health or safety of any considerable number of persons or public. (Rule 419 and CH&SC 41700)

Verification: The project owner shall make the site available for inspection of equipment and records by representatives of the District, ARB, and the Energy Commission.

AQ-88 Engine operation shall not exceed 200 hours per year without prior District approval. (Rule 210.1)

Verification: As part of the Annual Compliance Report the project owner shall include information on annual engine operating hours to demonstrate compliance with this condition including **a photograph showing the annual reading of engine hours**. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-89 Diesel engine driving emergency fire water pump shall comply with Tier 3 emissions standards and Air Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines. (California Code of Regulations 93115, Title 17)

Verification: The project owner shall submit the engine specifications at least 30 days prior to purchasing the engines for review and approval demonstrating that the engines meet the requirements of this condition as well as comply with the NSPS Subpart IIII emission limit requirements at the time of engine purchase.

AQ-90 Engine operation for maintenance and testing shall not exceed number of hours necessary to comply with the testing requirements of the National Fire Protection Association (NFPA) 25 – "Standard for the Inspection, Testing and Maintenance of Water Based Fire Protection Systems," 2002 edition without prior District approval. (California Code of Regulations 93115, Title 17)

Verification: As part of the Annual Compliance Report (**COMPLIANCE-8**) the project owner shall include information on annual engine operating hours to demonstrate compliance with this condition including **a photograph showing the annual reading of engine hours**. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-91 Additional engine operation for maintenance and emissions testing (excluding NFPA 25 testing) shall not exceed 50 hours per year without prior District approval. (California Code of Regulations 93115, Title 17)

Verification: As part of the Annual Compliance Report (**COMPLIANCE-8**) the project owner shall include information on annual engine operating hours to demonstrate compliance with this condition including **a photograph showing the annual reading of engine hours**. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

Compliance Testing Requirements

AQ-92 Should inspection reveal conditions indicative of non-compliance, compliance with any emission limitations shall be verified, within 60 days of District request. Test results shall be submitted to KCAPCD within 30 days after test completion. (Rule 108.1 and 210.1)

Verification: The project owner shall provide a test protocol to District for approval and CPM for review of any compliance tests proposed to be conducted as required under this condition at least 30 days prior to conducting such tests. The project owner shall notify the District and the CPM within fifteen working days before the execution of any compliance tests required under this condition. The test results shall be submitted to the District and to the CPM within 30 days of the completion of the tests.

Emission Limits

AQ-93 Emissions rate of each air contaminant from this unit shall not exceed following limits:

Particulate Matter (PM10):	0.15 gm/bhp-hr
	0.10 Lb/hr
	2.38 lb/day
	0.01 ton/yr
Sulfur Oxides (SOx as SO_2):	0.003 lb/hr
	0.08 lb/day
	0.0003 ton/yr
Oxides of Nitrogen (NOx as NO_2):	2.8 gm/bhp-hr
	1.85 lb/hr
	44.45 lb/day
	0.19 ton/yr
Volatile Organic Compounds (VOC): (as defined in Rule 210.1)	0.13 Lb/hr
	3.18 lb/day
	0.01 ton/yr
Carbon Monoxide:	1.72 lb/hr
	41.28 lb/day
	0.17 ton/yr

(Emissions limits established pursuant to Rule 210.1, unless otherwise noted.)

Compliance with maximum daily emission limits shall be verified by source operator (with appropriate operational data and recordkeeping to document maximum daily emission rate) each day source is operated and such documentation of compliance shall be retained and made readily available to District for period of three years. (Rules 209 and 210.1)

Verification: As part of the Annual Compliance Report (**COMPLIANCE-8**) the project owner shall include information on operating emission rates to demonstrate compliance with this condition. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

ATC No. 0368006 (Bio-Remediation of Hydrocarbon Contaminated Soil)

Equipment Description

A. 800-ft. by 200-ft. bio-remediation/land-farm facility,

B. Irrigation system for bio-remediation/land-farm facility, and

C. Bio-remediation fertilizer for enhanced bio-remediation.

Design Conditions

AQ-94 Bio-remediation area shall be lined with minimum 60-mil high density polyethylene (HDPE) or alternate lining approved by Lahontan Regional Water Quality Board (LRWQB). (Rule 210.1)

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-95 The project owner shall provide District with depth of bio-remediation operation area. (Rule 210.1)

Verification: The project owner shall submit the depth of the bio-remediation operation area to the District and CPM prior to use of the bio-remediation operation area.

Operational Conditions

AQ-96 Visible emissions from bio-remediation/land-farm facility shall not equal to exceed 0% opacity for more than five minutes in any two hour period. (Rule 210.1 BACT Requirement)

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-97 The project owner shall have flame ionization detector (FID) or photo ionization detector (PID) on site to measure soil VOC emissions (measured as hexane). (Rule 210.1)

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-98 The project owner shall maintain weekly VOC readings of bio-remediation area during any time it is operated. The project owner shall provide protocol for VOC readings, soil acidity (pH), soil moisture content (% weight), soil temperature (°F), and Nutrient Ratio (C:N:P) to be approved by District staff. (Rule 210.1)

Verification: The project owner shall provide a protocol for measuring bio-remediation soil VOC content to the District for approval and the CPM for review prior to use of the bio-remediation operation area. The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-99 If soil in bio-remediation area registers a VOC reading of less than 50-ppm by volume, measured three inches above soil surface, with FID or PID compliance with Condition AQ-73 is not required. (Rule 210.1)

Verification: Logs of the bio-remediation soil VOC content measurements shall be kept with specific notation regarding whether VOC readings are above or below 50 ppm by volume. The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-100 If soil in bio-remediation area registers a VOC reading greater than or equal to 50-ppm (calibrated to methane) by volume, measured three inches above soil surface, with FID or PID bio-remediation operation shall comply with the following conditions. (Rule 210.1)

A. Affected soil stockpile shall be covered with minimum 10-mile plastic sheeting within 24-hours of detection to control emissions during treatment until VOC readings 3-inches above the uncovered soil stockpile are less than 50-ppmv. (Rule 210.1)

B. Covered soil stockpile shall be treated by enhanced bio-remediation using accepted environmental engineering practices to maintain conditions suitable for bio-remediation. Soil in stockpiles shall be conditioned as necessary through addition of nutrients, moisture and air as needed.

C. The following parameters in treatment area shall be monitored according to approval protocol: VOC readings over treatment area in use, soil acidity (pH), soil moisture content (% weight), soil temperature (°F), and Nutrient Ratio (C:N:P).

D. Records of soil treatment and monitoring results shall be maintained at the site for a period of at least 5-years, and

E. If bio-remediation operation is not effective after two months (i.e. VOC readings show no reduction in VOC content), the project owner shall propose alternate method of soil remediation for District approval.

Verification: Logs of the bio-remediation soil VOC content measurements shall be kept with specific notation regarding whether VOC readings are above or below 50 ppm by volume with other records required by this condition. A summary of the bio-remediation operation area records to demonstrate ongoing compliance with this condition shall be provided in the Annual Compliance Report (**COMPLIANCE-8**).

AQ-101 Soil moisture content shall be maintained according to District approved protocol. (Rule 210.1)

Verification: A summary of the bio-remediation operation area records to demonstrate ongoing compliance with this condition shall be provided in the Annual Compliance Report (**COMPLIANCE-8**).

AQ-102 Compliance with all operational conditions shall be verified by appropriate recordkeeping, including records of operational data needed to demonstrate compliance. Such records shall be kept on site in readily available format. (Rule 209)

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-103 No emission resulting from use of this equipment shall cause injury, detriment, nuisance, annoyance to or endanger comfort, repose, health or safety of any considerable number of persons or public. (Rule 419 and CH&SC 41700)

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

Emission Limits

AQ-104 Emissions rate of each air contaminant from this unit shall not exceed the following emissions limits:

Volatile Organic Compounds (VOC):	0.17 lb/day
(as defined in Rule 210.1)	0.03 ton/yr

(Emissions limits established pursuant to Rule 210.1 unless otherwise noted)

Compliance with maximum daily emission limits shall be verified by source operator (with appropriate operational data and recordkeeping to document maximum daily emission rate) each day source is operated and such documentation of compliance shall be retained and made readily available to District for period of three years. (Rules 209 and 210.1)

Verification: As part of the Annual Compliance Report (**COMPLIANCE-8**) the project owner shall include information that demonstrates that the bio-remediation area has been operated using good engineering practices. Such operation shall be deemed to demonstrate compliance with this condition. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

Facility Wide Conditions

Construction Activity

AQ-105 All construction phase emissions shall be controlled utilizing reasonably available control provisions, e.g. construction site and unsurfaced roadway dust control, conscientious maintenance of mobile and piston engine-powered equipment, etc.

Verification: The project owner shall comply with the requirements of Conditions **AQ-SC1** through **AQ-SC5**.

Air Toxics

AQ-106 Facility shall comply with California Health and Safety Code Sections 44300 through 44384. (Rule 208.1)

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

C.1.14 CONCLUSIONS

Staff has made the following conclusions about the RSPP:

- The proposed project would not have the potential to exceed PSD emission levels during direct source operation and the facility is not considered a major stationary source with potential to cause adverse NEPA air quality impacts. However, without adequate fugitive dust mitigation, the proposed project would have the potential to exceed the PSD emission levels for PM10 during construction, and could cause potential localized exceedances of the PM10 NAAQS during construction. Recommended Conditions of Certification **AQ-SC1** through **AQ-SC4** would adequately mitigate these potentially adverse NEPA impacts.
- The proposed project would have the potential to exceed the General Conformity PM10 applicability threshold (100 tons/year) during construction and operation. Recommended Conditions of Certification **AQ-SC7**, for operation, will adequately mitigate this potentially adverse NEPA impacts; however, even considering staff's recommended construction Conditions of Certification **AQ-SC1** through **AQ-SC5**, the PM10 emissions during construction are estimated to exceed the General Conformity applicability threshold. Therefore, the BLM will have to complete a General Conformity analysis for the project prior to completing the project's Record of Decision (ROD). Based on the modeling analysis contained in this SA/DPA/DEIS, staff concludes that the BLM will be able to determine that the selected project alternative conforms to the applicable SIP per the criteria of 40 CFR Part 93.158.
- The proposed project would comply with applicable District Rules and Regulations and staff recommends the inclusion of the District's PDOC conditions as Conditions of Certification **AQ-1** through **AQ-106.**
- If left unmitigated, the proposed project's construction activities would likely contribute to significant CEQA adverse PM10 and ozone impacts. Staff recommends **AQ-SC1** to **AQ-SC5** to mitigate the potential impacts.

- The proposed project's operation would not cause new violations of any NO_2, SO_2, PM2.5 or CO ambient air quality standards. Therefore, the project-direct operation NOx, SOx, PM2.5 and CO emission impacts are not CEQA significant. However, the analyses did not include the new federal 1-hour NO_2 ambient air quality standard.
- The proposed project's direct and indirect, or secondary emissions contribution to existing violations of the ozone and PM10 ambient air quality standards are likely CEQA significant if unmitigated. Therefore, staff recommends **AQ-SC6** to mitigate the onsite maintenance vehicle emissions and **AQ-SC7** to mitigate the operating fugitive dust emissions to ensure that the potential ozone and PM10 CEQA impacts are mitigated to less than significant over the life of the project.
- The proposed project would be consistent with the requirements of SB 1368 and the Emission Performance Standard for greenhouse gases (see **Appendix Air-1**).

C.1.15 REFERENCES

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ACRONYMS

AAQS	Ambient Air Quality Standard
AERMOD	ARMS/EPA Regulatory Model
AFC	Application for Certification
APCO	Air Pollution Control Officer
AQCMM	Air Quality Construction Mitigation Manager
AQCMP	Air Quality Construction Mitigation Plan
APCD	Air Pollution Control District
ARB	California Air Resources Board
ATC	Authority to Construct
ATCM	Airborne Toxic Control Measure
BACT	Best Available Control Technology
bhp	brake horsepower
BLM	Bureau of Land Management
CCR	California Code of Regulations
CEC	California Energy Commission (or Energy Commission)
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CPM	(CEC) Compliance Project Manager

DEIR	Draft Environmental Impact Report (this document)
DPM	Diesel Particulate Matter
EIR	Environmental Impact Report
ERC	Emission Reduction Credit
FDOC	Final Determination Of Compliance
FEIR	Final Environmental Impact Report (to be prepared after this document)
GHG	Greenhouse Gas
GSU	Generator Set-up Unit
H_2S	Hydrogen Sulfide
hp	horsepower
HSC	Health and Safety Code
KCAPCD	Kern County Air Pollution Control District
kV	Kilovolt
lbs	Pounds
LORS	Laws, Ordinances, Regulations and Standards
MCR	Monthly Compliance Report
MDAB	Mojave Desert Air Basin
μg/m3	microgram per cubic meter
mg/m3	milligrams per cubic meter
MW	Megawatts (1,000,000 Watts)
NAAQS	National Ambient Air Quality Standard
NEPA	National Environmental Protection Act
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen or Nitrogen Oxides
NSPS	New Source Performance Standard
NSR	New Source Review
O_2	Oxygen
O_3	Ozone
OLM	Ozone Limiting Method
PDOC	Preliminary Determination Of Compliance
PM	Particulate Matter

PM10	Particulate Matter less than 10 microns in diameter
PM2.5	Particulate Matter less than 2.5 microns in diameter
ppm	Parts Per Million
ppmv	Parts Per Million by Volume
ppmvd	Parts Per Million by Volume, Dry
PSD	Prevention of Significant Deterioration
PTO	Permit to Operate
ROD	Record of Decision (Federal EIS process)
RSPP	Ridgecrest Solar Power Project
SA/DPA/DEIS	Staff Assessment/Draft Plan Amendment/Draft Environmental Impact Statement
SA/DPA/DEISE	Staff Assessment/Draft Plan Amendment/Draft Environmental Impact Statement Errata (will be prepared after this document)
SCE	Southern California Edison
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SO_4	Sulfate
SOx	Oxides of Sulfur
SWPPP	Storm Water Pollution Prevention Plan
tpy	tons per year
U.S.EPA	United States Environmental Protection Agency
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds

APPENDIX AIR-1 - GREENHOUSE GAS EMISSIONS

Testimony of William Walters, P.E.

SUMMARY OF CONCLUSIONS

The Ridgecrest Solar Power Project (RSPP) is a proposed addition to the state's electricity system. RSPP is a 250 MW solar concentrating thermal power plant, which would utilize parabolic trough solar thermal technology to solar heat a heat transfer fluid (HTF). This hot HTF would be used to generate steam in a solar steam generator. As a solar project, its greenhouse gas (GHG) emissions would be considerably less than the existing statewide average GHG emissions per unit of generation and considerably less than the GHG emissions from existing fossil fuel fired power plants providing generation to California, and thus would contribute to continued reduction of GHG emissions in the interconnected California and the western United States electricity systems.

While RSPP would emit some GHG emissions, the contribution of RSPP to the system build-out of renewable resources to meet the goals of the Renewable Portfolio Standard (RPS) in California would result in a net cumulative reduction of energy generation and GHG emissions from new and existing fossil-fired electricity resources. Electricity is produced by operation of inter-connected generation resources. Operation of one power plant, like RSPP, affects all other power plants in the interconnected system. RSPP would be a "must-take" facility and its operation would affect the overall electricity system operation and GHG emissions in several ways:

- RSPP would provide low-GHG, renewable generation.
- RSPP would facilitate to some degree the replacement high GHG emitting (e.g., out-of-state coal) electricity generation that must be phased out to meet the State's 2006 Emissions Performance Standard.
- RSPP could facilitate to some extent the replacement of generation provided by aging fossil-fired power plants that use once-through cooling.

These system impacts would result in a net reduction in GHG emissions across the electricity system providing energy and capacity to California. Thus, staff concludes that the proposed project would result in a cumulative overall reduction in GHG emissions from power plants, does not worsen current conditions, and would not result in impacts that are cumulatively CEQA significant.

Staff concludes that the short-term minor emission of greenhouse gases during construction that are necessary to create this new, low GHG-emitting power generating facility would be sufficiently reduced by "best practices" and would be more than offset by GHG emission reductions during operation. Thus, construction GHG emissions would not be CEQA significant.

The RSPP, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]).

The California Air Resources Board (ARB) has promulgated regulations for mandatory GHG emission reporting to comply with the California Global Warming Solutions Act of 2006 (AB 32 Núñez, Statutes of 2006, Chapter 488, Health and Safety Code sections 38500 et seq.) (ARB 2008a). The RSPP, which solely generates electricity from solar power, is exempt from the mandatory GHG emission reporting requirements for electricity generating facilities [CCR Title 17 §95101(c)(1)]. However, the proposed project may be subject to future reporting requirements and GHG reductions or trading requirements as additional state or federal GHG regulations are developed and implemented.

INTRODUCTION

Greenhouse gas (GHG) emissions are not criteria pollutants, but they are discussed in the context of cumulative impacts. However, on April 2, 2007, the U.S. Supreme Court found that GHGs are pollutants that must be covered by the federal Clean Air Act. In response, on September 30, 2009, the U.S. Environmental Protection Agency proposed to apply Prevention of Significant Deterioration (PSD) requirements to facilities whose carbon dioxide-equivalent emissions exceed 25,000 tons per year (U.S.EPA 2009c). The rule making is not finalized, but the GHG emissions for RSPP are not expected to exceed this amount.

The state has demonstrated a clear willingness to address global climate change through research, adaptation and inventory reductions. In that context, staff evaluates the GHG emissions from the proposed project, presents information on GHG emissions related to electricity generation, and describes the applicable GHG standards and requirements.

Generation of electricity can produce greenhouse gases with the criteria air pollutants that have been traditionally regulated under the federal and state Clean Air Acts. For fossil fuel-fired power plants, the GHG emissions include primarily carbon dioxide, with much smaller amounts of nitrous oxide (N_2O, not NO or NO_2, which are commonly known as NOx or oxides of nitrogen), and methane (CH_4 – often from unburned natural gas). For solar energy generation projects the stationary source GHG emissions are much smaller than fossil fuel-fired power plants, but the associated maintenance vehicle emissions are higher. Other sources of GHG emissions include sulfur hexafluoride (SF_6) from high voltage equipment and hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) from refrigeration/chiller equipment. GHG emissions from the electricity sector are dominated by CO_2 emissions from carbon-based fuels; other sources of GHG emissions are small and also are more likely to be easily controlled or reused or recycled, but are nevertheless documented here as some of the compounds have very high global warming potentials.

Global warming potential is a relative measure, compared to carbon dioxide, of a compound's residence time in the atmosphere and ability to warm the planet. Mass emissions of GHGs are converted into carbon dioxide equivalent (CO2E) metric tonnes (MT) for ease of comparison.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local laws and policies in **Greenhouse Gas Table** 1 pertain to the control and mitigation of greenhouse gas emissions. Staff's analysis examines the proposed project's compliance with these requirements.

Greenhouse Gas Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
40 Code of Federal Regulations (CFR) Part 98	This rule requires mandatory reporting of GHG emissions for facilities that emit more than 25,000 metric tons of CO_2 equivalent emissions per year.
State	
California Global Warming Solutions Act of 2006, AB 32 (Stats. 2006; Chapter 488; Health and Safety Code sections 38500 et seq.)	This act requires the California Air Resource Board (ARB) to enact standards that will reduce GHG emission to 1990 levels by 2020. Electricity production facilities will be regulated by the ARB.
California Code of Regulations, tit. 17, Subchapter 10, Article 2, sections 95100 et. seq.	These ARB regulations implement mandatory GHG emissions reporting as part of the California Global Warming Solutions Act of 2006 (Stats. 2006; Chapter 488; Health and Safety Code sections 38500 et seq.)
Title 20, California Code of Regulations, section 2900 et seq.; CPUC Decision D0701039 in proceeding R0604009	The regulations prohibit utilities from entering into long-term contracts with any base load facility that does not meet a greenhouse gas emission standard of 0.5 metric tonnes carbon dioxide per megawatt-hour (0.5 $MTCO_2$/MWh) or 1,100 pounds carbon dioxide per megawatt-hour (1,100 lbs CO_2/MWh).

GLOBAL CLIMATE CHANGE AND ELECTRICITY PRODUCTION

There is general scientific consensus that climate change is occurring and that human activity contributes in some measure (perhaps substantially) to that change. Man-made emissions of greenhouse gases, if not sufficiently curtailed, are likely to contribute further to continued increases in global temperatures. Indeed, the California Legislature finds that "[g]lobal warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California" (Cal. Health & Safety Code, sec. 38500, division 25.5, part 1).

In 1998, the Energy Commission identified a range of strategies to prepare for an uncertain climate future, including a need to account for the environmental impacts associated with energy production, planning, and procurement (CEC 1998, p.5). In 2003, the Energy Commission recommended that the state require reporting of

greenhouse gases (GHG) or global climate change[19] emissions as a condition of state licensing of new electric generating facilities (CEC 2003, IEPR p. 42). In 2006, California enacted the California Global Warming Solutions Act of 2006 (AB 32). It requires the California Air Resources Board (ARB) to adopt standards that will reduce statewide GHG emissions to statewide GHG emissions levels in 1990, with such reductions to be achieved by 2020. [20] To achieve this, ARB has a mandate to define the 1990 emissions level and achieve the maximum technologically feasible and cost-effective GHG emission reductions.

The ARB adopted early action GHG reduction measures in October 2007, adopted mandatory reporting requirements and the 2020 statewide target in December 2007, and adopted a statewide scoping plan in December 2008 to identify how emission reductions will be achieved from major sources of GHG via regulations, market mechanisms, and other actions. ARB staff is developing regulatory language to implement its plan and holds ongoing public workshops on key elements of the recommended GHG reduction measures, including market mechanisms (ARB 2006). The regulations must be effective by January 1, 2011 and mandatory compliance commences on January 1, 2012. The mandatory reporting requirements are effective for electric generating facilities with a nameplate capacity equal or greater than 1 megawatt (MW) capacity if their emissions exceed 2,500 metric tonnes per year. The due date for initial reports by existing facilities was June 1, 2009.

Examples of strategies that the state might pursue for managing GHG emissions in California, in addition to those recommended by the Energy Commission and the Public Utilities Commission, were identified in the California Climate Action Team's Report to the Governor (CalEPA 2006). The scoping plan approved by ARB in December 2008 builds upon the overall climate policies of the Climate Action Team report and shows the recommended strategies to achieve the goals for 2020 and beyond. Some strategies focus on reducing consumption of petroleum across all areas of the California economy. Improvements in transportation energy efficiency (fuel economy), land use planning, and alternatives to petroleum-based fuels are slated to provide substantial reductions by 2020 (CalEPA 2006). The scoping plan includes a requirement for 33% of California's electrical energy to be provided from renewable sources by 2020 (implementing California's 33% RPS goal), aggressive energy efficiency targets, and a cap-and-trade system that includes the electricity sector (ARB 2008b).

It is likely that GHG reductions mandated by ARB will not be uniform across emitting sectors, in that reductions will be based on cost-effectiveness (i.e., the greatest effect for the least cost). For example, the ARB proposes a 40% reduction in GHG from the electricity sector, even though that sector currently only produces about 25% of the state's GHG emissions. In response, in September 2008 the Energy Commission and the Public Utilities Commission provided recommendations (CPUC 2008) to ARB on

[19] Global climate change is the result of greenhouse gases, or air emissions with global warming potentials, affecting the global energy balance, and thereby, climate of the planet. The term greenhouse gases (GHG) and global climate change (GCC) gases are used interchangeably.

[20] Governor Schwarzenegger has also issued Executive Order S-3-05 establishing a goal of 80% below 1990 levels by 2050.

how to achieve such reductions through both programmatic and regulatory approaches, and identified regulation points should ARB decide that a multi-sector cap and trade system is warranted.

The Energy Commission's *2007 Integrated Energy Policy Report* (IEPR) also addressed climate change within the electricity, natural gas, and transportation sectors (CEC 2007). For the electricity sector, it recommended such approaches as pursuing all cost-effective energy efficiency measures and meeting the Governor's stated goal of a 33% renewable portfolio standard. The Energy Commission's *2009 Integrated Energy Policy Report* continues to emphasize the importance of meeting greenhouse gas emissions reduction goals along with other important statewide issues such as backing out use of once-through cooling in coastal California power plants (CEC 2009d).

SB 1368[21], enacted in 2006, and regulations adopted by the Energy Commission and the Public Utilities Commission pursuant to the bill, prohibits California utilities from entering into long-term commitments with any base load facilities that exceed the Emission Performance Standard of 0.500 metric tonnes CO_2 per megawatt-hour[22] (1,100 pounds CO_2/MWh). Specifically, the SB 1368 Emission Performance Standard (EPS) applies to base load power from new power plants, new investments in existing power plants, and new or renewed contracts with terms of five years or more, including contracts with power plants located outside of California.[23] If a project, instate or out of state, plans to sell base load electricity to a California utility that utility will have to demonstrate that the project meets the EPS. *Base load* units are defined as units that operate at a capacity factor higher than 60%. As a renewable electricity generating facility, RSPP is determined by rule to be compliant with the SB 1368 EPS.

In addition to these programs, California is involved in the Western Climate Initiative, a multi-state and international effort to establish a cap and trade market to reduce greenhouse gas emissions in the Western United States and the Western Electricity Coordinating Council (WECC). The timelines for the implementation of this program are similar to those of AB 32, with full roll-out beginning in 2012. And as with AB 32, the electricity sector has been a major focus of attention.

ELECTRICITY PROJECT GREENHOUSE GAS EMISSIONS

Electricity use can be as simple as turning on a switch to operate a light or fan. The system to deliver adequate and reliable electricity supply is complex and variable. But it operates as an integrated whole to meet demand, such that the dispatch of a new source of generation generally curtails or displaces one or more less efficient or less competitive existing sources. Within the system, generation resources provide electricity, or energy, generating capacity, and ancillary services to stabilize the system and facilitate electricity delivery, or movement, over the grid. *Capacity* is the instantaneous output of a resource, in megawatts. *Energy* is the capacity output over a unit of time, for example an hour or year, generally reported as megawatt-hours or

[21] Public Utilities Code § 8340 et seq.

[22] The Emission Performance Standard only applies to carbon dioxide, and does not include emissions of other greenhouse gases converted to carbon dioxide equivalent.

[23] See Rule at http://www.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/64072.htm

gigawatt-hours (GWh). Ancillary services[24] include regulation, spinning reserve, non-spinning reserve, voltage support, and black start capability. Individual generation resources can be built and operated to provide only one specific service. Alternatively, a resource may be able to provide one or all of these services, depending on its design and constantly changing system needs and operations.

California is actively pursuing policies to reduce GHG emissions that include adding non-GHG emitting renewable generation resources to the system mix. The generation of electricity using fossil fuels, even in a back-up generator at a thermal solar plant, produces air emissions known as greenhouse gases in addition to the criteria air pollutants that have been traditionally regulated under the federal and state Clean Air Acts. Greenhouse gas emissions contribute to the warming of the earth's atmosphere, leading to climate change.

PROJECT CONSTRUCTION

Construction of industrial facilities such as power plants requires coordination of numerous equipment and personnel. The concentrated on-site activities result in short-term, unavoidable increases in vehicle and equipment emissions that include greenhouse gases. The construction would last approximately 28 months. The greenhouse gas emissions estimate, for the entire construction period, provided by the applicant is below in **Greenhouse Gas Table 2**.

Greenhouse Gas Table 2
Estimated RSPP Potential Construction Greenhouse Gas Emissions

Construction Element	**CO_2-Equivalent (MTCO2E) [a,b]**
On-Site Construction Equipment	27,558
On-Site Motor Vehicles	591
Off-Site Motor Vehicles	15,108
Construction Total	43,257

Source: SM 2010a, Table DR-AIR-12.
[a] One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms
[b] The vast majority of the CO2E emissions, over 99%, is CO_2 from these combustion sources.

PROJECT OPERATIONS

Operations GHG emissions are shown in **Greenhouse Gas Table 3**. Operation of the RSPP would cause GHG emissions from the auxiliary boiler, HTF heater, fire pump engine, emergency generator engine, maintenance fleet and employee trips, and sulfur hexafluoride emissions from new electrical component equipment.

[24] See page CEC 2009b, page 95.

Greenhouse Gas Table 3
Estimated RSPP Potential Operating Greenhouse Gas Emissions

	Annual CO_2-Equivalent (MTCO2E)[a]
Auxiliary Boiler [b]	3,631
HTF Heater [b]	1,117
Emergency Generator Engine [b]	76
Fire Pump Engine [b]	8
Maintenance Vehicles [b]	37
Delivery Vehicles [b]	53
Employee Vehicles [b]	765
Equipment Leakage (SF_6)	6
Total Project GHG Emissions – MTCO2E [b]	**5,693**
Facility MWh per year	500,000
Facility GHG Emission Rate (MTCO2E/MWh)	0.011

Sources: SM 2010a, Table E.2-17; and employee vehicle emissions have been estimated by staff.
[a] One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms.
[b] The vast majority of the CO2E emissions, over 99%, is CO_2 from these emission sources.

Greenhouse Gas Table 3 shows what the proposed project, as permitted, could potentially emit in greenhouse gases on an annual basis. All emissions are converted to CO_2-equivalent and totaled. Electricity generation GHG emissions are generally dominated by CO_2 emissions from the carbon-based fuels; other sources of GHG are typically small and also are more likely to be easily controlled or reused/recycled. For this solar project the primary fuel, solar energy, is greenhouse gas free, but there is propane used in the auxiliary boiler used for morning startup and the HTF heater used for freeze protection, and gasoline and diesel fuel use in the maintenance vehicles, offsite delivery vehicles, staff and employee vehicles, the fire water pump engine, and the emergency generator engine. Another GHG emission source for this proposed project is SF_6 from electrical equipment leakage.

The proposed project is estimated to emit, directly from primary and secondary emission sources on an annual basis, nearly 5,700 metric tonnes of CO_2-equivalent GHG emissions per year. RSPP, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]). Regardless, RSPP has an estimated GHG emission rate of 0.011 MTCO2E/MWh, well below the Greenhouse Gas Emission Performance Standard of 0.500 MTCO2/MWh.

Solar Project Energy Payback Time

The beneficial energy and greenhouse gas impacts of renewable energy projects can also be measured by the *energy payback time*[25]. **Greenhouse Gas Tables 2** and **3** provide an estimate of the onsite construction and operation emissions, employee transportation emissions, and the final segment of offsite materials and consumables transportation. However, there are additional direct transportation and indirect manufacturing GHG emissions associated with the construction and operation of the proposed project, which are all considered in the determination of the energy payback time. A document sponsored by Greenpeace estimates that the energy payback time for concentrating solar power plants, such as RSPP, to be on the order of five months (Greenpeace 2005, Page 9); and the project life for RSPP is on the order of 30 years. Therefore, the proposed project's GHG emissions reduction potential from energy displacement would be substantial[26].

Natural Carbon Uptake Reduction

This proposed project would cause the clearing of land and removal of vegetation, which would reduce the ongoing natural carbon uptake by vegetation. A study of the Mojave Desert indicated that the desert may uptake carbon in amounts as high as 100 grams per square meter per year (Wohlfahrt et. al. 2008). This would equate to a maximum reduction in carbon uptake, calculated as CO_2, of 1.48 MT of CO_2 per acre per year for areas with complete vegetation removal. For this 2,002 acre proposed project (SM 2010a), which does require the complete removal of vegetation over most of the project site, the maximum equivalent loss in carbon uptake would be 2,963 MT of CO_2 per year, which would correspond to 0.006 MT of CO_2 per MWh generated. Therefore, the natural carbon uptake loss is negligible in comparison with the reduction in fossil fuel CO_2 emissions, which can range from 0.35 to 1.0 MT of CO_2 per MWh depending on the fuel and technology, that is enabled by this proposed project.

CLOSURE AND DECOMMISSIONING

Closure and decommissioning, as a one-time limited duration event, would have emissions that are similar in type and magnitude, but likely lower than, the construction emissions as discussed above.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff assesses four kinds of impacts: construction, operation, closure and decommissioning, and cumulative effects. As the name implies, construction impacts result from the emissions occurring during the construction of the proposed project. The

[25] The energy payback time is the time required to produce an amount of energy as great as what was consumed during production, which in the context of a solar power plant includes all of the energy required during construction and operation.

[26] The GHG displacement for the project would be similar to, but not exactly the same as, the amount of energy produced after energy payback is achieved multiplied by the average GHG emissions per unit of energy displaced. The average GHG emissions for the displaced energy over the project life is not known but currently fossil fuel fired power plants have GHG emissions that range from 0.35 MT/MWh CO2E for the most efficient combined cycle gas turbine power plants to over 1.0 MT/MWh for coal fired power plants.

operation impacts result from the emissions of the proposed project during operation. Cumulative impacts analysis assesses the impacts that result from the proposed project's incremental effect viewed over time. The impact of GHG emissions caused by this solar facility is characterized by considering how the power plant would affect the overall electricity system. The integrated electricity system depends on non-fossil and fossil-fueled generation resources to provide energy and satisfy local capacity needs. As directed by the Energy Commission's adopted order initiating an informational (OII) proceeding (08-GHG OII-1) (CEC 2009a), staff is refining and implementing the concept of a "blueprint" that describes the long-term roles (i.e., retirements and displacement) of fossil-fueled power plants in California's electricity system as we move to a high-renewable, low-GHG electricity system, which will include projects like RSPP.

PROPOSED PROJECT

Construction Impacts

Staff concludes that the GHG emission increases from construction activities would not be CEQA significant for several reasons. First, the period of construction would be short-term and the emissions intermittent during that period, not ongoing during the life of the proposed project. Second, best practices control measures that staff recommends, such as limiting idling times and requiring, as appropriate, equipment that meets the latest emissions standards, would further minimize greenhouse gas emissions since the use of newer equipment would increase efficiency and reduce GHG emissions and be compatible with low-carbon fuel (e.g., bio-diesel and ethanol) mandates that will likely be part of the ARB regulations to reduce GHG from construction vehicles and equipment. And lastly, these temporary GHG emissions are necessary to create this renewable energy source that would provide power with a very low GHG emissions profile, and the construction emissions would be more than offset by the reduction in fossil fuel fired generation that would be enabled by this proposed project. If the project construction emissions were distributed over the estimated 30 year life of the proposed project they would only increase the project life time annual facility GHG emissions rate by 0.0029 MT CO2E per MWh.

Direct/Indirect Operation Impacts and Mitigation

The proposed RSPP promotes the state's efforts to move towards a high-renewable, low-GHG electricity system, and, therefore, reduces both the amount of natural gas used by electricity generation and greenhouse gas emissions.

Net GHG emissions for the integrated electric system will decline when new renewable power plants are added to: 1) move renewable generation towards the 33% target; 2) improve the overall efficiency, or GHG emission rate, of the electric system; or 3) serve load growth or capacity needs more efficiently, or with fewer GHG emissions.

The Role of RSPP in Renewables Goals/Load Growth

As California moves towards an increased reliance on renewable energy by implementing the Renewables Portfolio Standard (RPS), non-renewable energy resources will be displaced. These reductions in non-renewable energy, shown in **Greenhouse Gas Table 4**, are targeted to be as much as 36,500 GWh. These assumptions are conservative in that the forecasted growth in electricity retail sales

assumes that the impacts of planned increases in expenditures on (uncommitted) energy efficiency are already embodied in the current retail sales forecast[27]. Energy Commission staff estimates that as much as 18,000 GWh of additional savings due to uncommitted energy efficiency programs may be forthcoming.[28] This would reduce non-renewable energy needs by a further 12,000 GWh given a 33% RPS.

Greenhouse Gas Table 4
Estimated Changes in Non-Renewable Energy
Potentially Needed to Meet California Loads, 2008-2020

California Electricity Supply	**Annual GWh**	
Statewide Retail Sales, 2008, actual [a]	264,794	
Statewide Retail Sales, 2020, forecast [a]	289,697	
Growth in Retail Sales, 2008-20	24,903	
Growth in Net Energy for Load [b]	29,840	
California Renewable Electricity	**GWh @ 20% RPS**	**GWh @ 33% RPS**
Renewable Energy Requirements, 2020 [c]	57,939	95,600
Current Renewable Energy, 2008	29,174	
Change in Renewable Energy-2008 to 2020	28,765	66,426
Resulting Change in Non-Renewable Energy	176	(36,586)

Source: Energy Commission staff 2010.
Notes:
a. 2009 IPER Demand Forecast, Form 1.1c. Excludes pumping loads for entities that do not have an RPS.
b. 2009 IEPR Demand Forecast, Form 1.5a.
c. RPS requirements are a percentage of retail sales.

The Role of RSPP in Retirements/Replacements

RSPP would be capable of annually providing 500 GWh of renewable generation energy to replace resources that are or will likely be precluded from serving California loads. State policies, including GHG goals, are discouraging or prohibiting new contracts and new investments in high GHG-emitting facilities such as coal-fired generation, generation that relies on water for once-through cooling, and aging power plants (CEC 2007). Some of the existing plants that are likely to require substantial capital investments to continue operation in light of these policies may be unlikely to undertake the investments and will retire or be replaced.

[27] Energy efficiency savings are already represented in the current Energy Commission demand forecast adopted December 2009 (CEC 2009c).

[28] See *Incremental Impacts of Energy Efficiency Policy Initiatives Relative to the 2009 Integrated Energy Policy Report Adopted Demand Forecast* (CEC-200-2010-001-D, January, 2010), page 2. Table 1 indicates that additional conservation for the three investor-owned utilities may be as high as 14,374 GWh. Increasing this value by 25% to account for the state's publicly-owned utilities yields a total reduction of 17,967 GWh.

Replacement of High GHG-Emitting Generation

High GHG -emitting resources, such as coal, are effectively prohibited from entering into new long-term contracts for California electricity deliveries as a result of the Emissions Performance Standard adopted in 2007 pursuant to SB 1368. Between now and 2020, more than 18,000 GWh of energy procured by California utilities under these contracts will have to reduce GHG emissions or be replaced; these contracts are presented in **Greenhouse Gas Table 5**.

Greenhouse Gas Table 5
Expiring Long-term Contracts with Coal-fired Generation 2009 – 2020

Utility	Facility [a]	Contract Expiration	Annual GWh Delivered to CA
PG&E, SCE	Misc In-state Qual. Facilities [a]	2009-2019	4,086
LADWP	Intermountain	2009-2013	3,163 [b]
City of Riverside	Bonanza, Hunter	2010	385
Department of Water Resources	Reid Gardner	2013 [c]	1,211
SDG&E	Boardman	2013	555
SCE	Four Corners	2016	4,920
Turlock Irrigation District	Boardman	2018	370
LADWP	Navajo	2019	3,832
		TOTAL	**18,522**

Source: Energy Commission staff based on Quarterly Fuel and Energy Report (QFER) filings.
Notes:
a. All facilities are located out-of-state except for the Miscellaneous In-state Qualifying Facilities.
b. Estimated annual reduction in energy provided to LADWP by Utah utilities from their entitlement by 2013.
c. Contract not subject to Emission Performance Standard, but the Department of Water Resources has stated its intention not to renew or extend.

This represents almost half of the energy associated with California utility contracts with coal-fired resources that will expire by 2030. If the State enacts a carbon adder[29], all the coal contracts (including those in **Greenhouse Gas Table 5**, which expire by 2020 and, other contracts that expire beyond 2020 and are not shown in the table) may be retired at an accelerated rate as coal-fired energy becomes uncompetitive due to the carbon adder or the capital needed to capture and sequester the carbon emissions. Also shown are the approximate 500 MW of in-state coal and petroleum coke-fired capacity that may be unlikely to contract with California utilities for baseload energy due to the SB1368 Emission Performance Standard. As these contracts expire, new and existing generation resources will replace the lost energy and capacity. Some will come from renewable generation such as this proposed project; some will come from new and existing natural gas fired generation. All of these new facilities will have substantially

[29] A carbon adder or carbon tax is a specific value added to the cost of a project for per ton of associated carbon or carbon dioxide emissions. Because it is based on, but not limited to, actual operations and emission and can be trued up at year end, it is considered a simple mechanism to assign environmental costs to a project.

lower GHG emissions rates than coal and petroleum coke-fired facilities which typically averages about 1.0 $MTCO_2$/MWh without carbon capture and sequestration. Thus, new renewable facilities will result in a net reduction in GHG emissions from the California electricity sector.

Retirement of Generation Using Once-Through Cooling

The State Water Resource Control Board (SWRCB) has proposed major changes to once-through cooling (OTC) units, shown in **Greenhouse Gas Table 6**, which would likely require extensive capital to retrofit, or retirement, or substantial curtailment of dozens of generating units. In 2008, these units collectively produced almost 58,000 GWh. While the more recently built OTC facilities may well install dry or wet cooling towers and continue to operate, the aging OTC plants are not likely to be retrofit to use dry or wet cooling towers without the power generation also being retrofit or replaced to use a more efficient and lower GHG emitting combined cycle gas turbine technology. Most of these existing OTC units operate at low capacity factors, suggesting a limited ability to compete in the current electricity market. Although the timing would be uncertain, new resources would out-compete aging plants and would displace the energy provided by OTC facilities and likely accelerate their retirements.

Any additional costs associated with complying with the SWRCB regulation would be amortized over a limited revenue stream today and into the foreseeable future. Their energy and much of their dispatchable, load-following capability will have to be replaced. These units constitute over 15,000 MW of merchant capacity and 17,800 GWh of merchant energy. Of this, much but not all of the capacity and energy are in local reliability areas, requiring a large share of replacement capacity – absent transmission upgrades – to locations in the same local reliability area. **Greenhouse Gas Table 6** provides a summary of the utility and merchant energy supplies affected by the OTC regulations.

New renewable generation resources will emit substantially less GHG emissions on average than other energy generation sources. Existing aging and OTC natural gas facility generation typically averages 0.6 to 0.7 $MTCO_2$/MWh, which is much less efficient, higher GHG emitting, than a renewable energy project like RSPP. A project like RSPP, located far from the coastal load pockets like the Los Angeles Local Reliability Area (LRA), would more likely provide energy support to facilitate the retirement of some aging and/or OTC power plants, but would not likely provide any local capacity support at or near the coastal OTC units. Regardless, due to its low greenhouse gas emissions, RSPP would serve to reduce GHG emissions from the electricity sector.

Greenhouse Gas Table 6
Aging and Once-Through Cooling Units: 2008 Capacity and Energy Output [a]

Plant, Unit Name	Owner	Local Reliability Area	Aging Plant?	Capacity (MW)	2008 Energy Output (GWh)	GHG Emission Rate ($MTCO_2/MWh$)
Diablo Canyon 1, 2	Utility	None	No	2,232	17,091	Nuclear
San Onofre 2, 3	Utility	L.A. Basin	No	2,246	15,392	Nuclear
Broadway 3 [b]	Utility	L.A. Basin	Yes	75	90	0.648
El Centro 3, 4 [b]	Utility	None	Yes	132	238	0.814
Grayson 3-5 [b]	Utility	LADWP	Yes	108	150	0.799
Grayson CC [b]	Utility	LADWP	Yes	130	27	0.896
Harbor CC	Utility	LADWP	No	227	203	0.509
Haynes 1, 2, 5, 6	Utility	LADWP	Yes	1,046	1,529	0.578
Haynes CC	Utility	LADWP	No	560	3,423	0.376
Humboldt Bay 1, 2 [a]	Utility	Humboldt	Yes	107	507	0.683
Olive 1, 2 [b]	Utility	LADWP	Yes	110	11	1.008
Scattergood 1-3	Utility	LADWP	Yes	803	1,327	0.618
Utility-Owned				7,776	39,988	0.693
Alamitos 1-6	Merchant	L.A. Basin	Yes	1,970	2,533	0.661
Contra Costa 6, 7	Merchant	S.F. Bay	Yes	680	160	0.615
Coolwater 1-4 [b]	Merchant	None	Yes	727	576	0.633
El Segundo 3, 4	Merchant	L.A. Basin	Yes	670	508	0.576
Encina 1-5	Merchant	San Diego	Yes	951	997	0.674
Etiwanda 3, 4 [b]	Merchant	L.A. Basin	Yes	666	848	0.631
Huntington Beach 1, 2	Merchant	L.A. Basin	Yes	430	916	0.591
Huntington Beach 3, 4	Merchant	L.A. Basin	No	450	620	0.563
Mandalay 1, 2	Merchant	Ventura	Yes	436	597	0.528
Morro Bay 3, 4	Merchant	None	Yes	600	83	0.524
Moss Landing 6, 7	Merchant	None	Yes	1,404	1,375	0.661
Moss Landing 1, 2	Merchant	None	No	1,080	5,791	0.378
Ormond Beach 1, 2	Merchant	Ventura	Yes	1,612	783	0.573
Pittsburg 5-7	Merchant	S.F. Bay	Yes	1,332	180	0.673
Potrero 3	Merchant	S.F. Bay	Yes	207	530	0.587
Redondo Beach 5-8	Merchant	L.A. Basin	Yes	1,343	317	0.810
South Bay 1-4	Merchant	San Diego	Yes	696	1,015	0.611
Merchant-Owned				15,254	17,828	0.605
Total In-State OTC				23,030	57,817	

Source: Energy Commission staff based on Quarterly Fuel and Energy Report (QFER) filings.

a. OTC Humboldt Bay Units 1 and 2 are included in this list. They must retire in 2010 when the new Humboldt Bay Generating Station (not ocean-cooled), currently under construction, enters commercial operation.

b. Units are aging but are not OTC.

Closure and Decommissioning

Eventually the facility would close, either at the end of its useful life or due to some unexpected situation such as a natural disaster or catastrophic facility breakdown. When the facility closes, all sources of air emissions would cease to operate and thus impacts associated with those greenhouse gas emissions would no longer occur. The only other expected, albeit temporary, GHG emissions would be equipment exhaust (off-road and on-road) from dismantling activities. These activities would be of much a shorter duration than construction of the proposed project, equipment used to dismantle the facility are assumed to have lower comparative GHG emissions due to technology advancement, and would be required to be controlled in a manner at least equivalent to that required during construction. It is assumed that the beneficial GHG impacts of this facility, displacement of fossil fuel fired generation, would be replaced by the construction of newer more efficiency renewable energy or other low GHG generating technology facilities. Also, the recycling of the facility components (steel, concrete, etc.) could indirectly reduce GHG emissions from decommissioning activities. Therefore, while there would be temporary adverse greenhouse gas CEQA impacts during decommissioning they are determined to be less than significant.

NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project as defined by the applicant. This alternative is analyzed because (1) it eliminates about 42% of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources (desert tortoise and Mohave ground squirrel), cultural resources, and recreational uses, and (2) avoids constructing a solar facility in the Mohave Ground Squirrel Conservation Area (MGSCA). The Northern Unit Alternative is shown in **Alternatives Figure 1**.

The Northern Unit Alternative would reduce the total construction GHG emissions of the proposed project (see **Greenhouse Gas Tables 2** and **3**) by somewhat less than 42%, and operation GHG emissions by somewhat less than 42%, due to lower efficiencies of the smaller project size.

The results of the Northern Unit Alternative would be the following:

- The impacts of the proposed project would not occur on the lands not used due to the smaller project size. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project.
- The benefits of the proposed project in displacing fossil fuel fired generation and reducing associated greenhouse gas emissions from gas-fired generation would be slightly reduced. Both State and Federal law support the increased use of renewable power generation.

If the Northern Unit Alternative were approved, other renewable projects may be developed that would compensate for the loss of generation compared to the proposed project on other sites in the Indian Wells Valley, Kern County, the MDAB, or in adjacent

states as developers strive to fill the 104 MW gap not supplied by the proposed project to provide renewable power that complies with utility requirements and State/Federal mandates.

SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would essentially be a 104 MW facility located within the boundaries of the proposed project as defined by the applicant. This alternative is analyzed because it eliminates about 58% of the proposed project area so all impacts are reduces, especially those related to desert washes, biological resources, and cultural resources. The boundaries of the Southern Unit Alternative are shown in **Alternatives Figure 2**.

The Southern Unit Alternative would reduce the total construction GHG emissions of the proposed project (see **Greenhouse Gas Tables 2** and **3**) by somewhat less than 42%, and operation GHG emissions by somewhat less than 42%, due to lower efficiencies of the smaller project size.

The results of the Southern Unit Alternative would be the following:

- The impacts of the proposed project would not occur on the lands not used due to the smaller project size. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project.
- The benefits of the proposed project in displacing fossil fuel fired generation and reducing associated greenhouse gas emissions from gas-fired generation would be slightly reduced. Both State and Federal law support the increased use of renewable power generation.

If the Southern Unit Alternative were approved, other renewable projects may be developed that would compensate for the loss of generation compared to the proposed project on other sites in the Indian Wells Valley, Kern County, the MDAB, or in adjacent states as developers strive to fill the 146 MW gap not supplied by the proposed project to provide renewable power that complies with utility requirements and State/Federal mandates.

ORIGINAL PROPOSED PROJECT ALTERNATIVE

The Original Proposed Alternative would be a 250 MW solar facility as originally proposed by the applicant. This alternative is analyzed because (1) It would reduce the amount of land developed within the Mohave Ground Squirrel Conservation Area, and (2) it could transmit the full 250 MW of power that the applicant has requested. The boundaries of the Original Proposed Project Alternative are shown in **Alternatives Figure 3**.

The Original Proposed Project Alternative would essentially require a similar amount of construction and have the same operating emission sources and similar maintenance requirements as the proposed project. Therefore, the GHG emissions from construction and operation are similar to that presented for the proposed project in **Greenhouse Gas Tables 2** and **3**.

The results of this alternative would be the following:

- Impacts similar to the proposed project would occur.
- Benefits similar to the proposed project in displacing fossil fuel fired generation and reducing associated greenhouse gas emissions from gas-fired generation would occur. Both State and Federal law support the increased use of renewable power generation.

NO ACTION ALTERNATIVES

No Action On Proposed Project Application And On CDCA Land Use Plan Amendment

Under this alternative, the proposed project would not be approved by the CEC and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

The results of this alternative would be the following:

- The impacts of the proposed project would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another renewable energy project.
- The benefits of the proposed project in displacing fossil fuel fired generation and reducing associated greenhouse gas emissions from gas-fired generation would not occur. Both State and Federal law support the increased use of renewable power generation.

If the proposed project is not approved, renewable projects would likely be developed on other sites in the Indian Wells Valley, Kern County, the MDAB, or in adjacent states as developers strive to provide renewable power that complies with utility requirements and State/Federal mandates.

No Action On Proposed Project And Amend The CDCA Land Use Plan To Make The Area Available For Future Solar Development

Under this alternative, the proposed project would not be approved by the CEC and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. As a result, GHG emissions would result from the construction and operation of the solar technology and would likely be similar to the GHG emissions from the proposed project. Different solar technologies require different amounts of construction and operations maintenance; however, it is expected that all the technologies would provide the more significant benefit, like the proposed project, of displacing fossil fuel fired generation and reducing

associated GHG emissions. As such, this No Project/No Action Alternative could result in GHG benefits similar to those of the proposed project.

No Action On Proposed Project Application And Amend The CDCA Land Use Plan To Make The Area Unavailable For Future Solar Development

Under this alternative, the proposed project would not be approved by the CEC and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the greenhouse gas emissions from the site, including carbon uptake, is not expected to change noticeably from existing conditions and, as such, this No Project/No Action Alternative would not result in the GHG benefits from the proposed project. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

COMPARISON OF ALTERNATIVES AND PROPOSED PROJECT

Greenhouse Gas Table 7 provides a comparison of the project alternatives

Greenhouse Gas Table 7
Comparison of Proposed Project and Alternatives

	Proposed Project (250 MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250 MW)	No Project/No Action*
Electricity Sector GHG Emissions Impact	Beneficial	Beneficial	Beneficial	Beneficial	No Impact

*All No Project/No Action alternatives assume that the RSPP project would not be built on the proposed site

CUMULATIVE IMPACTS

Cumulative impacts are defined as “two or more individual effects which, when considered together, are considerable or . . . compound or increase other environmental impacts” (CEQA Guidelines § 15355). “A cumulative impact consists of an impact that is created as a result of a combination of the project evaluated in the EIR together with other projects causing related impacts” (CEQA Guidelines § 15130[a][1]). Such impacts may be relatively minor and incremental, yet still be significant because of the existing environmental background, particularly when one considers other closely related past, present, and reasonably foreseeable future projects.

Cumulative effects are defined by NEPA regulations as "…the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions" (40 CFR 1508.7).

This entire assessment is a cumulative impact assessment. The proposed project alone would not be sufficient to change global climate, but would emit greenhouse gases and therefore has been analyzed as a potential cumulative impact in the context of existing GHG regulatory requirements and GHG energy policies.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The RSPP, as a solar energy generation project, is exempt from the mandatory GHG emission reporting requirements for electricity generating facilities as currently required by the California Air Resources Board (ARB) for compliance with the California Global Warming Solutions Act of 2006 (AB 32 Núñez, Statutes of 2006, Chapter 488, Health and Safety Code sections 38500 et seq.) (ARB 2008a).

The RSPP, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]).

Since the proposed project would have emissions that are below 25,000 MT/year of CO2E, the proposed project would not be subject to federal mandatory reporting of greenhouse gases. It would also be exempt from the state's greenhouse gas reporting requirements.

NOTEWORTHY PUBLIC BENEFITS

Greenhouse gas related noteworthy public benefits include the construction of renewable and low-GHG emitting generation technologies and the potential for successful integration into the California and greater WECC electricity systems. Additionally, the RSPP project would contribute to meeting the state's AB 32 goals.

CONCLUSIONS

The RSPP would emit considerably less greenhouse gases (GHG) than existing power plants and most other generation technologies, and thus would contribute to continued improvement of the overall western United States, and specifically California, electricity system GHG emission rate average. The proposed project would lead to a net reduction in GHG emissions across the electricity system that provides energy and capacity to California. Thus, staff concludes that the proposed project's operation would result in a cumulative overall reduction in GHG emissions from the state's power plants that would create a beneficial effect under both CEQA and NEPA, would not worsen current conditions, and would thus not result in CEQA impacts that are cumulatively significant or result in adverse NEPA impacts.

Staff concludes that the GHG emission increases typical from construction and decommissioning activities would not be CEQA significant for several reasons. First, the periods of construction and decommissioning would be short-term and not ongoing during the life of the proposed project. Second, the best practices control measures that staff recommends, such as limiting idling times and requiring, as appropriate, equipment that meets the latest emissions standards, would further minimize greenhouse gas emissions since the use of newer equipment would increase efficiency and reduce GHG emissions and be compatible with low-carbon fuel (e.g., bio-diesel and ethanol) mandates that will likely be part of the ARB regulations to reduce GHG from construction vehicles and equipment. Finally, the construction and decommissioning emissions are miniscule when compared to the reduction in fossil-fuel power plant greenhouse gas emissions during project operation. For all these reasons, staff would conclude that the short-term emission of greenhouse gases during construction would be sufficiently reduced and would be offset during proposed project operations and would, therefore, not be CEQA significant.

The RSPP, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]).

MITIGATION MEASURES/PROPOSED CONDITIONS OF CERTIFICATION

No Conditions of Certification related to project greenhouse gas emissions are proposed because the proposed project would create beneficial GHG impacts. The project owner would have to comply with any future applicable GHG regulations formulated by the ARB or the U.S.EPA, such as GHG reporting or emissions cap and trade markets.

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ACRONYMS

ARB	California Air Resources Board
CalEPA	California Environmental Protection Agency
CEE	California Energy Commissions
CEQA	California Environmental Quality Act
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO2E	Carbon Dioxide Equivalent
CPUC	California Public Utilities Commission
EIR	Environmental Impact Report
EPS	Emission Performance Standard
GCC	Global Climate Change
GHG	Green House Gas
GWh	Gigawatt-hour
HFC	Hydrofluorocarbons
IEPR	Integrated Energy Policy Report
IGCC	Integrated Gasification Combined Cycle

LADWP	Los Angeles Department of Water and Power
LRAs	Local Reliability Areas
MT	Metric tonnes
MW	Megawatts
MWh	Megawatt-hour
N_2O	Nitrous Oxide
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NO_3	Nitrates
NOx	Oxides of Nitrogen or Nitrogen Oxides
OII	Order Initiating an Informational
OTC	Once-Through Cooling
PFC	Perfluorocarbons
PSD	Prevention of Significant Deterioration
QFER	Quarterly Fuel and Energy Report
RPS	Renewables Portfolio Standard
RSPP	Ridgecrest Solar Power Project
SB	Senate Bill
SF_6	Sulfur hexafluoride
SWRCB	State Water Resource Control Board
WECC	Western Electricity Coordinating Council

C.2 BIOLOGICAL RESOURCES

Testimony of Dick Anderson, David Bise, Andrea Martine, and Joy Nishida

C.2.1 SUMMARY OF CONCLUSIONS

The Ridgecrest Solar Power Project (RSPP) is proposed to be constructed on land featuring unique habitat and biological resources. The project site supports a high concentration of the state and federal listed desert tortoise (DT) and represents an important geographic area which supports genetic linkage between populations of the state listed threatened Mohave ground squirrel (MGS). The qualities of the site to support high DT concentrations and MGS habitat and population connectivity are unique and irreplaceable, and consequentially project impacts cannot be fully mitigated.

If the project is developed, Conditions of Certification are included to maximize preservation of biological resources. These measures would not fully mitigate the significant impacts to State-listed species as required by the California Endangered Species Act (CESA), or reduce biological impacts to less than significant as that term is defined in the California Environmental Quality Act (CEQA), but they will provide some measure of impact reduction or salvage.

C.2.2 INTRODUCTION

Information provided in this document addresses potential impacts to special status species and areas of critical biological concern. This analysis also describes the unique biological resources at the project site and along the re-routed section of transmission line and the water pipeline. This document explains the need for avoidance, minimization, and mitigation, evaluates the adequacy of mitigation proposed by the applicant, and specifies additional mitigation measures to reduce impacts to less-than-significant levels, where possible. It also describes compliance with applicable laws, ordinances, regulations, and standards (LORS) and recommends conditions of certification.

This analysis is based, in part, upon information provided in the RSPP Application for Certification (AFC) (SM 2009a) and other submittals, responses to Energy Commission staff data requests (SM 2010a), and Energy Commission staff workshops; site visits by Energy Commission staff on November 4, 2009; December 14, 2009, and communications with representatives from the California Department of Fish and Game (CDFG), Bureau of Land Management (BLM), and U.S. Fish and Wildlife Service (USFWS), and independent research.

The term “staff” used in this section means Energy Commission staff unless otherwise stated.

C.2.3 THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

The determination of whether a project has a significant effect on biological resources is based on the best scientific and factual data that staff could review for the project. The significance of the project activity is in large part dependent on the setting of the particular site. For example, disturbance during construction of a “brownfield” (i.e., developed) site may not be significant, but this same disturbance of a “greenfield” (i.e., undeveloped) site may be significant because of the greater likelihood of sensitive biological resources in the area.

Significance requires consideration of both **context** and **intensity,** and we include those considerations in this determination:

A. **Context**. This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

B. **Intensity**. This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action.

For CEQA, staff generally relies on the CEQA Guidelines in assessing significance. In addition, because of the close relationship between CEQA and NEPA and the rules and regulations of the USFWS, BLM, and the CDFG governing protection of sensitive species and habitats, staff also relies on the results of assessments conducted by those agencies in assessing significance.

The checklist for assessing potential biological resources impacts that is found in Appendix G of the CEQA Guidelines indicates that a project may have a significant adverse effect if it does any of the following:

A. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game, United States Bureau of Land Management, or United States Fish and Wildlife Service. Special status species include but are not limited to:

   - State- or federally-listed species,
   - State Fully Protected species,
   - Candidates for state or federal listing, and/or
   - Species of Special Concern, sensitive species, and special status species.

B. Have a substantial adverse effect on any riparian habitat, jurisdictional waters, or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game, United States Bureau of Land Management, or United States Fish and Wildlife Service;

C. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;

D. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;

E. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; and

F. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

These guidelines are not thresholds of significance but examples of impacts that may or may not reach any particular level. In all cases, a finding under CEQA, that a particular impact is significant is a conclusion that must be supported by facts, analysis and well reasoned assertions.

This project will have a substantial impact through fatality and habitat loss on state and federally listed species including the MGS and DT. Under CEQA if a project has a potential to substantially degrade the quality of the environment or substantially reduce the number or restrict the range of an endangered, rare or threatened species a mandatory finding of significance is required. (Cal. Code Regs., tit. 14 § 15065 (a))

The California Endangered Species Act (CESA) requires that the impacts of the authorized take of threatened or endangered species shall be minimized and fully mitigated. The measures required to meet this obligation shall be roughly proportional in extent to the impact of the authorized taking on the species (Fish and Game Code § 2081subd.(b)(2)). The Federal Endangered Species Act requires a Biological Opinion be prepared by the United States Fish and Wildlife Service regarding the number of individual plants or animals that can be taken by the project.

C.2.4 SETTING AND EXISTING CONDITIONS

C.2.4.1 PROPOSED PROJECT

Solar Millennium LLC is proposing to develop a 250-megawatt (MW) utility-scale thermal electric power generating facility named Ridgecrest Solar Power Project (RSPP) in northeastern Kern County. The 2002-acre facility would be on federal land administered by BLM in the northern Mojave Desert about five miles southwest of the City of Ridgecrest, California.

The proposed RSPP project includes solar parabolic troughs, power block, main office building and parking lot, a main warehouse with laydown area, onsite access roads, a tie-in switchyard, and a land treatment unit for bioremediation or land farming of heat transfer fluid-contaminated soil and the project's linear facilities (transmission line, water pipeline and access roads) all adjacent to U.S. Highway 395 (US 395). North of Brown Road, the facility would consist of the northern power block, main office and access road and south of Brown Road would be the southern power block, 230-kilovolt (kV) switch yard, second office and the reroute of Southern California Edison (SCE) lines along the western edge of the southern power block. The total proposed RSPP project site that would be fenced is 2,002 acres and would encompass the entire facility and most of the building structures. The northern power block would include 1,118 acres within the fence line and the southern power block would enclose 809 acres including the power block. The switchyard (3.2 acres) will have its own fence line and an office (2.98 acres). The project would also include the disturbance of 58.2 acres for the transmission line realignment. The water line alignment would disturb 16.3 acres and would remain outside of any fence line.

Plant Site and Surrounding Area

The proposed RSPP project site is bounded by US 395 (which runs northwest to southeast) to the east, Brown Road is located to the west of the site and also bisects the proposed north and south power blocks. The RSPP project site is located on an alluvial fan that slopes northward from the El Paso Mountains to the southwest; it consists primarily of undeveloped open space. The most notable topographic features include an ephemeral drainage (El Paso Wash) passing generally from south to north, and a series of rock outcrops located in the eastern portion of the site near the intersection of Brown Road and US 395.

The southern power block would be placed west of the El Paso Wash south of Brown Road while the northern power block would be placed just to the east of El Paso Wash and north of Brown Road. The project proposes a culvert crossing at Brown Road. In addition, a heat transfer fluid pipe bridge and 230-kV transmission line are proposed to cross El Paso Wash. Also, nine drainage channel tie-ins will discharge into El Paso Wash. Several small unnamed ephemeral washes that traverse the RSPP project site will be re-routed.

The proposed RSPP project site is located within the Western Mojave Plan (WEMO) planning area (BLM 2005). The southern power block is proposed to be located within a WEMO-designated Mohave Ground Squirrel Conservation Area (BLM 2005). Details regarding the configuration of the site plan and construction of crossing and tie-ins are being finalized and will be available in the spring of 2010 (SM 2010a). Therefore, some of this information is subject to revision.

Water Pipeline

Ground water from Indian Wells Valley Water District (IWVWD) would be used for proposed RSPP project construction and operation activities. The proposed water pipeline construction will disturb approximately 16.3 acres and be located within the China Lake Boulevard and Brown Road right-of-ways (ROWs). The proposed water pipeline would be approximately 4.6 miles long with up to a 16-inch diameter pipe and

would connect to the Ridgecrest Heights storage tank and then run along China Lake Boulevard and Brown Road ROWs. Focused surveys and vegetation mapping will be conducted in the spring of 2010 for the proposed linear water pipeline route. The proposed alignment likely consists of a combination of disturbed, developed, and Mojave creosote bush scrub habitats based on reconnaissance-level surveys conducted by the project applicant (SM 2009a) and cursory site review by staff. However, the exact breakdown of impacts to each of these respective vegetation communities within the expected 16.3 acres of total impact for the water pipeline is currently unknown pending final vegetation mapping.

Transmission Line and Towers

An approximate 3,960-foot transmission line and four towers would be constructed to connect to an existing Southern California Edison 230-kV transmission line. The new proposed RSPP project description would provide locations for the following: the proposed switchyard, unpaved access road(s) to be used during construction and regular operations, route and length of above and below ground transmission line(s), and location of towers. Spring surveys would provide details for habitat(s) associated with the proposed transmission line route. It is likely to consist of disturbed and Mojave creosote bush scrub habitats based on reconnaissance-level surveys conducted by the project applicant (SM 2009a) and cursory site review by staff.

Vegetation and Wildlife

Plant Communities

Four vegetation communities were mapped within the Biological Resource Survey Area (BRSA) (estimated disturbance area for the original proposed project plus a 1-mile buffer) (see **Biological Resources Figure 1;** all figures are found at the end of this **BIOLOGICAL RESOURCES** section). Vegetation communities and land cover types are described in detail below and are based on a classification system by Holland. Additional classifications by Sawyer and Keeler-Wolf and CDFG were also used to provide clarification. The RSPP Applicant re-configured the project site subsequent to submission of the AFC (SM 2009a). Several hundred acres that were not previously surveyed for biological resources or mapped for vegetation communities will be included in the new proposed disturbance area, and will be surveyed in the spring of 2010. The vegetation community acreages within the revised BRSA and disturbance area for the current proposed project (re-configured project) will be finalized in the spring of 2010 once information is provided by the applicant. The final impact acreages of each vegetation community will be added to **Biological Resources Table 1** when they are submitted. Based on site visits by staff it is believed that the new proposed disturbance area will contain similar habitat as the original site. The acreage of the disturbance area will increase accordingly from 1,738.2 acres in the original proposed project to 2,002 acres which is the current estimated disturbance area. The acreage numbers in **Biological Resources Table 1** currently reflect the impact acreages from the original proposed project.

Biological Resources Table 1
RSPP Vegetation Communities/Cover Types

Vegetation Communities and Other Cover Types	Original Disturbance Area[1]	Original Buffer (1-mile)	Original BRSA
Mojave Desert Wash Scrub	8.2	50.2	58.4
Unvegetated[2] Ephemeral Dry Wash	8.4	35.2	43.6
Mojave Creosote Bush Scrub	1,721.1	7,375.1	9,096.2
Developed	0.5	113.5	114
Total Acres	**1,738.2**	**7,574.0**	**9,312.2**

[1] The breakdown of the impacts to various vegetation communities within the disturbance area is not fully available for the current proposed project. The acreages contained in Biological Resources Table 1 are based on the original proposed project (SM 2009a). These acreages will be revised once final vegetation mapping for the revised proposed project is completed in 2010. The total impact of the revised disturbance area is expected to be 2,002 acres.

[2]Unvegetated channels are potentially jurisdictional aquatic features and were not mapped within the buffer because these surveys were conducted at a minimum mapping unit of 1.0 acre, as opposed to 0.01 of an acre for riparian vegetation communities within the disturbance area. This approach is consistent with the EDAW AECOM Jurisdictional Delineation methodology and is pursuant to Appendix B, Section (g), Subsection (13), Paragraph (B), Clause (iii) of the CEC Siting Regulations, which does not require detailed mapping of aquatic features beyond 250 feet of the disturbance limits.

Mojave Desert Wash Scrub

Mojave Desert wash scrub is designated by Holland as Code 63700. It also approximates the Sawyer and Keeler-Wolf's Catclaw Acacia Series 129. This vegetation community consists of an open to moderately dense evergreen scrub that attains a height of three to six feet. This community consists of three primary components: wash-dependent vegetation, vegetated ephemeral dry wash, and islands of Mojave creosote bush scrub (e.g., riparian interfluves). The dominant and indicator plant of this community within the BRSA is scale-broom (*Lepidospartum squamatum*), which occurs in patches throughout the dry washes scattered amongst creosote bush (*Larrea tridentata*), spiny senna (*Senna armata*), cheesebush (*Hymenoclea salsola*), burroweed (*Ambrosia dumosa*), Virgin River brittlebush (*Encelia virginensis*), and rayless goldenhead (*Acamptopappus sphaerocephalus*). Common herbaceous plants include California desert dandelion (*Malacothrix californica*), Fremont pincushion (*Chaenactis fremontii*), distant phacelia (*Phacelia distans*), and Wallace eriophyllum (*Eriophyllum wallacei*). Mojave Desert wash scrub is concentrated among the northern portion of the dry wash that traverses the central portion of the BRSA from south to northwest (**Biological Resources Figure 1**). The acreage of Mojave Desert wash scrub within the revised disturbance area has not been calculated. There were an estimated 8.2 acres of impact to this community in the original proposed project disturbance area. The applicant will provide a revised calculation of impact acreages for Mojave Desert wash scrub in the spring of 2010.

Unvegetated Ephemeral Dry Wash

The unvegetated ephemeral dry wash community consists of unvegetated washes that are dominated by sandy substrate and little to no perennial vegetation

(**Biological Resources Figure 1**). Unvegetated ephemeral dry wash predominantly occurs within the transition zone between the desert wash scrub, in locations where the washes transition to sheet flow. There were no dominant perennial plant species, specifically scale-broom which is the dominant indicator of Mojave Desert wash scrub, observed in association with unvegetated channel as these areas are primarily devoid of vegetation. The acreage of unvegetated dry wash within the revised disturbance area has not been calculated. There were an estimated 8.4 acres of impact to this community in the original proposed project disturbance area. The applicant will provide a revised calculation of impact acreages for unvegetated ephemeral dry wash in the spring of 2010.

Mojave Creosote Bush Scrub

Mojave creosote bush scrub occurs on well-drained decomposed granite and volcanic soils and consists of widely spaced shrubs up to nine feet tall. This is the most common plant community within the BRSA (**Biological Resources Figure 1**). The community is dominated by creosote bush, burroweed, cheesebush, and Virgin River brittlebush. Common herbaceous species include needle goldfields (*Lasthenia gracilis*) and blue dicks (*Dichelostemma capitatum*).

Within the Mojave creosote bush scrub is a large volcanic outcrop which occurs along the western edge of the proposed RSPP project site where the Mojave creosote bush scrub becomes sparser and the herbaceous layer becomes more diverse. Vegetation associated with this outcrop includes Parish's larkspur (*Delphinium parishii* ssp. *parishii*), snake's head (*Malacothrix coulteri*), and dwarf cottonrose (*Logfia depressa*). Large granite boulder outcrops, in the central-eastern portion of the RSPP, are composed of sub-shrubs such as desert brickellbush (*Brickellia desertorum*), Eastern Mojave buckwheat (*Eriogonum fasciculatum* var. *polifolium*), and Cooper's goldenbush (*Ericameria cooperi*). The acreage of Mojave creosote bush scrub within the revised disturbance area has not been calculated. There were an estimated 1,721.1 acres of impact to this community in the original proposed project disturbance area. The applicant will provide a revised calculation of impact acreages for Mojave creosote bush scrub in the spring of 2010.

Developed

Developed areas within the proposed project site are minor with a few dirt roads and evidence of some past sheep grazing, but overall, the habitat is in very good condition. Brown Road is a two-lane paved roadway that traverses the entire central portion of the proposed RSPP project site from east to west. In addition numerous unpaved dirt roads (approximately 10 miles) traverse the project site. U.S. 395, a two-lane highway, is located just east of the site. A few residential lots occur near the project site around the northwestern corner of the project disturbance area, while more extensive residential development occurs near the northeast corner of the proposed RSPP project site at the outer limits of Ridgecrest, California. The acreage of developed areas within the revised disturbance area has not been calculated. There were an estimated 0.5 acre of impact to this community in the original proposed project disturbance area. The applicant will provide a revised calculation of impact acreages to developed areas in the spring of 2010.

Sensitive Habitats

The Mojave Desert wash scrub and the unvegetated ephemeral dry wash are sensitive vegetation communities occurring in the survey area or within one mile of project boundaries (SM 2009a). Sensitive vegetation communities are those that are considered rare in the region, support special status plant or animal species, or receive regulatory protection. At least some of the aforementioned communities are subject to regulation as waters of the State. As discussed below the high concentration of desert tortoise and the variety of plant and animal life support the sensitive vegetation community designation.

Ephemeral Drainages/Waters of the U.S./CDFG Jurisdictional State Waters

The primary drainage on the site is El Paso Wash. This feature roughly runs from southeast to northwest across the central portion of the site. There are also several smaller washes that run roughly parallel to El Paso Wash (SM 2009a). The site does not contain waters of the U.S. or other wetlands subject to ACOE jurisdiction (SM 2010a). The ACOE has verified this in a letter to the applicant. Discussions between the applicant and CDFG has confirmed that CDFG believes that at least some of the smaller, ephemeral washes within the revised disturbance areas are waters of the state. The applicant, in their draft Habitat Monitoring and Mitigation Plan (HMMP) estimated that 28.1 acres of waters of the state would be impacted by the proposed project. This original calculation included impacts resulting from the redirection of El Paso Wash. The current proposed project avoids most direct impacts to El Paso Wash. The applicant is preparing a revised jurisdictional determination. The estimated impact to waters of the state will be finalized once the revised jurisdictional determination has been prepared and approved.

El Paso Wash and the unnamed washes on the project site are typical of the drainages that characterize most of the arid southwest in that they are ephemeral streams rather than perennial or intermittent (an ephemeral stream is defined as one that flows briefly in direct response to precipitation). Dry desert washes like El Paso Wash support many of the same hydrological and ecological processes as perennial and intermittent streams, and provide the following functions and values: landscape-hydrologic connections; stream energy dissipation during high-water flows that reduces erosion and improves water quality; water supply and water-quality filtering; surface and subsurface water storage; groundwater recharge; sediment transport, storage, and deposition aiding in floodplain maintenance and development; nutrient cycling; wildlife habitat and movement/migration; and support for vegetation communities that help stabilize stream banks and provide wildlife habitat (Levick et al. 2008).

Wildlife

The proposed RSPP project site is located in relatively undisturbed habitat composed primarily of Mojave creosote bush scrub and Mojave Desert wash scrub vegetation communities. These communities support a wide variety of common and special status wildlife species. Wildlife species detected during the biological assessment and directed surveys conducted by the project applicant include those discussed below (SM 2009a). The RSPP Applicant re-configured the project site subsequent to submission of the AFC. Therefore, several hundred acres that were not previously surveyed for biological resources will be included in the new proposed disturbance area, and will

be surveyed in the spring of 2010. Information discussed below will be updated as needed following the RSPP Applicant's submittal of biological resources findings from their spring 2010 surveys.

Reptiles

Seventeen species of reptiles were observed within the BRSA during spring 2009 surveys. Reptile species most commonly observed within the BRSA include the western whiptail (Cnemidophorus tigris), side-blotched lizard (Uta stansburiana), desert horned lizard (Phrynosoma platyrhinos), zebra-tailed lizard (Callisaurus draconoides), gopher snake (Pituophis catenifer), and desert iguana (Dipsosaurus dorsalis). These species were relatively common throughout the habitat types observed within the BRSA. Sagebrush or western fence lizard (Sceloporus spp.), long-nosed leopard lizard (Gambelia wislizenii), common chuckwalla (Sauromalus ater), common kingsnake (Lampropeltis getula), Mojave rattlesnake (Crotalus scutulatus), sidewinder (Crotalus cerastes), long-nosed snake (Rhinocheilus lecontei), and western lyre snake (Trimorphodon biscutatus) were also observed in the BRSA. One special status reptile species, the federal and state-threatened DT, was observed in the BRSA. A more detailed discussion of this species is provided below (SM 2009a).

Birds

A detailed analysis of avian use of the BRSA is provided in the Avian Point Count Technical Report included as (SM 2010a Attachment H). Additional incidental observations of avian species in the BRSA were made during various protocol surveys conducted on the RSPP project site. The following summarizes avian use of the BRSA based on point count survey results and incidental detections by project biologists.

A total of 41 bird species were detected during spring 2009 surveys. Of these, 14 species of resident breeding birds were recorded in the BRSA between April 14 and June 15, 2009. Cumulatively, across all habitat types, horned lark (*Eremophila alpestris*) and sage sparrow (*Amphispiza bellii*) were the most commonly recorded species during the point count surveys. Black-throated sparrow (*Amphispiza bilineata*) was also frequently detected (SM 2009a).

Nine of the 14 resident bird species were detected within Mojave creosote bush scrub; this community averaged 2.9 species detected per point count station. The most common species observed in this habitat type were horned lark and sage sparrow. Horned lark and sage sparrow individuals accounted for 71 percent and 15 percent, respectively, of all birds detected during point counts in this habitat type. Other resident species detected less commonly within Mojave creosote bush scrub during point count or other surveys were black-throated sparrow, common raven (*Corvus corax*), verdin (*Auriparus flaviceps*), house finch (*Carpodacus mexicanus*), and mourning dove (*Zenaida macroura*), as well as the California Species of Special Concern loggerhead shrike (*Lanius ludovicianus*) and western burrowing owl (WBO) (*Athene cunicularia*) which is further discussed in "Special Status Species" below (SM 2009a). WBO is also a BLM Sensitive Species.

Additionally, rock wrens (*Salpinctes obsoletus*) were commonly detected in the large granite boulder outcrops in the central-eastern portion of the BRSA, amongst the Mojave creosote bush scrub; and a greater roadrunner (*Geococcyx californianus*) was detected at that location during rare plant surveys (SM 2009a).

Mojave Desert wash scrub had the highest resident species richness. Eleven of the 14 resident species were detected in Mojave Desert wash scrub habitat. This community averaged 3.75 species detected per point count station. The most common species observed were horned lark and sage sparrow, accounting for 79 percent (combined) of all birds detected during point counts. Other species detected in this habitat type included all species found in Mojave creosote bush scrub except house finch, plus lesser nighthawk (*Chordeiles acutipennis*), Costa's hummingbird (*Calypte costae),* and Le Conte's thrasher (*Toxostoma lecontei*) (SM 2009a).

Twenty-three species of non-resident birds were identified in the BRSA during point counts and other surveys. Of the non-resident species detected during point counts, Brewer's sparrow (*Spizella breweri*) was the most common, followed closely by white-crowned sparrow (*Zonotrichia leucophrys*), yellow-rumped warbler (*Dendroica coronata*), and blue-gray gnatcatcher (*Polioptila caerulea*). Tree swallow (*Tachycineta bicolor*), cliff swallow (*Petrocheliden pyrrhonota*), great-tailed grackle (*Quiscalus mexicanus*), and pine siskin (*Carduelis pinus*) were observed flying over the point count circles only and were not associated with any particular vegetation community. All other species observed on site were observed perched or foraging within the count circles for at least part of the observation period. Mojave Desert wash scrub had the highest number of nonresident species detected per station. This community averaged 3.00 species detected per point count station, while creosote bush scrub averaged 0.95 species per station (SM 2009a).

Raptors observed onsite include a red-tailed hawk (Buteo jamaicensis), turkey vulture (Cathartes aura), and western burrowing owl (further discussed in "Special Status Species" below) (SM 2009a). A State-listed threatened Swainson's hawk (Buteo swainsonii) was incidentally observed flying over the BRSA on April 28, 2009 (further discussed in "Special Status Species" below) (SM 2009a).

Mammals. Eleven mammal taxa were detected within the BRSA during spring 2009 surveys. Desert kit fox (*Vulpes macrotis arsipus*) and coyote (*Canis latrans*) dens and sign were detected throughout the BRSA. Kangaroo rats (*Dipodomys* spp.) and pocket mice (*Perognathus* spp.), which were frequently observed on and adjacent to dirt roads at dusk or night after western burrowing owl surveys, are abundant in the BRSA. Black-tailed jackrabbit (*Lepus californicus*) was observed regularly along with occasional sightings of white-tailed antelope squirrel (*Ammospermophilus leucurus)* and desert cottontail (*Sylvilagus audubonii*). Desert woodrat (*Neotoma lepida*) sign (e.g., middens and scat) was detected near rocky outcrops. Additionally, evidence of old wild burro (*Equus asinus)* scat was present on site. No bats were detected within the BRSA during spring 2009 surveys although specific surveys for bats were not conducted. Additionally, no significant roost sites for special status bats, as identified in the WEMO are known to occur within the BRSA. Marginal potential roosting habitat for bats is located amongst the rocky outcrops along the eastern border of the disturbance area and within the buffer (SM 2009a).

Large mammalian predator activity was documented across the BRSA during spring 2009. Predator digs in ground squirrel, kangaroo rat, and pocket mouse burrow complexes were prevalent. Most predator activity in the BRSA appears to be by desert kit fox and coyote. Bobcat (*Lynx rufus*) scat was observed in the large granite boulder outcrops in the central-eastern portion of the BRSA during vegetation surveys. American badger (*Taxidea taxus*) was detected by its claw marks at one location in the BRSA, approximately 3,500 feet north of the original disturbance area. No evidence of mountain lion (*Felis concolor*) was detected in the BRSA (SM 2009a).

Special Status Species

Biological Resources Table 2 includes special-status species that are known to occur in the project area and vicinity according to the California Natural Diversity Database (CNDDB) (CDFG 2009) or have the potential of occurring based on habitats present within the proposed project site. The applicant and Energy Commission Staff also consulted USFWS and CNPS lists for species that could potentially occur in the vicinity of the site and species covered by the WEMO plan. Special status species include those species that are protected by federal, state, or local laws, ordinances, regulations or standards.

Biological Resources Table 2
Special Status Species Known or Potentially Occurring in the RSPP Area

PLANTS				
Common Name (*Scientific Name*)	**Status State/Fed/BLM/CNPS**	**Potential for Occurrence**	**Habitat**	**Bloom Period**
Alkali mariposa lily (*Calochortus striatus*)	__/__/S /1B.2 WEMO	**Low**—not observed during Feb 11 and May 6 surveys. No habitat occurs within the RSPP. Nearest CNDDB record occurs 25 miles to the northwest of the RSPP.	Chaparral, chenopod scrub, meadows and seeps; 70-1595 m; mesic, alkaline areas	April - June
Brown fox sedge (*Carex vulpinoidea*)	__/__/__/2.2	**Low**—not observed during Feb 11 and May 6 surveys. No suitable habitat occurs within the RSPP. Nearest CNDDB record occurs 13.8 miles to the northwest of the RSPP.	Marshes and swamps riparian woodland; 25-1200 m	May - June
Muir's tarplant (*Carlquistia muirii*, syn. *Raillardiopsis m*.)	__/__/__/2.2	**Low**—not observed during Feb 11 and May 6 surveys. No suitable habitat occurs within the RSPP. Nearest CNDDB record occurs 13.8 miles to the northwest of the RSPP.	Marshes and swamps riparian woodland; 25-1200 m	May - June

PLANTS				
Common Name (*Scientific Name*)	**Status State/Fed/BLM/CNPS**	**Potential for Occurrence**	**Habitat**	**Bloom Period**
Red Rock tarplant (*Deinandra arida*)	R/__/S/1B.2 WEMO	**Moderate**—not observed during surveys conducted from Feb 18 and May 8. Marginal habitat occurs on RSPP. Closest CNDDB occurrence 18 miles to the southwest of the RSPP in Red Rock State Park.	Mojavean desert scrub; 300-950 m; in clay soils of washes along ephemeral seeps and streams and on adjacent sand flats in moist, sub-alkaline, gravelly sand; in wetter years also found on volcanic tuff at base and on lower slopes of ridges and cliffs;	April – November
Mojave tarplant (*Deinandra mohavensis*)	E/__/S/1B.3 WEMO	**Moderate**—not observed during surveys conducted from Feb 18 and May 8. Marginal habitat occurs on the RSPP. Nearest CNDDB record is 15 miles to the northwest of the RSPP in Short Canyon.	Chaparral, riparian scrub, riparian scrub; 640-1600m; low sand bars in river beds, along stream channels or in ephemeral grass areas in riparian scrub and chaparral (mesic);	June - October
Cottontop cactus (*Echinocactus polycephalus* var. *polycephalus*)	None (included at BLM request)	**Present**—occurs on site. Mapped on vegetation communities map (Biological Resources Figure 1).	Creosote bush scrub; 0-1000 m	March - May
Hedgehog cactus (*Echinocereus* sp.)	None (included at BLM request)	**High**— not observed during surveys conducted from Feb 18 and May 8. Suitable habitat occurs within the RSPP.	Creosote bush scrub; 150-3000 m	April - August

PLANTS				
Common Name (*Scientific Name*)	**Status State/Fed/BLM/CNPS**	**Potential for Occurrence**	**Habitat**	**Bloom Period**
Red Rock poppy (*Eschscholzia minutiflora* ssp. *twisselmannii*)	__/__/S/1B.2	**High**—not observed during surveys conducted from Feb 18 and May 8. Suitable habitat occurs within the RSPP. Nearest CNDDB record occurs 8.5 miles southeast of the RSPP.	Mojavean desert scrub; 680-1230 m; on volcanic tuff	March - May
Creamy blazing star (*Mentzelia tridentata*)	__/__/S/1B.3	**High**— not observed during surveys conducted from Feb 18 and May 8. Suitable habitat occurs within the RSPP. Nearest CNDDB record occurs 17.5 miles southwest of the RSPP.	Mojave desert scrub, 700-1160m; rocky, gravelly, sandy area.	March - May
Charlotte's phacelia (*Phacelia nashiana*)	__/__/S/1B.2 WEMO	**Moderate**— not observed during surveys conducted from Feb 18 and May 8. Marginal habitat occurs within the RSPP. Nearest CNDDB record is 12 miles to the west of the RSPP.	Joshua tree woodland, Mojavean desert scrub, pinyon and juniper woodland; 600-2200 m; sandy to rocky granitic slopes.	March - June
Latimer's woodland-gilia (*Saltugilia latimeri*)	__/__/S/1B.2	**Moderate**— not observed during surveys conducted from Feb 18 and May 8. Marginal habitat occurs within the RSPP. Nearest CNDDB record occurs 16.3 miles to the northwest of the RSPP.	Chaparral, Mojavean desert scrub, pinyon and juniper woodland; 400-1900 m; sandy or rocky, often granitic, sometimes washes	March - June

WILDLIFE		
Common Name (*Scientific Name*)	**Status State/Federal/BLM**	**Potential for Occurrence**
Fish		
Mohave tui chub (*Gila bicolor mohavensis*)	SE/FE/__	**None**—no habitat for species is present on RSPP site.
Reptiles		
Desert tortoise (*Gopherus agassizii*)	ST/FT/__	**Present**—observed on project site during surveys.
Birds		
Western burrowing owl (*Athene cunicularia*)	CSC/BCC/S	**Present**—observed on project site during surveys.
Loggerhead shrike (*Lanius ludovicianus*)	CSC/BCC/__	**Present**—observed on project site during surveys.
Le Conte's thrasher (*Toxostoma lecontei*)	CSC/BCC/S	**Present**—observed on project site during surveys.
Northern harrier (*Circus cyaneus*)	CSC/__/S	**Low**—species may occasionally forage on the site. Species is not expected to breed on the site
Yellow warbler (*Dendroica petechia*)	CSC/__/__	**Low**—species is expected only to utilize the site during migration.
Vaux's swift (*Chaetura vauxi*)	CSC/__/__	**Low**—species is expected only to utilize the site during migration.
Yellow-headed blackbird (*Xanthocephalus xanthocephalus*)	CSC/__/__	**Low**—species is expected only to utilize the site during migration.
Bendire's thrasher (*Toxostoma bendirei*)	CSC/BCC/S	**Low**—species was not observed during biological assessment and point count surveys. Site does not contain significant specimens of *Yucca* sp. which is a favored habitat element.
Golden eagle (*Aquila chrysaetos*)	SFP/BCC/S	**High**—species likely forages on the site periodically. Site does not contain suitable nesting habitat.
Mammals		
Mohave ground squirrel (*Spermophilus mohavensis)*	ST/__/__	**High**—focused surveys were not conducted on the site, but likely to be present given known occurrences in vicinity and suitable habitat present on site.
Pallid bat (*Antrozous pallidus*)	CSC/__/S	**Moderate**—species was not detected, but focused surveys for bats were not conducted.

WILDLIFE		
Common Name (*Scientific Name*)	**Status State/Federal/BLM**	**Potential for Occurrence**
Spotted bat (*Euderma maculatum)*	CSC/__/S	**Moderate**—species was not detected, but focused surveys for bats were not conducted. More likely to forage on site as potential roosting habitat is limited to rock outcrops within project area.
Yuma myotis (*Myotis yumanensis*)	__/__/S	**Low**—species was not detected, but focused surveys for bats were not conducted. Roosting habitat is present within rock outcrops of project area. However, this species is typically associated with permanent water sources which are not present on the RSPP site.
Desert kit fox (*Vulpes macrotis arsipus*)	PFB/__/__	**Present**—sign and animals observed throughout project site and survey buffer areas.
American badger (*Taxidea taxus*)	CSC/__/__	**Present**—sign of this species (digging marks) was observed in the buffer area to the north of the proposed project impact area.

Sources: CDFG 2009; CNPS 2009; SM 2009a

Status Codes:
State
CSC: California Species of Special Concern. Species of concern to CDFG because of declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction.
SE: State listed as endangered
ST: State listed as threatened
SFP: Fully protected
PFB: Protected furbearing mammal
WL: Watch List: includes species formerly on California Species of Special Concern List (Remsen 1978) but which did not meet the criteria for the current list of special concern bird species (Shuford and Gardali 2008).

Federal
FE: Federally listed endangered: species in danger of extinction throughout a significant portion of its range
FT: Federally listed, threatened: species likely to become endangered within the foreseeable future
BCC: Fish and Wildlife Service: Birds of Conservation Concern: Identifies migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent highest conservation priorities <http://www.fws.gov/migratorybirds/NewReportsPublications/SpecialTopics/BCC2008/BCC2008.pdf>

BLM
S: Sensitive

California Native Plant Society (CNPS)
List 1B: Rare, threatened, or endangered in California and elsewhere
List 2: Rare, threatened, or endangered in California but more common elsewhere
0.1: Seriously threatened in California (high degree/immediacy of threat)
0.2: Fairly threatened in California (moderate degree/immediacy of threat)
0.3: Not very threatened in California (low degree/immediacy of threats or no current threats known)

Potential to Occur:
Present: Species was observed during focused surveys or during biological assessment of site.
High: Suitable habitat is present within the proposed site: occurrence records exist for species in proximity to the site; species expected to occur on site
Moderate: Low quality suitable habitat is present within or near the proposed site; species was not identified during reconnaissance surveys of the site; species may occur on site
Low: Suitable habitat is not present on site; species not expected to occur on site

The following species - yellow warbler, Vaux's swift, and yellow-headed blackbird - are considered migrants and nonbreeding seasonal residents on the proposed RSPP project site and are not further addressed in this document. In addition, three special status species - the northern harrier, Nelson's bighorn sheep, and Bendire's

thrasher - have potential to occur within the BRSA, but were not detected during spring 2009 surveys and are not discussed further in this analysis. Pallid bats were not formally surveyed for, but are not discussed further because of a general lack of suitable roosting habitat for bats on the site. Several bat species, including pallid bats may periodically forage over the proposed site.

Special Status Plants

The proposed RSPP project area is known to have potential to support nine special status plant species (**Biological Resources Table 2)**. Species with a moderate to high potential to occur on the project site include; Red Rock tarplant, Mojave tarplant, Red Rock poppy, creamy blazing star, Charlotte's phacelia, and Latimer's woodland-gilia. These species were not detected during focused surveys. Species with a low potential to occur were those lacking suitable habitat or those only known to occur at elevations outside of the elevation range of the RSPP area. These species include alkali mariposa lily, brown fox sedge, and Muir's tarplant. In addition, cottontop cactus and hedgehog cactus were surveyed for at the request of BLM since that agency tracks the occurrences of this species on lands that it manages. Cottontop cactus was observed and mapped on the proposed RSPP project site.

Special status plant surveys were conducted on the RSPP site between February and May 2009. The portions of the proposed RSPP project site with potential to support rare plants were surveyed by walking parallel transects ranging from 10 feet to 100 feet apart based on the distribution of botanical resources and topography. Transects were walked within native habitat, but developed areas were surveyed by a combination of walking transects and selecting key vantage points from existing dirt access roads.

Red Rock tarplant (Deinandra arida)

Red rock tarplant is an annual herb found in Kern County. Low quality habitat for Red Rock tarplant occurs in the BRSA based on visits to known nearby habitat for the species and the low water flow in the dry washes. None were detected in the BRSA.

Mojave tarplant (Deinandra mohavensis)

Mojave tarplant is an annual herb found in Kern, Riverside, San Bernardino and San Diego counties. A field visit to an existing population of Mojave tarplant near Red Rock State Park (CNDDB 2010) on May 6, 2009, confirmed some plants were blooming. None were detected in the BRSA. Since the species was blooming at the reference population and not found it is unlikely that Mojave tarplant occurs in the BRSA.

Red Rock Poppy (Eschscholzia minutiflora ssp. twisselmannii)

Red rock poppy is an annual herb found in Kern and San Bernardino counties (CNDDB 2010). Suitable habitat occurs on the proposed RSPP project site. Surveys were conducted May 6, 2009, during the blooming period. No Red Rock poppy plants were observed during surveys.

Creamy Blazing Star (Mentzelia tridentata)

Creamy blazing star is an annual herb found in Inyo, Kern, San Bernardino, Riverside, San Diego, and Imperial counties (CNDDB 2010). Suitable habitat occurs on the proposed RSPP project site. Surveys were conducted May 6, 2009, during the blooming period. No Creamy blazing star plants were observed during surveys.

Non special-status plants

Cottontop Cactus (Echinocactus polycephalus var. polycephalus)

Hedgehog Cactus (Echinocereus sp.)

California Barrel Cactus (Ferocactus sp.)

BLM required field surveys and mapping of these three species for future plant salvage. Only Cottontop cactus was observed in the proposed disturbance area and was mapped (see **Biological Resources Figure 1**).

Special Status Wildlife

The project area is known to support several special status wildlife species. Several of the special status wildlife species listed in **Biological Resources Table 2** are known to be present on the site or are assumed to be present due to proximity to known records (DT, WBO, loggerhead shrike, American badger, and MGS. Other special status species have a moderate potential to occur on the site based on habitat types present within the site and/or proximity of the site to known occurrences of the species (pallid bat and spotted bat).

Desert Tortoise (Gopherus agassizii)

The DT's range includes the Mojave Desert region of Nevada, southern California, and the southwest corner of Utah and the Sonoran Desert region of Arizona and northern Mexico. The DT range is divided into Mojave and Sonoran populations. There are at least two and very probably three species of DT. The populations are sufficiently different genetically, behaviorally, physiologically, and morphologically to be named as separate species (Berry et al. 2002, Murphy et al. 2006).

The DTs near the proposed RSPP site are part of the Mojave population, which is primarily found in creosote bush-dominated valleys with adequate annual forbs for forage. Further, the Mojave population can be subdivided genetically into several separate genetic units, each ecosystem based. By far the most threatened is the segment in the far western Mojave Desert (Fremont-Kramer unit) in the vicinity of the project site (Kristin Berry personal communication).

DT activity is seasonally variable and in California, peak adult and juvenile activity typically coincides with the greatest annual forage availability during the early spring and summer. The tortoises are active very early in the morning and late in the evening between late-August and mid-October for the courtship season. It is at this time of year that the effective courting and mating occurs. However, tortoises will emerge from their burrows at any time of year when the weather is suitable. Hatchling DTs typically become active earlier than adults do, and their greatest activity period can be expected

between late winter and spring. During active periods, tortoises feed on a wide variety of herbaceous plants, including cactus, grasses, and annual flowers (USFWS 1994).

Annual home ranges have been estimated between 10 and 450 acres and are age, sex, seasonal, and resource density dependent, with some overlap between individuals (USFWS 1994). Harless et al. (2009) found that Mojave DTs had home ranges that were approximately 15-519 acres, with an average of 71 acres. More than 1.5 square miles of habitat may be required to meet the life history needs of a tortoise, and individuals have been known to travel more than seven miles at a time (BLM 2001). In drought years, tortoises can be expected to wander farther in search of forage. During their active period, DTs retreat to shallow burrows and aboveground shade to escape the heat of the day and will retire to burrows at nighttime. DTs are primarily dormant in winter in underground burrows.

DT populations have declined throughout their range because of loss and degradation of habitat caused by urbanization, agricultural development, military training, recreational use, mining, and livestock grazing. The loss of individual DTs to increased predation by common ravens, collection by humans for pets or consumption, collisions with vehicles on paved and unpaved roads, and mortality resulting from diseases also contributed to declines (USFWS 2004).

Declines in over 50 percent of its population in the U.S. (30 percent of its overall range) have been attributable to several factors, paramount of which are an upper respiratory tract disease; habitat loss, degradation, and fragmentation; predation on young tortoises, especially by ravens; and potentially drought. These declines have been documented at the local level and are most notable in the western extent of the listed range (i.e., the Western Mojave), where the proposed RSPP project is located. The proposed RSPP project site occurs in the northern limits of the West Mojave recovery unit but does not occur within designated DT critical habitat. Four DT sub-populations occur south of the proposed RSPP project site, which have been identified as part of the West Mojave recovery unit. DT populations within these sub-populations have been characterized as variable and patchy with some areas containing high densities of DT while others contain low densities. DT population densities outside these sub-populations; however, are generally very low. However, the proposed RSPP project site is an exception with a high density of DTs. See **Biological Resources Table 3** below for a comparison of the RSPP DT density compared to the Western Mojave survey sites conducted by USFWS. CNDDB records show seven DT records within 10 miles of the project area (SM 2009a).

Survey Results for Desert Tortoise

During a habitat assessment in spring 2009, it was determined that the majority of the BRSA contains suitable habitat for DT with the exception of some limited areas of development in the northern portion of the BRSA. DT was observed and is well distributed over the BRSA (**Biological Resources Figure 2**). Protocol level surveys were conducted on the proposed RSPP project site between March 7 and May 28, 2009. These surveys provided 100 percent survey coverage of the original proposed impact areas and linear facilities and less stringent surveying of the 1-mile surrounding buffer area (SM 2009a DT survey report). A total of 50 DTs were observed during the

biological surveys in 2009, 10 were located outside the original proposed disturbance area and 40 were found within the original proposed disturbance area (SM 2009a) (**Biological Resources Figure 2**). Since the proposed RSPP project site alignment has changed since focused surveys for DT were conducted in 2009, additional 2010 surveys will be conducted to complete focused surveys for DT within the new project areas. Based on similar habitat and environmental conditions, it is expected that the 2010 survey results will be similar to the 2009 results.

Of all detections within the BRSA, 29 were adult DTs, 12 were juveniles, and 9 were DTs of unknown age. This is a higher percentage of juveniles than was reported for the El Paso and Red Rock studies or the Jawbone-Butterbredt Area of Critical Environmental Concern (ACEC) study. The ratio of juveniles to adults within the BRSA is important, because it provides evidence of a successful breeding group of tortoises with juveniles (Berry et al. 2008, Kristin Berry, personal communication). Had the numbers included a higher number of adults, this would indicate unsuccessful breeding or high juvenile mortality placing the existence of the population at risk. A higher number of juveniles with a corresponding lower number of adults would indicate young are being produced but not surviving to maturity at a rate sufficient to offset deaths of adults

Over 200 DT burrows and 33 pallets were observed within the original BRSA. Pallets are shallow depressions dug under shrubs that provide temporary resting spots for DTs. DTs were observed throughout the original BRSA and are mapped on **Biological Resources Figure 2**. Twenty-two burrows were occupied by DTs; 48 burrows were noted as active (showing recent evidence of use by DT). Thirty-six active burrows and 18 occupied burrows were within the original proposed disturbance area. The following additional DT sign was detected within the original proposed disturbance area: four active DT pallets, 23 additional DT pallets, 99 observations of scat (12 of which were fresh), eight observations of bone fragments, and five carcasses (2 of which were adults) (**Biological Resources Figure 2**). Additionally, DT tracks were common within active DT burrows.

Estimation of Desert Tortoise Abundance

An estimation of DT on the original proposed disturbance area was calculated by the applicant. This estimation was based on the following equation:

Estimated # of tortoises= Number of DTs observed above ground/ $(P_a)(P_d)$.

The number of DTs found above ground within the disturbance area during focused surveys was 28 (SM 2009a). P_a is an estimation of the probability that a tortoise will be found above ground and is based on the amount of rainfall from the previous winter. For 2009, P_a is 0.64. P_d is the probability of detecting a tortoise when it is above ground. For purposes of this model P_d is 0.63. Therefore, the estimated abundance of adult DTs within the original disturbance area is 69. The corresponding adult DT density within the original disturbance area is 0.040 DTs per acre, or 9.8 DTs per km^2. These reported densities at the project site are comparatively higher than DT densities recently reported within the nearby Fremont-Kramer Desert Wildlife Management Area (DWMA)(5.3 to 7.6 DTs per km^2) (SM 2009a, USFWS 2009).

The USFWS has several years of monitoring data estimating the density of DT within the Western Mojave Recovery Area (USFWS 2009). The estimated densities for the Western Mojave recovery unit for sampling years and the estimated densities for tortoise on the proposed RSPP project site based on focused surveys are provided in **Biological Resources Table 3** below. Estimates of tortoise density on the proposed RSPP project site were calculated using the original 1,740-acre estimated disturbance area where 40 DT were detected (SM 2009a DT survey report). The estimated density within the revised disturbance area will be recalculated once protocol surveys are conducted on areas within the revised project area that were not previously surveyed. Staff believes that given the entire ROW contains similar habitat, it can be expected that the DT on the newly proposed project areas within the ROW will be at a similar high density of DT.

Biological Resources Table 3
Estimated Desert Tortoise Densities in the Western Mojave Recovery Unit and the Proposed RSPP

Sampling Site	Estimated Tortoises per km^2
Western Mojave (2001)	7.6
Western Mojave (2002)	7.1
Western Mojave (2003)	5.7
Western Mojave (2004)	5.3
Western Mojave (2005)	6.0
Western Mojave (2007)	4.7
Ridgecrest SPP (2009)	**9.8**

As shown in **Biological Resources Table 3**, the proposed RSPP project site with an estimated density of 9.8 DTs per square kilometer, has a significantly higher density of DT as compared to recent survey results in the western Mojave region as a whole.

Desert Tortoise Habitat in the Project Area

The entire BRSA contains suitable habitat for DTs.

Desert Tortoise Critical Habitat/Desert Tortoise Natural Areas

The proposed RSPP project site is not located in an area that has been designated as DT Critical Habitat. Critical Habitat consists of specific areas designated in 1994 by the USFWS in the draft DT Recovery Plan. The RSPP project is approximately seven miles north of the nearest DT critical habitat (Fremont-Kramer Desert Wildlife Management Area) (SM 2009a).The proposed project site is located approximately 17 miles northeast of the Desert Tortoise Natural Area (DTNA).

Desert Tortoise Habitat Connectivity

The proposed RSPP project site occurs within the DT West Mojave recovery unit; four DT sub-populations and areas of critical habitat have been designated as DWMAs by the WEMO to the south of the proposed RSPP project site; however, the closest DT DWMA, the Fremont-Kramer DWMA, is greater than seven miles

southeast of the proposed RSPP project site. DT populations within this recovery unit are characterized by localized areas of high density in suitable habitat surrounded by areas of low density within less suitable habitat areas. Movements between local populations are important for long-term population viability. The proposed RSPP site was determined to support a high density of DT relative to known populations nearby (Kristin Berry, personal communication), and DT habitat at the project site could contribute to population connectivity with known populations to the south. Due to its overall large size, the proposed RSPP site would contribute to a significant loss of suitable habitat available for DT dispersal between local populations. Movements to the north and east are probably limited by development associated with the City of Ridgecrest and movement barriers associated with US 395, and State Routes 14 and 178 (SM 2009a). With a general decline in DT population as noted above, especially for the western Mojave populations, high density areas like the one on the project site, are of great importance for long term species survival. This is especially true when the DT population exhibit an adult to juvenile ratio indicating population stability.

Mohave Ground Squirrel

The Mohave ground squirrel (MGS, state-listed Threatened) is rare throughout its range and is found only in the western Mojave Desert, in San Bernardino, Los Angeles, Kern, and Inyo counties. This species inhabits desert areas, including alluvial fans, basins, and plains with deep sandy or gravelly friable soils with an abundance of native herbaceous vegetation. MGSs can be found in Mojave creosote bush scrub, shadscale desert scrub, alkali scrub, and Joshua tree woodland. This species feeds on a variety of foods, but primarily on the leaves and seeds of forbs and shrubs (Leitner 2008).

This diurnal ground squirrel is active above ground in the spring and early summer. Emergence dates vary depending on elevation. Males emerge as early as Feb 1 and females usually around February 15 (SM 2010a; DR-BIO-59). Squirrels begin aestivation between July and September. Stored body fat is the principal source of energy for aestivation, although food is also stored in the burrows. Home range size averages approximately 0.91 acre and varies from 0.25 to 2 acres.

Populations of MGS have been reduced by urban development, off-road vehicle use, and agriculture. The MGS is threatened by loss of habitat and degradation of habitat due to urban, suburban, and rural development; agriculture; military activities; energy development; livestock grazing; and off-highway vehicle use.

Mohave Ground Squirrel Habitat/Presence in the Project Area

There are no records of MGS occurrence on the proposed RSPP project site as no trapping efforts have been made. However, two lines of evidence suggest that the proposed RSPP project site supports a MGS population. First, there are 24 documented MGS occurrences within five miles of the boundaries of the project ROW (**Biological Resources Figure 3**). An analysis of the habitat associated with these occurrences indicates that the species has been detected in both creosote bush scrub and in desert wash scrub in the region surrounding the proposed RSPP project site. Second, the proposed RSPP project site supports both of these desert scrub communities and MGS habitat suitability has been mapped (SM 2009a Figure 5.3-7). The entire original proposed

RSPP project site is classified as suitable habitat for the species, with over 77 percent classified as medium or high suitability. It is likely that the unmapped remainder of the current proposed project will be classified as suitable MGS habitat based on cursory review of the vegetation communities in the unsurveyed areas. Furthermore, the southern portion of the project site is located within the Mohave Ground Squirrel Conservation Area as designated in the BLM WEMO. As a result of these considerations, the applicant has chosen to assume presence of the species over the entire project site (SM 2009a).

Within its range, which occurs almost entirely within the WEMO planning area, MGS inhabits flat to moderate desert terrain, including alluvial fans, basins, and plains with deep sandy or gravelly friable soils with an abundance of native herbaceous vegetation. Important habitat features for MGS are food availability and appropriate soil composition for burrow construction. MGS primarily feed on green vegetation and seeds of shrubs and forbs but may also eat invertebrates. Spiny hop-sage (*Grayia spinosa*), winterfat (*Krascheninnikovia lanata*), and saltbush (*Atriplex* spp.) are of particular importance in the MGS diet in the northern portion of its range, especially during portions of the year when herbaceous annuals are no longer available and in drought years. Both spiny hop-sage and winterfat were observed in areas along or adjacent to desert washes; in particular, these shrub species are common in the southern portion of the BRSA. High-quality habitat includes a diversity of shrub species, native herbaceous plants, and sandy or loamy soils (often with large soil accumulations at the bases of shrubs) that provide suitable substrate for burrow construction (SM 2009a).

In summary, the entire original proposed project site consists of suitable MGS habitat (SM 2009a). It is likely that the revised project site areas and revised BRSA areas that have not yet been assessed for MGS will contain suitable habitat for MGS as well. The habitat assessment for the new areas will be conducted in 2010. The southern portion of the disturbance area (south of Brown Road) occurs within the Mohave Ground Squirrel Conservation Area, a Wildlife Habitat Management Area designated by the WEMO. This designation was not based on biology but on the convenient boundaries of Brown Road. Biologically, the habitat south and north of Brown Road is the same and of high value for MGS. Therefore, the entire proposed project site likely represents suitable habitat for MGS.

Habitat Connectivity

Within the MGS's range, MGS populations exist north, south, east, and west of the proposed RSPP site (**Biological Resources Figure 4**) (Leitner 2008). MGSs are also known to occur within the proposed RSPP project vicinity as stated previously (**Biological Resources Figure 3**) (Leitner 2008). Recent research indicates the Olancha population to the north of the proposed site and the Little Dixie Wash population to the west of the proposed project site are core populations (Leitner 2008), and that past development in this valley has fragmented occupied and potential MGS habitat and created barriers between the Little Dixie Wash core population and the known population to the east of Ridgecrest. Off Highway Vehicle use in Red Rock State Park, agricultural conversions west of Koehn Lake, the Koehn Lake bed, and rugged terrain and rocky substrate in the El Paso Mountains limit connectivity between the Olancha and Little Dixie Wash populations and the majority

of the species' range which occurs to the south of the proposed project site. Construction and operation of US 395 and State Routes 14 and 178 have also adversely affected MGS habitat connectivity. MGS in the Little Dixie Wash-El Paso Wash vicinity are genetically distinguishable from other populations but also show genetic evidence of on-going exchange with the population to the south (Marjorie Matocq, University of Nevada Reno, personal communication).

The proposed RSPP project site could be used by a variety of wildlife species for movement purposes. Wildlife movement activities typically fall into one of three movement categories: (1) dispersal (e.g., juvenile animals from natal areas, or individuals extending range distributions); (2) seasonal migration; and (3) movements related to home range activities (e.g., foraging for food or water; defending territories; or searching for mates, breeding areas, or cover). MGS studies have identified the proposed RSPP site as potentially a valuable habitat linkage for MGS (**Biological Resources Figures 4 and 5**). This information was not available when the WEMO was being completed but given the current level of data, the importance of the project site for MGS has only increased. The physical site appears to be the most viable linkage connecting the Little Dixie Wash core population to the southern populations and the remaining population east of Ridgecrest. At the project site, the linkage is an approximate 2.5-mile wide area of low-relief habitat with alluvial/lacustrine soils bound by lava flows to the west and south and developing areas of Ridgecrest near US 395 on the east. This is the narrow point in the remaining, occupiable, contiguous habitat connecting the Little Dixie Wash core population, the population east of Ridgecrest, and the populations to the south. Another, much smaller potential branch of this linkage goes through a saddle between lava flows southwest of the project site (this potential linkage appears to be only a few hundred feet across and its habitat suitability is marginal).

Western Burrowing Owl (Athene cunicularia)

Western burrowing owls (WBO) inhabit arid lands throughout much of the western United States and southern interior of western Canada (Haug et al. 1993). In many other areas, this species has declined because of habitat modification, poisoning of its prey, and introduced nest predators. The WBO is diurnal and usually non-migratory in this portion of its range.

WBOs are unique among the North American owls in that they nest and roost in abandoned burrows, especially those created by ground squirrels, kit fox (*Vulpes macrotis*), and other wildlife. WBOs have a strong affinity for previously occupied nesting and wintering habitats. They often return to burrows used in previous years, especially if they were successful at reproducing there in previous years (Gervais et al. 2008). The southern California breeding season (defined as from pair bonding to fledging) generally occurs from February to August with peak breeding activity from April through July (Haug et al. 1993).

WBOs tend to be opportunistic feeders. Large arthropods, mainly beetles and grasshoppers, comprise a large portion of their diet. Small mammals, especially mice and voles (*Microtus*, *Peromyscus*, and *Mus* spp.) are also important food items. Other prey animals include reptiles and amphibians, young cottontail rabbits (*Sylvilagus* sp.), bats, and birds, such as sparrows and horned larks. Consumption of insects increases

during the breeding season (Haug et al. 1993). WBOs in California are generally nonmigratory and most abundant in the Central and Imperial valleys, primarily in agricultural areas. Small, scattered populations occur in the Mojave Desert. Although the WBO population in the southern desert region is primarily resident (i.e., present year-round), some migration from northern populations to this area occurs during winter. Seasonal nonmigratory movements and shifts in burrow use by juveniles and adults within a region also occur. The WEMO documents 53 records of WBOs in the west Mojave Desert, only five of which are confirmed or probable breeding pairs. Other sources document scattered WBO occurrences in eastern Kern County, including near the BRSA in the Ridgecrest region (SM 2009a).

Habitat throughout the project area is suitable for WBOs. Seventy-eight burrows with burrowing owl sign were identified within the survey area (SM 2009a). Seven active burrowing owl burrows were located on the project site in three separate regions of the BRSA, including five main or nest burrows and two satellite burrows. A minimum of eight WBOs were detected, including at least two nesting pairs with juveniles. One pair, and four individual WBOs were recorded within the original disturbance area; a second WBO pair was detected in the northwest portion of the buffer, outside of the new proposed RSPP project area (SM 2009a) (**Biological Resources Figure 6**).

The project applicant conducted Phase II (burrow surveys) and Phase III (owl survey, census, and mapping) on the site according to the Burrowing Owl Consortium Guidelines. A total of 78 burrows with various levels of WBO sign (29 percent of the 272 suitable burrows) were detected during the Phase II and Phase III surveys (**Biological Resources Figure 6**), including the seven active burrows; 55 of these occur in the current RSPP project disturbance area. Sign observed at the 71 inactive burrows (i.e., burrows not occupied by WBO during the surveys) was old and consisted primarily of pellets that were bleached, desiccated, and disintegrated; or whitewash remnants that were partly eroded. Of these 71 inactive burrows, 15 had relatively abundant old sign and showed evidence of past regular use (e.g., multiple pellets and whitewash spots) (**Biological Resources Figure 6**); sign at the other 56 burrows was sparse and did not indicate regular use in recent years (e.g., one degraded pellet, single spot of whitewash, etc.). The number of inactive burrows with WBO sign, particularly those with abundant old sign, suggests that other areas of the disturbance area may have been used previously by WBO for breeding (SM 2009a).

Loggerhead Shrike (Lanius ludovicianus)

Loggerhead shrikes are uncommon residents throughout most of the southern portion of their range, including southern California. In southern California they are generally much more common in interior desert regions than along the coast (Humple 2008). Loggerhead shrikes initiate their breeding season in February and may continue with raising a second brood as late as July; they often re-nest if their first nest fails or to raise a second brood (Yosef 1996).

This species can be found within lowland, open habitat types, including creosote scrub and other desert habitats, sage scrub, non-native grasslands, chaparral, riparian, croplands, and areas characterized by open scattered trees and shrubs. Fences, posts, or other potential perches are typically present. In general, loggerhead shrikes prey

upon large insects, small birds, amphibians, reptiles, and small rodents over open ground within areas of short vegetation, usually impaling prey on thorns, wire barbs, or sharp twigs to cache for later feeding (Yosef 1996).

Loggerhead shrikes are fairly common breeding residents in the Mojave Desert, and are typically associated with desert scrub. Surveys conducted since 1966 have shown a decreasing trend in the population of loggerhead shrikes in Mojave and Sonoran Deserts (Sauer et al. 2008). Suitable habitat for loggerhead shrike occurs throughout the scrub habitats within the proposed RSPP project BRSA area, and loggerhead shrikes were observed during the 2009 site surveys (SM 2009a).

Le Conte's Thrasher (Toxostoma lecontei)

This species inhabits some of the hottest and driest habitats in the arid southwest, including the deserts of southeastern California where they occur year-round. Preferred habitats include sparse desert scrub, alkali desert scrub, and desert succulent scrub habitats with open desert washes. They seek gentle to rolling slopes associated with dry desert washes, conditions found on alluvial fans that are found in the project area. Nests are typically placed in prickly vegetation such as cacti or thorny shrubs (Sheppard 1996). The Le Conte's thrasher population densities are among the lowest of passerine (perching) birds, estimated at less than five birds per square kilometer in optimal habitats (Fitton 2008). This low population density decreases the probability of their detection during field surveys. The population decline is due in part to the conversion of habitat to agriculture and urbanization (Laudenslayer et al. 1992). LeConte's thrashers are also affected by off-highway use during nesting season (Remsen 1978), which occurs on designated unimproved roads throughout the project site. This species requires areas with an accumulated leaf litter under most plants as cover for its preferred arthropod prey; they also feed on seeds, insects, small lizards, and other small vertebrates.

One pair of LeConte's thrasher was observed within the project area in 2009 during avian surveys and one was observed during focused DT surveys (SM 2009a). There is high potential for LeConte's thrashers to utilize the proposed RSPP project area for breeding and foraging habitat.

Golden Eagle (Aquila chrysaetos)

Throughout most of the western United States golden eagles are primarily year-round residents, breeding from late January through August with peak activity in March through July (Kochert et al. 2002). Migratory patterns are usually fairly local in California where adults are relatively sedentary, but dispersing juveniles sometimes migrate south in the fall. This species is generally considered to be more common in southern California than in the northern part of the state (USFS 2008).

Habitats for this species typically include rolling foothills, mountain areas, and deserts. Golden eagles need open terrain for hunting and prefer grasslands, deserts, savanna, and early successional stages of forest and shrub habitats. Golden eagles primarily prey on lagomorphs and rodents but will also take other mammals, birds, reptiles, and some carrion (Kochert et al. 2002). This species prefers to nest in rugged, open habitats with canyons and escarpments, with overhanging ledges and cliffs and large trees used

as cover. Golden eagles were not detected at the proposed RSPP project site, but are likely to forage over the site periodically. They are unlikely to nest on-site because of the absence of suitable nesting habitat. There are 10 known golden eagle nests from the last several decades within 30 miles of the RSPP site. One of those known nests is within seven miles, another approximately eight miles, two approximately 10 miles, one approximately 11 miles, and the remainder more than 15 miles from the proposed RSPP site. Some of these nesting locations may be inactive today. It is also likely that there are unknown nesting locations throughout the area.

The USFWS has recently provided new guidance on survey protocols and impact analysis that would meet the definitions provided in the Bald and Golden Protection Act. The applicant has arranged to conduct a golden eagle nest survey within a ten mile radius of the site. The results will be available in May or June 2010. At that time, an assessment can be made of the potential impacts to golden eagle foraging habitat, and to nest sites and breeding territories. The estimation of impacts will determine whether a take permit will be required under the Eagle Protection Act.

Pallid Bat (Antrozous pallidus)

Pallid bats range throughout western North America, inhabiting low elevation rocky arid deserts and canyonlands, shrub-steppe grasslands and higher elevation coniferous forests (WBWG 2005a). They are most abundant in xeric ecosystems, including the Great Basin, Mojave, and Sonoran deserts. This species can be a solitary rooster, or can occupy small or large roost groups; day and night roosts include crevices in rocky outcrops and cliffs, caves, mines, hollow trees or bark, and various human structures such as bridges, barns, porches, bat boxes, and human-occupied as well as vacant buildings (WBWG 2005a). Pallid bats are opportunistic generalists that glean a variety of arthropod prey from surfaces, but also capture insects on the wing (WBWG 2005a).

No pallid bats were observed during the surveys, but no surveys were specifically conducted for this species or any other bats. Pallid bats were recorded in 1997 in Red Rock Canyon State Park near an active maternity colony in a mine shaft in the vicinity of a desert spring (CNDDB 2010). There is a moderate potential for this species to forage on the site, but a low potential for it to roost on the site given the relative lack of suitable roosting sites.

Spotted Bat (Euderma maculatum)

Spotted bats occur throughout western North America, and have been found from below sea level to 9,000 feet in arid, low desert habitats to high elevation conifer forests (WBWG 2005b). Prominent rock features appear to be a necessary feature for roosting; roost sites are cracks, crevices, and caves, usually high in fractured rock cliffs (WBWG 2005b). Spotted bats feed primarily on moths and are apparently solitary but occasionally roost or hibernate in small groups (WBWG 2005b). This species is infrequently captured; although in the southwest spotted bats have been most often captured over water (WBWG 2005b).

No spotted bats were observed during the surveys, but no surveys were specifically conducted for this species or any other bats. Spotted bats were recorded in 1997 in Red Rock Canyon State Park near a desert spring in canyon lands (CNDDB 2010). There is

a moderate potential for this species to forage on the site, but a low potential for it to roost on the site given the relative lack of suitable roosting sites.

Desert Kit Fox (Vulpes macrotis arsipus)

The desert kit fox is not a special status species, but is a protected furbearer under Title 14, California Code of Regulations (Section 460), which states that "Fisher, marten, river otter, desert kit fox, and red fox may not be taken at any time". Therefore, potential take of this species must be avoided. The desert kit fox lives in desert scrublands and grasslands and they feed primarily on small rodents, birds, insects, and reptiles. Dens are excavated in loose, sandy or loamy soils. The species is active year round. However, it typically forages at night during the hottest months in late spring and summer.

A total of 75 burrows and burrow complexes were found within the original disturbance area including 4 active complexes and 3 complexes that had pups. An additional 44 burrows (including 4 active burrows) were found within the original BRSA (**Biological Resources Figure 7**). The large majority of the site provides suitable denning habitat with the exception of rocky outcrops on the western edge of the proposed project site. The entire proposed RSPP project site is suitable foraging habitat for the species (SM 2009a).

American Badger (Taxidea taxus)

American badgers were once fairly widespread throughout open grassland habitats of California. They are now uncommon, permanent residents throughout most of the state, with the exception of the northern North Coast area. They are most abundant in the drier open stages of most shrub, forest, and herbaceous habitats with friable soils. In the southwest, badgers are typically associated with creosote bush scrub and sagebrush. Mating occurs in late summer or early fall and two to three young are born 183 to 265 days later in March or April (Long 1973). Badgers are fossorial (burrowing) mammals. They dig large burrows in dry, friable soils and use multiple dens/cover burrows within their home range. They typically use a different den every day, although they can use a den for a few days at a time (Sullivan 1996). Cover burrows are an average of 30 feet in length, and are approximately three feet in depth. Natal dens are larger and more complex than cover dens. In undisturbed, high-quality habitat, badger dens can average 0.64 dens per acre, but are much lower in highly disturbed areas (Sullivan 1996).

Sign of American badgers were detected during project surveys in 2009 in the survey buffer area to the north of the proposed impact area (**Biological Resources Figure 7**). No individuals or sign were detected within the original proposed disturbance area. There are records in the CNDDB for this species immediately to the west of the proposed RSPP project area.

Swainson's Hawk (Buteo swainsoni)

One Swainson's hawk, listed as threatened under CESA, was incidentally observed flying over the BRSA on April 28, 2009 and was likely migrating over the area. Swainson's hawk is not expected to breed or regularly use the BRSA due to the lack of

suitable nesting habitat and no breeding records nearby. The nearest Swainson's hawk record is approximately 50 miles from the BRSA. However, the proposed project site is considered potential foraging habitat.

C.2.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

CONSTRUCTION DIRECT AND INDIRECT IMPACTS AND MITIGATION

For clarity purposes it should be noted that CEQA uses the term "impacts" when describing changes to the environment while the convention under NEPA is to use the term "effects." The terms will be used here interchangeably but only CEQA requires that significant impacts or effects be mitigated or reduced to a level less than significant.

Direct impacts are those impacts that result from the project and occur at the same time and place. Indirect impacts are caused by the project, but can occur later in time or are farther removed in distance while still reasonably foreseeable and related to the project. The potential impacts discussed in this analysis are those most likely to be associated with construction and operation of the project.

Impact analyses typically characterize effects to plant communities as temporary or permanent, with a permanent impact referring to areas that are paved or otherwise precluded from restoration to a pre-project state. In the desert ecosystems the definition of permanent impacts needs to reflect the slow recovery rates of its plant communities. Natural recovery rates from disturbance in these systems depend on the nature and severity of the impact. For example, creosote bushes can resprout a full canopy within five years after damage from heavy vehicle traffic (Gibson et al. 2004), but more severe damage involving vegetation removal and soil disturbance can take from 50 to 300 years for partial recovery; complete ecosystem recovery may require over 3,000 years (Lovich and Bainbridge 1999). In this analysis, an impact is considered temporary only if there is evidence to indicate that pre-disturbance levels of biomass, cover, density, community structure, and soil characteristics could be achieved within five years. Unless otherwise indicated, the acreages provided below for impacts are considered permanent.

A commonly used measure to reduce impacts below a significant level is compensatory mitigation. This normally involves acquisition of high value habitat that can be maintained and managed in perpetuity for the biological resources impacted and lost due to the RSPP project. Staff discusses compensatory mitigation following the discussions of direct, indirect, operational, and cumulative impacts.

OVERVIEW OF IMPACTS TO VEGETATION AND WILDLIFE

The proposed RSPP plant is expected to have a disturbance area of approximately 2,002 acres. This includes approximately 1,928 acres for the northern and southern power blocks, 16.3 acres for the proposed water line, and 58.2 acres for the realignment of the power line. Although the vegetation mapping of the entire 2,002 acres has not been completed and additional biological resource protocol surveys of portions of the re-configured RSPP site, transmission line realignment, and water pipeline have not been completed, the project will result in the destruction of most of the habitat through

extensive grading. Given current survey data and site investigation, it is estimated that over 90% of destroyed habitat will occur within creosote bush scrub. Impact acreage is expected to be similar to those acreages found in **Biological Resources Table 1**.

The project applicant intends to perform vegetation mapping and update the delineation of waters of the state for the revised impact area in the spring of 2010. This will allow the commission to accurately calculate vegetation community impacts and impacts to waters of the state from the proposed RSPP project. The applicant will also be conducting focused protocol surveys for special status plant and wildlife species within the revised impact area in the spring of 2010. Based on the results of these surveys, staff's impact assessment and proposed conditions of certification may require updates to reflect potential impacts to biological resources from the revised impact area information. The project applicant originally estimated that 28.1 acres of waters of the state would be impacted by the original proposed project. This original estimate included impacts to El Paso Wash, which will be largely avoided by the current proposed project. So, the impact to state waters may be less than 28.1 acres depending on the outcome of the revised delineation of waters of the state.

Non-native Invasive Species

Construction activities and soil disturbance could introduce new non native invasive species to lands adjacent to the proposed RSPP project site and its linear facilities, and could further spread weeds already present in the project vicinity. The spread of invasive plants is a major threat to biological resources in the Mojave Desert because non-native plants can displace native plants, increase the threat of wildfire, and supplant wildlife foods that are important to herbivorous species.

To avoid and minimize the spread of existing weeds and the introduction of new ones, an active weed management strategy and control methods must be implemented. The applicant has prepared a draft Weed Management Plan (SM 2010a) to avoid and minimize the spread of non-native invasive plant species. The final weed management plan will require review by BLM personnel to insure it complies with NEPA herbicide application guidelines. Energy commission staff has incorporated recommendations from the applicant into proposed Condition of Certification **BIO-19** (Weed Management Plan). The Weed Management Plan includes a discussion of non-native invasive species targeted for eradication or control and a variety of weed control measures such as establishing weed wash stations for construction vehicles and revegetation of disturbed areas with native seed mix. Implementation of this condition/weed management plan would reduce potential impacts from introduction and spread of weeds to less than significant levels under CEQA. Any use of chemical control techniques will require a site specific environmental evaluation and specific authorizations from BLM. BLM has a list of approved herbicides that could be approved.

Impacts of Dust on Remaining Vegetation

Disturbance of the soil’s surface caused by construction traffic and other activities would result in increased wind erosion of the soil. Aeolian transport of dust and sand can result in the degradation of soil and vegetation over a widening area (Okin et al. 2001). Dust can have deleterious physiological effects on plants and may affect their productivity and nutritional qualities. This could subsequently reduce the amount of suitable forage

available for local wildlife species. The destruction of plants and soil crusts by windblown sand and dust exacerbates the erodibility of the soil and accelerates the loss of nutrients in the soil (Okin et al. 2001). The impacts of increased dust on remaining vegetation adjacent to the proposed RSPP site can be minimized with implementation of staff's proposed Condition of Certification **BIO-8 [**Impact Avoidance and Minimization Measures (Best Management Practices)] to less than significant levels.

Impacts to Jurisdictional State Waters

The ephemeral drainages on the proposed RSPP project site provide beneficial functions and values such as groundwater recharge, flood peak attenuation, floodwater storage, and wildlife corridors and habitat. For the proposed RSPP project, these functions would be impaired by construction and operation. The ACOE has determined that there are no waters of the U.S. on the proposed RSPP site. However, there are waters of the state on the proposed RSPP site. As stated previously, the applicant originally estimated that 28.1 acres of state waters would be impacted by construction of the proposed RSPP project.

The applicant has agreed to maintain the El Paso Wash in a natural condition in order to continue providing hydrologic functions and value for wildlife. The applicant is currently preparing an updated delineation of waters of the state according to CDFG guidelines. Once that delineation is approved, the extent of impacts to state waters will be calculated. Mass grading of the unnamed jurisdictional washes on the proposed RSPP site would eliminate the hydrological and biological values and functions provided by these features. Specifically, construction of the proposed RSPP project would eliminate the hydrological connections of unnamed washes tributary to El Paso Wash; eliminate the stream energy dissipation function provided by these washes during large storm events; eliminate the surface and subsurface water storage and groundwater recharge functions currently provided by these washes and the El Paso Wash associated floodplain; eliminate sediment transport, storage, deposition and nutrient cycling functions that currently aids in floodplain maintenance and vegetation establishment and maintenance; and eliminate the vegetation communities that help stabilize stream banks and provide wildlife habitat within the wash and its associated floodplain. Eliminating the washes on the proposed RSPP site would fundamentally and permanently alter the natural geomorphic and hydrological processes that currently characterize the project site, which in turn would fundamentally alter the biological processes that support recruitment of native vegetation and creation of wildlife habitat within the wash and on the associated floodplain. For these reasons, staff has concluded that construction of the proposed RSPP project would significantly impact the biological functions and values of the desert washes.

This impact can be mitigated to below a level of significance if compensation lands contain wash acreage equal to or greater than wash acreage lost on the proposed RSPP site and other conditions of the Lake and Streambed Alteration Agreement (LSA) are implemented (Condition of Certification **BIO-18**). The extent of state waters to be impacted on the proposed RSPP site and the extent of wash habitats present on compensation lands are not known at this time. RSPP did submit a LSA application that was found to be inadequate by CDFG. A re-delineation of the RSPP site is anticipated to be completed in the spring of 2010 and the new information submitted to CDFG.

CDFG will review the submittal and complete the LSA and staff will include it in Condition of Certification **BIO-18.** Additionally, staff's proposed Condition of Certification **BIO-12** (Desert Tortoise and Mohave Ground Squirrel Habitat Compensatory Mitigation and CDFG 2081 Permit)**,** which requires compensation lands to be purchased and protected that have similar biological attributes as the RSPP site, will help reduce the impacts to washes to a less than significant level. The project applicant would also be required to submit a project closure plan which would restore the original washes in place and therefore restore some of the existing functions and values of current washes that are expected to be impacted.

Impacts to Raptors and Migratory/Special Status Bird Species

Vegetation at the plant site and along linear facilities provides foraging, cover, and/or breeding habitat for migratory birds, including a number of special status bird species confirmed to be present at the site. Loggerhead shrike, LeConte's thrasher and WBO are special-status species known to breed and forage at the site. WBOs are discussed in further detail below. Power plant construction would eliminate nesting habitat for these and other species and could result in direct and indirect impacts to these species due to habitat loss, habitat fragmentation, or injury/fatality of individuals from bird collisions with project facilities or from interactions with concentrated sunbeams. Nonresident migratory birds pass through the site during regular migration activities but are not expected to be impacted. Raptors such as prairie falcons (*Falco mexicanus*) and golden eagles may forage occasionally at the site. There are known nest locations for golden eagles in the El Paso Mountains approximately 5 to 10 miles south of the proposed site. The loss of foraging habitat will be partially mitigated by acquisition and enhancement on the compensation lands (see staff's proposed Condition of Certification **BIO-12**). No impacts to northern harrier (*Circus cyaneus*) or peregrine falcon (*Falco peregrinus*) are anticipated because these species occur only infrequently at the proposed RSPP project area and do not breed there.

Title 50, Code of Federal Regulations, section 22.26 of the Eagle Protection Act authorizes take of golden and bald eagles. The USFWS requires a take permit to be issued for "take" of golden eagles where the taking is associated with, but not the purpose of the activity, and cannot practicably be avoided. Take under the terms of the act is defined as "to pursue, shoot, shoot at, wound, kill, capture, trap, collect, molest or disturb." Disturb is defined as "*to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, injury to an eagle; a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."* The USFWS is still preparing guidelines regarding whether and to what degree removal of foraging habitat for golden eagles would meet the definition of "disturb" under the act and therefore require issuance of a take permit. The proposed RSPP project site is potential foraging habitat for golden eagles because the species is known to forage within vegetation communities found on the site and there are known nesting locations within the estimated foraging distance for golden eagles. The site does not represent suitable nesting habitat for golden eagles. Therefore, it is unclear whether a take permit under the Eagle Protection Act would be required for the proposed RSPP. Further guidance from the USFWS is forthcoming for utility-scale renewable energy projects such as the

proposed RSPP project. The RSPP applicant will survey a 10-mile radius around the RSPP site for active golden eagle nests during the spring of 2010. Following this survey and based on the results, a decision will be made by the USFWS whether the project would require a take permit for golden eagles. Condition of Certification **BIO-22** requires the project owner to coordinate with the USFWS to determine if a take permit is needed for golden eagles for the RSPP site.

The federal Migratory Bird Treaty and Fish and Game Code section 3503 regulates the loss of active bird nests or young. The applicant has proposed mitigation measures to avoid and minimize impacts to nesting birds that have been incorporated into staff's proposed Conditions of Certification **BIO-8** [(Impact Avoidance and Minimization Measures (Best Management Practices)], **BIO-14** (Pre-Construction Nest Surveys, and **BIO-15** (Monitoring Impacts of Technology on Birds). Implementation of staff's proposed conditions of certification would avoid direct impacts to nests, eggs, or young of migratory birds and would minimize the impacts of construction disturbance to nesting birds.

Loss of nesting and foraging habitat for these special status bird species would add to the cumulative loss of habitat for these species within the region. See the cumulative impact discussion for a description of cumulative projects considered for impact discussion. Implementation of staff's proposed Condition of Certification **BIO-12,** which requires compensatory mitigation, Condition of Certification **BIO-21** which requires the project owner to complete an Avian and Bat Protection Plan (ABPP), and Condition of Certification **BIO-22** which requires the project owner to obtain a Federal Eagle Act Take Permit or show evidence that one is not needed, would reduce impacts to migratory birds to less than a significant impact.

Impacts to Western Burrowing Owls

Western burrowing owls (WBO) are a state species of special concern that nest on the proposed RSPP project site and would be directly impacted by construction. Seven active burrows with at least one pair with juveniles and four individual owls were found within the original proposed disturbance area. An additional pair and four additional individuals were found within the original buffer area. Additional surveys will be conducted in 2010 to determine if additional owls are present in the unsurveyed areas of the current proposed project area. Without implementation of impact avoidance and minimization measures (staff's proposed Condition of Certification **BIO-8**), WBO adults, eggs, or young could be crushed or entombed by grading activities, and nesting and foraging activities would be directly and indirectly impacted by construction and operation of the project. The project would also result in permanent loss of 2,002 acres that are currently used by WBO for nesting and foraging. Staff considers these impacts significant. Habitat loss is one of the primary threats to California's WBO population (Gervais et al. 2008), and the proposed RSPP project site would contribute incrementally to this significant loss.

To avoid impacts to WBO that might be nesting or residing within burrows in the project impact area, the applicant has proposed conducting pre-construction surveys on the plant site and along all linear facilities, using methods recommended by CDFG (CBOC 1993). To avoid direct take of owls, the applicant has proposed passive relocation.

Passive relocation involves encouraging owls to move from occupied burrows to alternate natural or artificial burrows that are at least 150 feet from the impact zone and are within contiguous foraging habitat for all of the relocated owls. Passive relocation of owls is only implemented during the non-breeding season (CDFG 1995) in order to avoid egg and dependent chick separation from adult owls, which would likely result in death of those eggs and young. Passive relocation, construction of artificial burrows, and surveys prior to relocation would be in accordance with CDFG-approved guidelines (CBOC 1993).

The project applicant, at the request of energy commission staff, has prepared a draft Western Burrowing Owl Relocation/Translocation Plan (SM 2010a). This draft plan will be the basis for staff's proposed Condition of Certification **BIO-17** (Burrowing Owl Impact Avoidance, Clearance Surveys, Relocation/Translocation, and Long-Term Monitoring). With the implementation of staff's proposed Condition of Certification **BIO-17** and Condition of Certification **BIO-21** which requires the project owner to complete an Avian and Bat Protection Plan (ABPP), the impacts to WBO would be reduced to less than significant levels.

Noise

Noise from construction activities could temporarily discourage wildlife from foraging and nesting immediately adjacent to the project area. Many bird species rely on vocalization during the breeding season to attract a mate within their territory. Noise levels from certain construction, operations, and demolition activities could reduce the reproductive success of nesting birds.

The expected loudest composite noise level from the ongoing construction is approximately 85 dBA at 50 feet from the activity, which results in noise levels of approximately 79 and 73 dBA at distances of 100 and 200 feet from the activity, respectively (Solar Millennium 2009a). The construction period is temporary and relatively long term (28 months), and wildlife usually becomes habituated to ongoing general construction noise. Weisenberger et al. (1996) found that bighorn sheep responded to aircraft over-flights with increased heart rates and altered behavior; however, animal response decreased with increased exposure.

As part of the final phase before operation, a process of readying a steam turbine for startup known as a "steam blow" is initiated. This process cleans the piping and tubing which carry steam to the turbines; starting the turbines without cleaning these systems would destroy the turbine. The Applicant is currently proposing to use a low pressure technique. This method releases steam over a continuous period of about 36 hours and would result in noise levels of about 80 dBA at 100 feet. The traditional, high pressure method would result in noise levels as high as 130 dBA at 100 feet, several times per day. If this louder method is chosen, the project owner would perform the steam blow in such a manner that the noise level is not greater than 110 dBA measured at 100 feet from the property line. Either process may be performed several times over a period of two to three weeks (Solar Millennium 2009a).

Heavy equipment operation and noisy construction work related to project construction would typically start no later than 6:00 am and end no later than 7:00 pm. The exception would be if low pressure steam blows are conducted, which occur over a 36-hour period

and occur only over a period of two to three weeks. As a result of these design features, the temporary nature of these activities, and the adherence to noise reducing mitigation measures, the noise levels at the project fence line are not expected to have any substantial impact on nearby wildlife resources. No significant wildlife resources would be expected to remain within the disturbance area. Therefore, no significant impact to wildlife from construction noise would be expected.

Impacts to Special Status Mammals

Impacts to American Badger and Desert Kit Fox

The proposed RSPP project site includes suitable foraging and denning habitat for American badger. The American badger is protected under Title 14, California Code of Regulations (sections 670.2 and 670.5), and potential impacts to individuals of this species must be mitigated to less than significant levels under CEQA. Construction of the proposed RSPP project could kill or injure American badgers by crushing individuals with heavy equipment, or entombing them within a den. Sign of one American badger was found within the original BRSA in 2009. No badger individuals were found during surveys. Followup surveys for the areas of the current proposed project that were not originally surveyed for badger will be conducted in 2010. Construction activities could also result in disturbance or harassment of individuals. Staff's proposed Condition of Certification **BIO-16** (American Badger and Desert Kit Fox Clearance Surveys, Relocation/Translocation Plan, and Long-term Monitoring Plan) would reduce the take of American badgers. The compensatory mitigation (staff's proposed Condition of Certification **BIO- 12**) will reduce the project-related impacts to American badger to less than significant levels under CEQA.

The desert kit fox is protected under Title 14, California Code of Regulations (sections 670.2 and 670.5) as a protected furbearing mammal and potential impacts to individuals of this species must be avoided. Seventy-five fox burrows, including 4 active burrow complexes with 3 fox pups, were found in the original disturbance area. An additional 44 burrows, including 4 active burrow complexes were found in the original BRSA. Adult foxes were not observed during focused surveys in 2009. Additional surveys will be conducted in 2010 for areas of the current proposed project that were not surveyed in 2009. Based on this information, the entire RSPP site includes suitable foraging and denning habitat for this species. Construction of the RSPP project could kill or injure desert kit fox by crushing individuals with heavy equipment, or entombing them within a den. Construction activities could also result in disturbance or harassment of individuals. Staff's proposed Condition of Certification **BIO-16** (American Badger and Desert Kit Fox Clearance Surveys, Relocation/Translocation Plan, and Long-Term Monitoring Plan) would reduce the take of desert kit fox to be in compliance with Sections 670.2 and 670.5 of the California Code of Regulations. The compensatory mitigation (staff's proposed Condition of Certification **BIO- 12**) will reduce the project-related impacts to desert kit fox to less than significant levels under CEQA.

Impacts to Mohave Ground Squirrel

The entire 2,002-acre proposed RSPP project site is suitable habitat for the California threatened Mohave ground squirrel (MGS). Approximately 77 percent of the project site is considered medium to high suitability for MGS. This is based on a habitat assessment

performed on the site by Dr. Philip Leitner and known occurrences of the species in the immediate vicinity of the site (DR- BIO–58 2010b, SM 2009a, CNDDB 2010). No trapping was conducted on the proposed RSPP project site because the applicant agreed to assume MGS were present but ample evidence exists to support a conclusion that MGS are present on the site. Such evidence includes the relatively undisturbed habitat on the project site with diverse vegetation of the type that provides forage and cover for resident MGS and the numerous detections, at least 24, (**Biological Resources Figure 3**) of MGS within five miles of the project site, in the same habitat types. Finally, the project site sits between known populations of MGS to the north, west, and to the south (CNDDB 2010).

Grading and construction within the proposed RSPP site will likely result in the take of all MGS on the site. Staff assumes that take of MGS during the grading of 2,002 acres is unavoidable. It is especially likely that any MGSs (adults and juveniles) in burrows during project grading would be killed during project construction. Energy commission staff has requested that the applicant prepare a draft MGS translocation plan (SM 2010a). The applicant's biologist doubts the feasibility of implementing a translocation plan for MGS. However, fatality of MGS must be minimized, so salvage trapping should occur prior to grading. The translocated individuals should be monitored with radio telemetry to determine the survival rate of individual MGS after translocation occurs.

Mohave Ground Squirrel Habitat Connectivity

Generally, biological resource impacts relate to the death or injury of individual animals due to direct taking or loss of habitat. Due to the unique geographical location relative to known core populations of MGS, development of the project would impact not only individual MGS, but also substantially reduce the connectivity of the Little Dixie Wash core population to the west of the proposed RSPP site with known populations east of Ridgecrest, and the populations to the south of the proposed RSPP site with the Olancha core population to the north of the site.

Aerial photographs and topographic maps confirm Leitner's conclusions that the project site provides the widest section between natural and manmade barriers in the region to support connectivity between the northern core population near Olancha and southern populations of MGS. Natural features like the nearby El Paso Mountains provide barriers to MGS movement as does increased expansion of the City of Ridgecrest and the building of US 395. The current landscape creates a visible funnel with the project site as the most obvious point of connection between the southern and northern populations of MGS. Past habitat loss and fragmentation in the vicinity of the City of Ridgecrest and the continued growth towards US 395, has reduced other potential areas of connectivity. Without a conscious effort to recognize and protect genetic flow there is serious risk in eliminating all potential regional connectivity within the next few decades (see **Biological Resource Figure 5**). At the project site, the linkage is an approximate 2.5-mile wide area of low-relief habitat with suitable burrowing substrates (alluvial and lacustrine soils) bound by lava flows to the west and south and developing areas of the City of Ridgecrest near US 395 on the east. This is the narrow point in the remaining,

suitable, contiguous habitat connecting the Little Dixie Wash core population to the west of the RSPP site and the known population east of Ridgecrest and the Olancha core population to the north and remaining populations to the south.

Another, much smaller linkage goes through a saddle between lava flows southwest of the project site. This potential genetic linkage appears to be only a few hundred feet across and its habitat suitability is marginal because of the increased topographic relief in this area and the extent of rocky habitats. Therefore, this possible link provides less suitable linkage habitat than the RSPP site.

The project will result in isolation of MGS populations and lead to excessive inbreeding and decrease their ability to withstand random catastrophic events or disease which could cause the reduction or elimination of these populations. Sufficient connectivity is important between core habitat areas to allow gene flow (Leitner 2008).

In addition to geographic analysis, recent genetic studies have shown that MGS populations show some evidence of divergence in the Western Mojave Desert. This may be a result of increasingly isolated populations (Bell et al. 2009). It also shows there is still periodic transfer of genetic material between the populations. MGS in the Little Dixie Wash-El Paso Wash vicinity are genetically distinguishable from other populations but also show genetic evidence of on-going exchange with the population to the south (Marjorie Matocq, University of Nevada Reno, personal communication). Building the RSPP would reduce the habitat connectivity between these populations. Increased isolation may result in a subsequent reduction in genetic variability throughout the entire MGS population and reduce other meta-population functions, which are essential for population persistence.

Leitner's recommendation to maintain viable linkages between MGS populations is supported by recent literature. A review of over 1,000 wildlife population networks on six continents found that the quality of habitat between larger habitat patches was an important predictor of occupancy within these patches. This highlighted the importance of maintaining connections between core population areas.

Developing the project may impact MGS habitat connectivity as it will further reduce the dwindling remaining connectivity between the northern and southern populations of MGS. Although there is uncertainty as to the exact means in which the northern and southern MGS populations can interact and it is not known how narrow a route can be to still provide suitable connectivity. Aerial photographs and site investigation of the proposed project area make it apparent that the existing area of connectivity is small and limited. This is especially so given the area east of the project site that the applicant identifies as a potential north-south connection is comprised of the remaining partially developed habitat between the City of Ridgecrest and US 395.

Development of the City of Ridgecrest is moving south and west towards US 395 and most likely within two decades the area will be residential/developed, so that area does not represent long-term connectivity for MGS. Consult the cumulative impact section for a discussion of proposed projects within the City of Ridgecrest.

The project site has the most suitable habitat and geography for connectivity to populations to the north and south of the site. As mentioned previously, there is a small, unnamed wash area to the west of the project area that could serve a limited function as a movement corridor for MGS; however, the area is not as suitable for this function as the proposed project site since this offsite corridor is only several hundred yards in width. **Biological Resources Figure 5** illustrates the most suitable area of connectivity is contained within the project site. Therefore, residual (i.e. unmitigable) effects would occur to MGS connectivity even with the acquisition of suitable compensation lands for MGS because development of the RSPP site would result in the loss of the most suitable movement corridor.

Impacts do not stop at the project fence line. As previously discussed, indirect impacts such as noise, increased construction and operational traffic, dust, spread of invasive plants, and increased public use expand project-related impacts beyond the direct disturbance area. Industrial facilities such as the proposed RSPP will affect the area surrounding it in various ways. The novelty of the facility will attract curious visitors and probably additional off-road vehicle enthusiasts. All these activities will reduce the value of the area surrounding the project site further reducing connectivity. Past development in the Indian Wells Valley has fragmented occupied and potential MGS habitat and created barriers between the core MGS populations southwest of Inyokern and the known population to the east of Ridgecrest (Leitner 2008). Construction and operation of US 395 and State Routes 14 and 178 have also adversely affected MGS habitat connectivity (Leitner 2008). Due to its overall large size, the proposed RSPP would contribute to a significant loss of suitable habitat available for MGS dispersal and genetic connections between local populations. Currently, no studies have been conducted to determine to what extent past habitat loss and fragmentation in the vicinity of Ridgecrest have altered MGS connectivity and movement patterns but existing quantitative and qualitative information regarding future renewable energy growth in the area points to greater fragmentation of MGS connectivity in the region (see **Cumulative Impacts** subsection).

The connectivity of the proposed RSPP site is a result of the physical location, geography, and habitat. The loss of additional connectivity between the northern and southern populations of MGS at the proposed RSPP site should be avoided and the proposed RSPP site preserved in a natural state.

Construction Impacts to Desert Tortoise (DT)

The proposed RSPP site will result in significant impacts to the DT population in the region. Based on applicant survey data, there are an estimated 69 DT within the original disturbance area. Additional surveys in 2010 may determine that the actual number of DT within the current proposed disturbance area is higher than 69 because several hundred acres of suitable habitat have not been fully surveyed. The proposed RSPP site contains relatively unique habitat conditions for DT for the following reasons:

1. The habitat on the proposed RSPP site supports relatively undisturbed high value habitat with diverse vegetation that provides forage and cover for a large resident population of DT. The native annual plant production is consistently high at this site as evidenced by grazing production surveys conducted by the BLM. This vegetation provides dependable forage for DTs.

2. At 9.8 DT per km^2, the DT density on the project site is high despite a general low level of density in the surrounding area and despite factors such as the close proximity of the site to the City of Ridgecrest and US 395 that would normally reduce the habitat suitability for DT. This estimated density is also among the highest recorded DT density in the western Mojave Desert (see **Biological Resources Table 3**)

3. The DTs on the proposed RSPP project site and in the general region are more tolerant of winter temperature extremes and are able to survive on less summer rainfall than populations in the southern and eastern Mojave. Their burrows are deeper and longer to adjust to the temperature variations (Murphy et al. 2007). The DT population in this area and onsite provide genetic variability for the general DT population as climate change in the region moves suitable habitat for DT to the north.

Historically, DT densities were much higher than today. In the 1940s and 1950s some areas within the Indian Wells Valley had 100 or more DTs per square kilometer. By 2000, those numbers had been reduced by as much as 90 percent. During this decade they have continued to decline. A recent DT study in the El Paso Mountains area found juveniles, immature and sub-adults tortoises, an indication that young are being produced but not surviving to maturity at a rate sufficient to offset deaths of adults (Kristin Berry, personal communication). Similar trends and population declines have been reported at sites throughout the DT geographic range as well as in the nearby Desert Tortoise Research Natural Area and Red Rock Canyon State Park (Berry and Medica 1995, Berry et al. 2008, Keith et al. 2008, Kristin Berry personal communication). The continued decline of the DT makes the project site, with its 29 adults, and 12 juveniles (estimated population on site of 69 DTs) all the more important as a population anchor or source population for the western Mojave and evidences the uniqueness of the project site.

The proposed RSPP site has DT densities that are among the highest recorded this decade in the USFWS range-wide monitoring of the Mojave population of the DT (USFWS 2009). Of thirty sites sampled by USFWS from 2001 through 2007 in Desert Wildlife Management Areas (DWMAs), critical habitat for DT, and Areas of Critical Environmental Concern, only two sites had higher average densities than the proposed Ridgecrest site. The proposed RSPP site had a density of 9.8 DTs per square kilometer. The highest average density recorded at the other sample sites in the Mojave Desert was 7.2 DTs per square kilometer. The two sample sites that had higher densities (10.1 and 10.8) were both in the Colorado Desert.

In looking at the meaning of such a high density it is important to consider the general area surrounding the RSPP site which has been found to contain low DT densities. Throughout the Mojave area there are isolated pockets of high DT density and it is not fully understood the role these areas will play in DT survival (Berry et al. 2008, Keith et al. 2008, Berry et al. 2006). But the fact that the DT is in decline makes these concentrated DT reservoirs an important part of the overall conservation effort. This is especially the case if this population has greater tolerance to temperature changes since temperature changes will likely occur throughout the range of DT because of global climate change. Preservation of the characteristics of this particular DT

population will be important for long-term survival of DT as a whole since adaptability to temperature increases associated with climate change will be important for the species as a whole. Beyond the unique ability for the site to support DT, there is something unique and special about the project site that contains the abundance of flora and fauna as described above. Loss of this habitat would result in residual (i.e. unmitigable) effects on DT because habitat acquisition of comparable high density DT habitat is not feasible and would still result in the loss of this physical site. In addition, there is no evidence supporting the belief that other lands can be enhanced to support population densities as found on the project site on a long term basis. Evidence exists to support findings that the DT population in the area is more tolerant to winter temperature extremes and low summer rainfall than populations to the south. This more tolerant population acts as genetic reservoir for the region's population (Murphy et al. 2007). The site is a combination of high value habitat, rich soils, and geography, with many DTs.

Construction of the RSPP site would result in the following impacts to DT:

- Direct loss of 2,002 acres of suitable DT habitat.
- Loss of DT habitat that supports an unusually high density of DT for the Western Mojave
- Direct loss of at least an estimated 69 DT individuals. Final direct surveys may increase the number of DTs within the proposed disturbance area
- Indirect impacts to DTs by noise or vibrations from the heavy equipment during construction
- Injury or mortality from encounters with workers' or visitors' pets
- DT from outside the project disturbance area may also be attracted to the construction area by application of water to control dust, placing them at higher risk of injury or mortality
- Increased human activity and vehicle travel would occur from the construction and improvement of access roads, which could disturb, injure, or kill individual tortoises.
- DTs may take shelter under parked vehicles and be killed, injured, or harassed when the vehicles are moved

Desert Tortoise Habitat Connectivity

The proposed RSPP project site occurs within the DT West Mojave recovery unit; four DT sub-populations and areas of critical habitat have been designated as DWMAs by the WEMO to the south of the Project site. The closest DT DWMA, the Fremont-Kramer DWMA, is approximately seven miles southeast of the proposed project site. DT populations within this recovery unit are characterized by localized areas of high density surrounded by areas of low density amongst suitable habitat. Movements between local populations are important for long-term population viability. The proposed RSPP site supports a high density of DT relative to known populations nearby, and DT habitat at the project site provides suitable habitat for individual DTs from the south. The proposed RSPP project would also contribute to significant losses of suitable habitat available for DT dispersal between local populations. Movements to

the north and east are somewhat limited by development associated with Ridgecrest and movement barriers associated with US 395, and State Routes 14 and 178 (RSPP 2009).

Operational Impacts

Numerous activities take place during the normal operation of the facility that can lower the value of the area surrounding the facility for many wildlife species. Normal operating actions of the proposed RSPP project will expand the area of impact beyond the footprint of the proposed RSPP project site. Potential operational impacts to biological resources include increased risk of raven, coyote, and dog predation on DTs and other wildlife species, impacts to resident birds and wildlife due to increased levels of traffic, potential collisions with structures, behavior modification or reduction of reproductive activity or nest abandonment in the proximity of the RSPP site due to increased noise and lighting during operation, deterioration of habitat from increased trash that attracts additional predators such as ravens, and wildlife interactions with concentrated sunlight. Reduced use or abandonment of valuable habitat near the proposed RSPP project will have impacts on DTs and MGSs. These impacts are discussed below.

Avian Predators

Ravens

Construction and operation of the proposed RSPP project could provide new sources of food, water, and nesting sites for DT predators such as the common raven. Ravens depend on human subsistence to expand into areas where they were previously absent or in low abundance. Ravens habituate to human activities and are subsidized by food and water provided by humans, as well as roosting and nesting resources that are introduced or augmented by human encroachment into previously undisturbed desert habitats. Common raven populations in some areas of the Mojave Desert increased 1500 percent from 1968 to 1988 in response to expanding human use of the desert (Boarman 2003). Since ravens were scarce in this area prior to 1940, the current level of raven predation on juvenile DTs is considered to be an unnatural occurrence (BLM 1990).

Construction and operation of the proposed RSPP project would provide new attractants and subsidies that would result in increases in the raven population, which would negatively affect the DT population. The applicant has identified these raven attractants and subsidies as follows: potential creation of new perching/roosting/nesting sites; water ponding from dust suppression; and increase in trash generation during construction and operation that could help support increased raven populations. These impacts are discussed below.

Perching, Roosting, and Nesting Sites

Most raven predation on DT is thought to take place during the spring, most likely by breeding ravens that have been shown to spend most of their time foraging within 1,300 feet of their nests (Kristan and Boarman 2003). Therefore, RSPP structures such as towers, transmission poles and lines, and maintenance buildings that offer new nesting and perching substrates may pose increased risk of predation to nearby DT populations. Staff's proposed Condition of Certification **BIO-13** prescribes the need to

formulate a raven monitoring, management, and control plan. The applicant has prepared a draft plan for raven monitoring that describes in detail methods to control raven populations within and adjacent to the proposed RSPP project site.

Ponding

During construction, water would be applied to the graded areas, construction right-of-way, dirt roads, trenches, spoil piles, and other areas of ground disturbance to minimize dust emissions and topsoil erosion. Ponded water has the potential to attract ravens, thereby potentially resulting in increased DT predation. As described in staff's proposed Condition of Certification **BIO-8**, this potential impact would be minimized by using the minimal amount of water needed for dust abatement, with a Biological Monitor patrolling the construction sites to ensure water does not puddle. The Designated Biologist would be responsible to monitor the site during construction to ensure no ponding occurs.

Food Waste

Ravens are scavengers that forage at landfills, dumpsters , open garbage drums and plastic bags placed on the curb for garbage pickup, and on roadkills. Both the construction and operation phases of the proposed RSPP project would result in increased use of the area by ravens attracted to the grading activity. Increased waste generation in the project area and improper management of waste would attract ravens. Ravens are attracted to dumpsters themselves. This potential impact can be minimized with implementation of measures described in staff's proposed Condition of Certification **BIO-13**, which requires that all food-related waste be placed in self-closing containers and removed daily from the site, and that food not be left unattended on the site.

Cumulative/Regional Impacts of Avian Predators

Construction and operation of the proposed RSPP and subsequent increases in raven predation would contribute incrementally to the cumulative significant impacts to the DT population. The proposed RSPP project site is already subject to elevated raven predation pressure due to effects from adjacent development and any cumulative loss of adult or juvenile tortoises due to the further increase of raven subsidies could have a long-term effect on the regional DT population by further reducing the recruitment of juvenile tortoises into the adult life stages (Boarman 2003). The effects of this shortage may not be apparent for years because tortoises do not typically reach sexual maturity until approximately 15 to 20 years of age.

The USFWS is developing a comprehensive, regional raven management plan that would implement the recommendations in the USFWS *Environmental Assessment to Implement a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise* (USFWS 2008b). The final raven monitoring and management plan for the RSPP site should incorporate recommendations from the USFWS' assessment where applicable.

The USFWS has required other utility-size solar projects in the region to make a payment of an in-lieu fee to a third party account set up by the USFWS to support a regional raven monitoring plan to offset cumulative impacts on DT due to raven range expansion (Blackford 2009). These fees would contribute to a region-wide management and monitoring program in the California Desert Conservation Area, Staff's proposed

Condition of Certification **BIO-13** specifies that the applicant complete a final Raven Management and Monitoring Plan in consultation with staff, CDFG, and USFWS. Staff anticipates that the applicant would be able to produce a final raven monitoring and management plan that would meet the approval of CDFG, USFWS and staff. The in-lieu fee would offset contributions of the project to cumulative impacts associated with regional increases in raven numbers, and the project-specific raven management efforts proposed by the applicant would reduce impacts to DT from raven predation to less-than-significant levels.

Other Predators

In addition to ravens, dogs have emerged as significant predators of DTs. Dogs may range several miles into the desert and have been found digging up and killing DTs (USFWS 1994; Evans 2001). Dogs brought to the proposed RSPP project site with visitors or workers may harass, injure, or kill DTs, particularly if allowed off leash to roam freely in occupied DT habitat. Implementation of staff's proposed Condition of Certification **BIO-6**, the worker environmental awareness training, and restrictions on pets being brought to the site required of all personnel (Condition of Certification **BIO-8**) would reduce the potential for these impacts to below the level of significance.

Increased Risk from Roads/Traffic

Vehicle traffic would increase as a result of proposed RSPP project construction and operation. Improvement of existing access roads would allow for greater access to the site from the general public, thereby increasing the risk of injuring or killing DT, MGS, and other wildlife. Construction of the proposed RSPP project would be completed over a period of approximately 28 months, starting in late 2010 and continuing until early 2013 (SM 2009a, p. 5.8-9). The average would be approximately 405 workers over the course of construction (SM 2009a, p. 5.8-11). An estimated peak of 633 workers would occur in Month 11. Construction is also forecast to generate an average of approximately 100 one-way truck trips per day with a peak of approximately 140 truck trips per day. During operations approximately three truck trips per day are expected, along with estimated vehicular traffic from 84 workers (SM 2009a, p. 5.13-15).

The potential for increased traffic-related tortoise mortality is greatest along paved roads where vehicle frequency and speed is greatest, although tortoises on dirt roads may also be affected depending on vehicle frequency, amount of dust, and speed. Census data indicate that DT numbers decline as vehicle use increases and that tortoise sign increases with increased distance from roads (Nicholson 1978). To minimize the risks of increased traffic fatality and other hazards associated with roads at the proposed RSPP project site, the applicant has proposed a variety of impact minimization measures which staff has added to and incorporated into staff's proposed Condition of Certification **BIO-5**, **BIO-6**, **BIO-7**, and **BIO-8**. These measures include confining vehicular traffic to and from the project site to existing routes of travel, prohibiting cross country vehicle and equipment use by workers outside designated work areas, imposing a speed limit of 15 miles per hour on routes within DT habitat, and placing exclusionary fencing along applicable roads. Staff has also included in Condition of Certification **BIO-8** that speed bumps be used to control vehicle speed. These measures would be expected to reduce impacts to local wildlife from increased traffic to below the level of significance.

Collisions and Electrocution

Birds are known to collide with communications towers, transmission lines, and other elevated structures. The tallest structures at the plant site would be the air cooling system, which would be 120 feet tall. The power block, steam turbine, and other structures would be 55 feet or less in height. These structures at the proposed RSPP project site would be unlikely to pose a collision risk because they are shorter than those typically associated with bird collision events and because bird densities are already low in the project area and would be even lower after the solar fields are built and no habitat is available to attract birds.

Large raptors like golden eagles can be electrocuted by transmission lines when a bird's wings simultaneously contact two conductors of different phases, or a conductor and a ground. This happens most frequently when a bird attempts to perch on a structure with insufficient clearance between these elements. The presence of distribution lines 69 kV or less represents more of a danger to raptors than transmission lines greater than 69 kV, because the spacing between conductors in distribution lines is much less than that of transmission lines (APLIC 1996). The proposed transmission lines would be 115-kV. To minimize risk of electrocution, the applicant has proposed a "raptor-friendly" construction design for the transmission line with conductor wire spacing greater than the wingspans of large birds to help prevent electrocution as described in *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006* (APLIC2006). The proposed mitigation addressed in staff's proposed Conditions of Certification **BIO-8** and **BIO-21** and **BIO-22** will reduce the potential for collisions and electrocutions. Condition of Certification **BIO-21** requires the project owner to complete an Avian and Bat Protection Plan (ABPP), and Condition of Certification **BIO-22** requires the project owner to obtain a Federal Eagle Act Take Permit or show evidence that one is not needed. With the implementation of these conditions of certification, staff concludes that the proposed transmission lines would not pose a significant threat to birds.

Power Plant Related Bird Collisions, Incineration, and Blinding

This project includes reflective mirror-like surfaces that could cause collision fatalities and injuries to birds. The effects of this type of solar collector on birds are currently unknown. Bird fatalities have been reported at prototype Solar One, a central receiver solar power plant that was located near Daggett, California in the Mojave Desert. Solar One consisted of a site of approximately 80 acres covered with 1,818 mirrors, or heliostats, each of which was approximately 74-square-feet in area. These heliostats focused the sun on a centrally located, tower-mounted boiler. When not directed at the tower, the heliostats were focused at standby points, which were four small (16 feet in diameter) points at a height of 260 feet. These points glowed white when viewed from the ground. The temperatures at the standby points varied with the number of heliostats and amount of sunshine, but were high enough to burn feathers and incinerate insects. Though some birds were incinerated, most of the avian fatalities at the Solar One site were from collisions with structures (McCrary, et al. 1986).

Whether or not there is a similar potential for incinerating and/or blinding of birds at the RSPP site is unknown because the technology is different than the site described above. The temperatures reached at the proposed RSPP project site are lower than at

Solar One but still adequate to boil water for electrical power production. Additionally, the question of whether the concentrated sunlight can blind birds has never been answered. This could cause either permanent or temporary blindness resulting in collisions with structures. Blindness was the apparent primary cause of avian fatalities at Solar One. Since the RSPP site will also cause glare from the mirror fields, a similar impact to birds may also occur. There is also concern for collisions with the mirrors that may appear to a bird as a no-hazard flight area. Birds may fly directly into the mirrors not expecting to encounter a hard surface thereby suffering an injury or death.

Given the lack of research-based data on these impacts for the specific technology proposed for the RSPP site, energy commission staff cannot conclusively conclude that significant avian collisions or blinding will occur. However, due to potential for significant impacts, energy commission staff recommends avian monitoring so that if impacts do occur, they can be addressed. Staff's proposed Condition of Certification **BIO-15** requires the applicant to monitor for dead bird for two years after the start of operation, and to publish the study results. If significant impacts are occurring, potential mitigation options would be considered and recommended if reasonable and feasible. Condition of Certification **BIO-21** requires the project owner to complete an ABPP. The ABPP would establish best management practices to reduce impacts to birds.

Lighting

An increase in light and glare at the site would be expected to occur during construction and operation of the project. The behavior of many wildlife species would be affected by both construction lighting and operations lighting. Many wildlife species avoid lighted areas during darkness. The sum of impacts from these avoidance behaviors, including impacts to special status species can reach a significant level over the life of the project. RSPP operations would require on-site nighttime lighting for safety and security, which could disturb nocturnal wildlife. To reduce off-site lighting impacts, lighting at the RSPP facility would be restricted to areas required for safety, security, and operation. Exterior lights would be hooded, and lights would be directed onsite so that light or glare would be minimized. Low-pressure sodium lamps and fixtures of a non-glare type would be specified. Switched lighting would be provided for areas where continuous lighting is not required for normal operation, safety, or security; this would allow these areas to remain un-illuminated (dark) most of the time, thereby minimizing the amount of lighting potentially visible off site. Proposed condition of certification **VIS-8** describes limits to lighting on the site during operation. With implementation of this condition and the general conditions included in **BIO-8**, lighting at the proposed RSPP project site would have impacts on wildlife but they would be less than significant.

Lighting may also be required to facilitate nighttime construction activities, which might disrupt the activities and affect behavior of nocturnal wildlife. As discussed in the Visual Resources section, construction lighting must be consistent with worker safety codes, directed toward the center of the construction site, shielded to prevent light from straying offsite, and task-specific.

With implementation of staff's proposed Condition of Certification **BIO-8** and the conditions supplied by the applicant regarding lighting, construction lighting at the proposed RSPP project site would impact wildlife but those impacts would be reduced to less than significant.

Noise

Sensitive species such as DT, MGS, desert kit fox, American badger, burrowing owls and other special status species would be affected by noise during operation. The noise levels that can result in behavior changes start at a range from 60 dB(A) to 85 dB(A) (Knight and Gutzwiler 1995; Sarigul-Klijn 1997), depending on the study and the species. Operational noise, anticipated to be approximately 42 dBA on average, would be more consistent and at a much lower level than during construction. The Kern County Noise Ordinance limits times that construction can occur, but does not limit construction noise levels (SM 2009a). The power plant would operate an average of about 10 hours a day, 7 days a week throughout the year. The solar field and power generation equipment would be started up each morning after sunrise and insolation build-up, and shut down in the evening when insolation drops below the level required for generating power. Although plant operations would not create a high level of additional noise, it would result in behavioral changes in some wildlife using the area or cause some species to avoid the surrounding area. In the case of some resident animals, they would be able to habituate to routine noise (as from operation).

Noise would most likely impact diurnally active species the most, such as DT and MGS. Staff concludes that operational noise will not result in significant impacts to biological resources.

Dust

Disturbance of the soil's surface caused by operations traffic and other activities such as mirror washing may result in increased erosion of the soil. Aeolian transport of dust and sand can result in the degradation of soil and vegetation over a widening area (Okin et al. 2001). Dust can have deleterious physiological effects on plants and may affect their productivity and nutritional qualities. The applicant will implement erosion control measures both during operation of the proposed RSPP project. The impacts of increased dust and other operation impacts can be minimized with implementation of staff's proposed Condition of Certification **BIO-8** (Impact Avoidance and Minimization Measures) to less than significant levels.

Non Native Invasive Species

It is anticipated that non-native invasive plant species would follow in the wake of disturbance along the linear facilities and project boundary, and could further spread weeds already present in the project vicinity. The introduction of artificial shading caused by the reflectors in an arid environment where light availability was not considered a limiting factor would result in changes to the micro-environments under these structures favoring weedy ephemerals. Studies conducted in the Sonoran and Mojave Deserts have demonstrated that shading resulted in a cooler, moister microhabitat below and near structures (Smith 1984, Smith et al. 1987). The shading and wind deflection caused by the structures decrease the soil temperature extremes and also decrease evaporation from the soil surface. The addition of water due to a

regular mirror washing regimen also increases the humidity of the microhabitat around the solar structures. This change from the normal arid desert environment does not favor the native arid-adapted species and allows the weedy ephemerals to colonize (Smith 1984). Smith's 1984 study also demonstrated that plant biomass had substantially increased in and around the solar structures, possibly resulting in an increase of rodents and their predators.

To avoid and minimize the spread of existing weeds and the introduction of new ones, an active weed management strategy and control methods must be implemented. The applicant has provided a draft Weed Management Plan (SM 2010a) to avoid and minimize the adverse effects of noxious weeds. Staff concurs with the recommendations in the applicant's Weed Management Plan, and has incorporated them into staff's proposed Condition of Certification **BIO-19**, (Weed Management Plan). The Weed Management Plan will include a discussion of weed eradication and control methods, preventative measures to be implemented during operation such as weed monitoring and management, weed control in areas where irrigation and mirror washing take place, and long-term reporting requirements. Implementation of staff's proposed Condition of Certification **BIO-19** would lessen the impact of noxious weeds to less than significant levels.

Biological Resources Table 4 summarizes the potential impacts to special status species found within the proposed RSPP site.

Biological Resources Table 4
Summary of Impacts/Mitigation

Biological Resource	Impact/Mitigation
Desert Tortoise	**Impacts:** Project construction and operation will result in direct, indirect, and cumulative impacts to DT resulting from loss of 2,002 acres of high value habitat supporting approximately 69 tortoises, habitat fragmentation, and risk of fatality of individuals from construction equipment, increased traffic and increased predation rates. Indirect effects may also occur from project construction and operation such as increased traffic mortality, dust control, increased lighting, and dust. **Mitigation:** Full mitigation for the loss of this high value location for DT is not possible. The loss of this high density site will result in residual effects even with the acquisition of compensation lands. If the site is permitted, the following conditions of certification will help reduce impacts but not below a significant level. Implementation of Conditions of Certification (COCs) **BIO-6** (Worker Environmental Awareness Training), **BIO-7**(BRMIMP), **BIO-8** [Impact Avoidance and Minimization Measures (Best Management Practices)], **BIO-9** (Desert tortoise translocation plan), **BIO-10** (Desert tortoise clearance and fencing), **BIO-12** (Desert tortoise and Mohave ground squirrel compensatory mitigation), **BIO-13** (Raven monitoring, management, and control plan), and **BIO-19** (Weed management plan)
Mohave Ground Squirrel	**Impacts:** Project construction and operation will result in direct, indirect, and cumulative impacts to MGS resulting from loss of 2,002 acres of suitable habitat, habitat fragmentation, risk of fatality to individuals from construction equipment, increased traffic and increased roadkill rates, and the loss of all or portions of the connectivity provided by the physical project site. **Mitigation:** Full mitigation for the loss of this high value location for MGS connectivity between northern and southern MGS populations is not possible; no other location provides this function or could be enhanced to offset the loss of this function. The loss of this valuable connectivity location will result in residual effects even with the acquisition of compensation lands. If the site is permitted, the following conditions of certification will help reduce impacts but not below a significant level. Implementation of COCs **BIO-6** (Worker Environmental Awareness Training), **BIO-7** (BRMIMP), **BIO-8** [Impact Avoidance and Minimization Measures (Best Management Practices)], **BIO-11** (Mohave ground squirrel clearance surveys), **BIO-12** (Desert tortoise and Mohave ground squirrel compensatory mitigation), and **BIO-19** (Weed Management Plan)

Biological Resource	Impact/Mitigation
Golden Eagle	**Impacts:** Project construction and operation would result in direct loss of 2,002 acres of foraging habitat for golden eagles. Cumulative impacts include habitat fragmentation, increased traffic, and increased human activity reducing the foraging value of the RSPP site vicinity. **Mitigation:** Implementation of COCs **BIO-6** (Worker Environmental Awareness Training), **BIO-7** (BRMIMP), **BIO-8** [Impact Avoidance and Minimization Measures(Best Management Practices)], **BIO-12** (Desert tortoise and Mohave ground squirrel compensatory mitigation), **BIO-22** (requires the project owner to complete an Avian and Bat Protection Plan (ABPP)), and **BIO-23** requires the project owner to obtain a Federal Eagle Act Take Permit or show evidence that one is not needed.
Burrowing Owl	**Impacts:** Project construction and operation can result in direct and indirect impacts to burrowing owl resulting from loss of 2,002 acres of suitable habitat, habitat fragmentation, risk of fatality to individuals from construction equipment, increased traffic and increased predation rates. **Mitigation:** Implementation of COCs **BIO-6** (Worker Environmental Awareness Training), **BIO-7** (BRMIMP), **BIO-8** [Impact Avoidance and Minimization Measures(Best Management Practices)], **BIO-12** (Desert tortoise and Mohave ground squirrel compensatory mitigation), **BIO-14** (Pre-construction nest surveys and impact avoidance measures), **BIO-15** (Monitoring Impacts of Technology on Birds), **BIO-17** (Burrowing owl impact avoidance and minimization measures), and **BIO-22** (requires the project owner to complete an Avian and Bat Protection Plan (ABPP)).
American Badger	**Impacts:** Project construction and operation can result in direct and indirect impacts to American badger resulting from loss of 2,002 acres of suitable habitat, habitat fragmentation, risk of fatality to individuals from construction equipment, and increased traffic. **Mitigation:** Implementation of COCs **BIO-6** (Worker Environmental Awareness Training), **BIO-7** (BRMIMP), **BIO-8** [Impact Avoidance and Minimization Measures(Best Management Practices)], **BIO-12** (Desert tortoise and Mohave ground squirrel compensatory mitigation), and **BIO-16** (American badger and desert kit fox impact avoidance and minimization measures).
Desert Kit Fox	**Impacts:** Project construction and operation can result in direct and indirect impacts to desert kit fox resulting from loss of 2,002 acres of suitable habitat, habitat fragmentation, risk of fatality to individuals from construction equipment, increased traffic and increased predation rates. **Mitigation:** Implementation of COCs **BIO-6** (Worker Environmental Awareness Training), **BIO-7** (BRMIMP), **BIO-8** [Impact Avoidance and Minimization Measures (Best Management Practices)], **BIO-12** (Desert tortoise and Mohave ground squirrel compensatory

Biological Resource	Impact/Mitigation
	mitigation), and **BIO-16** (American badger and desert kit fox impact avoidance and minimization measures).
Bird Species Protected by MBTA	**Impacts:** Project construction can result in loss of suitable nesting and foraging habitat, increased fatality associated with impacts with construction equipment, collisions with solar reflectors, and death or injury associated with interactions with concentrated solar beams. **Mitigation:** Implementation of COCs **BIO-6** (Worker Environmental Awareness Training), **BIO-7** (BRMIMP), **BIO-8** [Impact Avoidance and Minimization Measures (Best Management Practices)], **BIO-12** (Desert tortoise and Mohave ground squirrel compensatory mitigation), **BIO-14** (Pre-construction nest surveys and impact avoidance measures), **BIO-15** (Monitoring Impacts of Technology on Birds), and **BIO-22** (requires the project owner to complete an Avian and Bat Protection Plan (ABPP)).
Dust related to project construction and operation	**Impacts:** Increased dust emissions during project construction may negatively impact surrounding vegetation and therefore reduce habitat values for local wildlife species. **Mitigation:** Implementation of COC **BIO-8** [Impact Avoidance and Minimization Measures (Best Management Practices)].
Noise related to project construction and operation	**Impacts:** Increased noise during project construction and operation can interfere with vocalizations and other social interactions of local wildlife. Increased noise will cause avoidance of areas adjacent to the project or abandonment of active nests, burrows or defended territories. **Mitigation:** Implementation of applicant's noise best management practices.
State Waters	**Impacts:** The exact extent of project-related impacts to state waters is currently unknown. However, impacts to state waters are expected from implementation of the project. **Mitigation:** Implementation of COC **BIO-18** (Lake and streambed impact minimization and compensation measures), if necessary.

DECOMMISSIONING

In the future, the proposed RSPP project site would experience either a planned closure or could experience an unexpected (either temporary or permanent) closure. Temporary closure may be a result of necessary maintenance, hazardous weather conditions, or damage due to a natural disaster. Permanent closure would be a result of damage that is beyond repair, adverse economic conditions, project technology becoming obsolete, or other significant reasons. A Decommissioning and Reclamation Plan must be

prepared and approved by BLM and the Energy Commission. When facility closure occurs, it must comply with that Decommissioning and Reclamation Plan.

The process of decommissioning the proposed RSPP project site could potentially impact biological resources in the area. The proposed RSPP site itself would presumably have little or no value for biological resources at the time of decommissioning. All significant vegetation would have been removed during construction and maintained relatively free of vegetation during operation of the RSPP. However, potential impacts could occur to native habitats and species that occur in close proximity to the proposed RSPP project site.

Staff's proposed Condition of Certification **COMPLIANCE-11** requires the Applicant to develop a Decommissioning and Reclamation Plan and cost estimate that meets the requirements of BLM's 43 CFR 3809.550 et seq. Staff acknowledges the uncertainty in planning for conditions 30 to 50 years in the future, but the Decommissioning and Reclamation Plan cannot defer establishing reasonable performance standards and goals until that time. The plan must explicitly state that the goals of reclamation include restoration of the site's topography and hydrology to a relatively natural condition and restoration of native plant communities. The plan must also provide guidelines for developing milestones and specific, quantitative success criteria for parameters such as native plant density and diversity and percent cover for weeds, thresholds that would trigger remedial actions, and information about what those remedial actions would be. The plan should also provide an approximate outline and schedule for monitoring the success of the reclamation effort. Staff recommends that the reclamation plan establish at least a 10-year monitoring period to achieve revegetation success criteria because of the slow pace of restoration in a desert environment.

C.2.4.3 MITIGATION UNDER CEQA

The practice of land acquisition and enhancement, translocation of DT or MGS, highway fencing, raven management and even DT breeding as means to offset the loss of habitat and individual DT and MGS would not be effective mitigation under CEQA in this specific project.

The proposed site's high value habitat and tortoise concentration will not be possible to replace through CEQA required mitigation because the impact is not merely a question of numbers, but the loss of this particular unique site and its characteristics that allow it to support such a high density of DT and provide connectivity for MGS. Adding DT to the region from elsewhere or somehow accelerating their rate of reproduction does not fully mitigate the significant impacts associated with the development of this unique area of land. Most translocated tortoises leave the release site (Kristin Berry, Personal Communication) and acquiring mitigation land elsewhere will not create the same density of DT as on the proposed site and such density is critical in supporting long term populations in the Ridgecrest area. Likewise, another piece of land will not replace the lost connectivity for MGS.

The applicant has recommended impact avoidance and minimization measures to reduce construction impacts to DT, including installation of exclusion fencing to keep DT

out of construction areas, reducing construction traffic, speed limits, and fencing roads to reduce the incidence of road kills, worker training programs, translocation, and other measures.

In the event the Commission approves the project, staff believes such measures should be used as a means to lessen impacts. Staff has incorporated these recommendations into conditions of certification. These include staff's proposed Conditions of Certification **BIO-1** through**BIO-8** which apply to protection of DTs and other biological resources in and near the proposed RSPP site. Staff's proposed Condition of Certification **BIO-10** would involve installation of security and DT exclusionary fencing around the entire project site. Implementation of staff's proposed Conditions of Certification **BIO-9** and **BIO-10** could result in direct effects to DTs such as fatality, injury, or harassment of DTs due to equipment operation during fence construction, fence installation activities, removal of tortoise burrows, and tortoise relocation or translocation. Installation of exclusionary fencing at the perimeter of the project area would also fragment habitat for DT and home ranges of individual tortoises. At other developments, exclusionary fencing has experienced numerous problems such as breaches, wash outs, tortoises returning to home sites, and getting through breaks in the fence or open gates.

Translocation is not considered mitigation but salvage because of the high mortality rate associated with moving DTs off of their home range. Capturing, handling, and relocating/translocating DTs from the proposed site after the installation of the fencing could result in harassment and possibly death or injury. Tortoises may die or become injured by capture and relocation if these methods are performed improperly, particularly during extreme temperatures, or if they void their bladders. Averill-Murray (2001) determined that tortoises that voided their bladders during handling had significantly lower overall survival rates (0.81-0.88) than those that did not void (0.96). In addition, if DTs are handled by biologists without the use of appropriate protective measures, pathogens may be spread among the translocated tortoises or resident tortoises on the translocation site. For those tortoise near but not within the RSPP site, removal of habitat within a tortoise's home range or segregating individuals from their home range with a fence would likely result in displacement stress that could result in loss of health, exposure, increased risk of predation, increased intra-specific competition, and death. Fatality for translocated DTs has been estimated at approximately 44 percent over a 21-month period for one part of the Fort Irwin translocation project (Kristin Berry, personal communication). Based on data from several translocation studies, some tortoises moved outside their home ranges will attempt to return to their original home sites, thus exposing them to adverse effects associated with project construction and predation.

The CDFG expressed concerns about impacts to resident tortoises that may engage in "fence-walking" to try to pass through the fence. Fence-walking typically occurs when a tortoise is moved out of its home range or a fence is placed within or across its home range. While there have not been any quantitative scientific studies of this behavior, it has been observed with captive tortoises with the Fort Irwin relocation, during the Hyundai test track translocation activities, and by researchers associated with the Ft. Irwin project. Such behavior would result in increased exposure to predation and increased levels of stress.

Compensatory Mitigation

Many of California's wildlife populations are declining because the state has developed thousands of square miles of natural communities and associated wildlife during the last two centuries. Energy development projects along with other types of development contribute to these declines.

If impacts cannot be avoided, then compensatory mitigation is needed for projects that contribute directly, indirectly and/or cumulatively to the incremental degradation and decline of the state's natural communities and wildlife populations. Other large-scale energy projects in California are subject to a rigorous environmental review and approval process, and generally include compensatory mitigation requirements to offset impacts to biological resources. The compensatory mitigation approach recommended in this document is consistent with that of other utility-scale energy developments. Staff believes that compensatory mitigation along with the other conditions of certification will satisfactorily mitigate many of the RSPP project impacts, however, on this project, compensatory mitigation will not fully mitigate the loss of MGS connectivity nor the loss of a high value DT location. The unique characteristics and geographic location of this site makes it irreplaceable.

Compensatory Mitigation: A Standard Tool to Offset Wildlife Impacts

The Energy Commission and other resource agencies commonly use compensatory mitigation as a tool to offset the project-related and/or cumulative loss of biological resource values from impacts that could not be avoided or minimized. Compensatory mitigation is the key element of federal Habitat Conservation Plans and California Natural Community Conservation Plans. The intent of the compensatory mitigation approach proposed here is to offset losses of biological resource values with land acquisitions, conservation easements, and opportunistic management of those lands to enhance biological resource values.

Compensatory mitigation does not replace avoidance, minimization, or other types of mitigation measures but works in concert with them, and is used when minimization and avoidance measures are inadequate to avoid indirect, direct, and/or cumulative biological resource impacts.

Objective of Compensatory Mitigation

The objective of compensatory mitigation is to offset to the extent practicable the anticipated take, displacement effects, and habitat loss by providing compensatory mitigation lands with some biologically relevant nexus to the impact. The mitigation lands should maintain the number and the range of the impacted species by creating new functional habitat, enhancing or restoring existing functional habitat, and/or initiating management actions in habitats to increase function (carrying capacity) and reduce/control adverse conditions (exotics, nest predators).

The California Endangered Species Act (CESA) requires that projects "fully mitigate" all impacts on the protected species:

> *The applicant will minimize and fully mitigate the impacts of the take authorized under the permit. The measures required to meet this obligation shall be roughly proportional in extent to the impact of the authorized taking on the species. Where various measures are available to meet this obligation, the measures required shall maintain the applicant's objectives to the greatest extent possible. All required measures shall be capable of successful implementation. For purposes of this section only, impacts of taking include all impacts on the species that result from any act that would cause the proposed taking* (14 CCR § 783.4).

These CESA requirements can be achieved by implementing the following:

- The conservation of large, contiguous habitat areas;
- The conservation of essential habitat (nest trees, breeding areas, wintering/roost areas, foraging habitat, migratory rest areas);
- The conservation and restoration of habitat connectivity corridors including migratory flyways, decreasing habitat fragmentation and maximizing species distribution across its range;
- The conservation of population structures and genetics; and
- The management of lands to enhance resources for target species.

Compensation Methodology, Management & Funding Compensation Mechanism

Staff and CDFG agree that compensatory mitigation at a 5:1 ratio is appropriate for RSPP impacts. However, some differences remain between the federal and state approach to compensatory mitigation that currently preclude a complete integration of compensatory mitigation requirements. For example, the BLM's CDCA Plan requires a 5:1 compensation ratio for the southern portion of the RSPP site south of Brown Road, and a 1:1 ratio for the northern portion, north of Brown Road. Another difference is the state requirement for permanent protection of acquired mitigation lands. Energy Commission staff and CDFG require that mitigation lands acquired for endangered species be maintained and protected in perpetuity for the benefit of those species. The BLM cannot always make the same commitment to protecting acquired mitigation lands because their multiple use mandate restricts their ability to designate lands solely for conservation purposes and to exclude potentially incompatible development and activities.

The details of the compensatory mitigation for the RSPP have not been agreed to and will be worked out by early summer of 2010. Some type of satisfactory distribution of compensation lands between CDFG and BLM is anticipated.

Management and Monitoring

Management and monitoring of the compensatory mitigation land is critical to achieving full mitigation. The management and monitoring should include measurable

performance standards/success criteria. In addition, adaptive management/contingency plans are needed to address reasonably foreseeable potential changes in site conditions or failure to meet success criteria. The applicant or the approved land management organization will prepare a management plan for the compensatory parcel(s) and it must be approved by Energy Commission staff, CDFG, BLM, and USFWS (see Condition of Certification **BIO-12** for details). Finally, an annual report made to the involved agencies is essential to inform the staff's of the Energy Commission, BLM, USFWS, and CDFG, as to the success of the compensatory mitigation and whether management changes are needed.

Funding

Compensatory mitigation requires assurances of funding sufficient to cover habitat acquisition, restoration costs, long-term (in perpetuity) management costs, and all monitoring and reporting associated with implementing a management plan, including funds to cover contingency actions needed due to failure to meet performance standards. This funding would be calculated in a manner that ensures the adequate funding of land and species monitoring and maintenance requirements in perpetuity. The Property Analysis Record (PAR) is a commonly used and accepted software tool developed by the Center for Natural Lands Management (2008) to help land managers calculate endowment amounts for specific projects. Generally, staff and the CDFG will require security (a letter of credit or alternative mechanism that can be released as components of mitigation are achieved unless the mitigation is secured in advance of project impacts), funds for enhancement of off-site compensatory habitat, and a non-wasting permanent endowment of an amount sufficient that the average annual interest funds management activities. In some cases, permit conditions for low impact projects with no impacts to listed species can be sufficient for enforcing performance standards and requiring compliance without requiring additional financial assurances. Use of mitigation banks requires either security that will be released upon proof of purchase of credits or purchase of credits prior to impacts. The BLM and USFWS have guidance and requirements that will also apply.

The various costs of compensatory mitigation have not yet been determined for the RSPP.

Ridgecrest Solar Power Plant Compensatory Mitigation

Compensatory mitigation for primarily DT and MGS, but also for other special status species, typically involves balancing the acreage of habitat loss with acquisition of lands that would be initially improved, protected and maintained to support healthy populations of the impacted species. The compensation is achieved by improving the carrying capacity of the acquired acreage (for example, by habitat restoration, fencing, road closures) so that more DT and MGS will survive and reproduce on these lands, thus offsetting, over time, the decrease in numbers of these species resulting from the RSPP caused losses.

To fully offset impacts, the California Endangered Species Act (CESA) requires a full mitigation finding. On past energy projects considered by the Energy Commission, staff and the CDFG has required a 3:1 to 5:1 habitat compensation ratio to meet the California Endangered Species Act full mitigation standard for habitat such as that found

at the RSPP project site. CDFG has required 5:1 on numerous other projects. The higher ratio reflects projects that would result in impacts to multiple listed species and the limits to increases in carrying capacity that can be achieved on the acquired lands, even with implementation of all possible protection and enhancement measures.

Energy Commission staff proposes compensation at a 5:1 ratio for the impacts of the RSPP. This compensation ratio is consistent with past Energy Commission projects and with Incidental Take Permits (ITPs) issued by CDFG in the region. BLM requires that the southern portion of the site which is within the MGS Conservation Area, be compensated at a ratio of 5:1 and the northern half which is not in the MGS Conservation Area to be compensated at a 1:1 ratio. Staff recommends a 5:1 compensation ratio for the entire proposed RSPP site since biologically the southern and northern portions of the site are equally valuable. Using a 5:1 ratio means 10,010 acres would need to be acquired for mitigation of impacts to 2,002 acres of habitat.

The compensation lands must support both DT and MGS. If both species were not present within the compensation lands, then additional compensation acreage would likely be required to ensure suitable habitat conservation is available for both MGS and DT.

ALTERNATIVES ANALYSIS

Five alternatives, including the current proposed project, were analyzed for the proposed RSPP project alternatives analysis. These include the Northern Unit Only Alternative, the Southern Unit Only Alternative, the Original Proposed Project Alternative and three no project alternatives. The analysis of No Project Alternatives finds no significant impacts to listed DT or MGS. All alternatives that impact habitat at any portion of the proposed RSPP project site are found to result in significant impacts that cannot be fully mitigated because this physical location is irreplaceable as previously discussed above.

Staff has found the proposed RSPP project location very important for MGS connectivity and does not believe impacts to the site can be fully mitigated. In this case it is the location, the physical site with its habitat and location relative to known populations of MGS that cannot be mitigated. No other location can provide a viable long-term linkage between the Little Dixie Wash and Olancha core MGS populations and MGS populations to the south and east of the RSPP site. Similarly, the site supports a high-density population of DT relative to other populations in the Western Mojave and is irreplaceable. The proposed RSPP area has a relatively high density of DT and is surrounded by areas with low DT densities. In the case of DT it is also a geographic location with diverse vegetation, rich soils and an estimated 69 DTs on site. The site cannot be fully mitigated for DT impacts because the habitat qualities that support the high density of DT are not available on mitigation lands. Therefore, staff finds that the current proposed project, the original proposed project, the northern unit alternative, and the southern unit alternative still contain residual effects pertaining to loss of DT density and MGS connectivity because the site characteristics that support these factors on the proposed RSPP site cannot be duplicated through the acquisition of compensation lands at any compensation ratio.

Although staff finds the proposed RSPP project to have significant impacts that cannot be fully mitigated, mitigation measures have been developed to reduce impacts not related to loss of high-density DT habitat or MGS movement corridors. The analysis below discusses potential impacts to biological resources associated with each proposed alternative.

C.2.5 ALTERNATIVE 1-NORTHERN SOLAR UNIT ONLY

The Northern Solar Unit Only Alternative would eliminate the southern solar unit as part of the proposed project. This alternative would reduce the area proposed for development from 2,002 acres to 1,134.3 acres (43 percent reduction in project area), and reduce the generation capacity of the project from 250 MW under the proposed project to 146 MW (42 percent of the proposed generation capacity). This alternative would be composed of a 1,118-acre power block and a water pipeline impacting 16.3 acres for a total of 1,134 acres of impact. This alternative would avoid a majority of direct impacts to El Paso Wash. This alternative would avoid direct impacts to the designated Mohave Ground Squirrel Conservation Area south of Brown Road. This alternative would cause significant impacts to MGSs and DTs due to development of a portion of the physical site that has physical characteristics as described previously that cannot be fully mitigated.

C.2.5.1 SETTING AND EXISTING CONDITIONS

The general setting and existing conditions would remain as described in section **C.2.4.1 SETTING AND EXISTING CONDITIONS**. This alternative would be located entirely north of Brown Road. As with the current proposed project, the entire northern field contains 1,134 acres of suitable habitat for DT, MGS, WBO, desert kit fox, and American badger.

C.2.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Northern Unit Only Alternative would impact 1,134.3 acres of Mojave creosote bush scrub and desert wash scrub habitat. Compensatory mitigation for impacts DT, MGS, and waters of the state resulting from this alternative would be reduced to correspond to the reduced impact acreage. As with the proposed project, the Northern Unit Only Alternative would result in a loss of high value habitat for DT, MGS, and other special status species. The loss of the high-density DT habitat and connectivity for MGS are impacts that cannot be fully mitigated with the acquisition of compensation lands. The reduced level of development associated with the northern unit only alternative may reduce the severity of the loss of MGS connectivity. However, any development in the vicinity of the proposed RSPP site is likely to have severe impacts to MGS connectivity because the existing suitable movement corridor is already narrow (2.5 miles). Therefore, these impacts would result in a residual effect for this alternative even after the acquisition of mitigation lands. Specific mitigation measures for impacts that may occur during construction would be the same as those for the proposed project and include: staff's proposed Conditions of Certification **BIO-8** [Impact Avoidance and Minimization Measures(Best Management Practices)], **BIO-10** (Desert Tortoise Clearance Surveys), **BIO-12** (Desert Tortoise and Mohave Ground Squirrel Habitat

Compensatory Mitigation), **BIO-16** (American Badger and Desert Kit Fox Clearance Surveys, Relocation/Translocation, and Monitoring), and **BIO-19** (Weed Management Plan).

Under this alternative, direct impacts to El Paso Wash would be generally avoided. Smaller washes would be directly impacted. The extent of this impact is currently unknown pending completion of the revised delineation of waters of the state. Project construction and facility operation would result in indirect impacts to El Paso Wash and remaining washes due to construction noise, facility operation noise, and facility lighting. Mitigation for these potential indirect impacts would be the same as the proposed project and would include staff's proposed Conditions of Certification **BIO-8 [**(Impact Avoidance and Minimization Measures (Best Management Practices)] and **BIO-18** (Lake or Streambed Impact Minimization and Compensation Measures).

Although the Northern Unit Only Alternative would result in impacts to less American badger and desert kit fox habitat as compared to the proposed project, direct impacts to these species such as substantial loss and fragmentation of habitat would still occur. In addition, crushing or entombing of these animals during construction and facility operation could potentially occur. Mitigation for these impacts would be the same as that proposed under the proposed project (i.e., staff's proposed Condition of Certification **BIO-16** [American Badger and Desert Kit Fox Clearance Survey, Relocation/Translocation Plan, and Long Term Monitoring]).

The extent of habitat loss for WBO, golden eagle, loggerhead shrike, Le Conte's thrasher, and other special status birds under this alternative would be reduced as compared to the proposed project. Potential loss of nests, eggs, or young during construction and operation of the facility could potentially occur. In addition, loss of breeding and foraging habitat for these species would occur. Local and migratory bird species may be potentially injured or killed from collisions with project structures, or injured or killed from interactions with concentrated sun light produced by the facility. Mitigation for these impacts would be the same as those proposed under the proposed project, (i.e., staff's proposed Conditions of Certification **BIO-14** (Pre-construction Nest Surveys) would avoid these potentially significant impacts to nesting birds. It is unknown if birds will collide with the facility mirrors or experience retina burn (blinding) or be incinerated by flying through the concentrated sun light. In order to understand this potential impact, Condition of Certification **BIO-15** (Monitoring Impacts of Technology on Birds) has been included as a condition of certification. This condition would require monitoring for these impacts to birds. Potential impacts to WBOs would be mitigated by Condition of Certification **BIO-17** (Burrowing Owl Impact Avoidance, Clearance Surveys, Relocation/Translocation Plan, and Long-term Monitoring Plan). To further reduce impacts, Condition of Certification **BIO-22** requires an Avian and Bat Protection Plan, and Condition of Certification **BIO-23** requires a Federal Eagle Act Take Permit or show evidence that one is not needed.

Several special status plant species have the potential to occur within the project area, although none were observed during spring surveys in 2009. This alternative could potentially result in direct or indirect impacts to special status plant species from

construction and fragmentation of habitat. Mitigation for these potential impacts would be similar to those proposed under staff's proposed Conditions of Certification **BIO-19** (Weed Management Plan).

The impacts from roads and traffic to local wildlife would be similar with the decrease in the size of the solar field although the construction and operation traffic may be slightly reduced because of the smaller construction area and smaller operation that may require fewer permanent employees. Mitigation for impacts would be the same as mitigation under the proposed project (i.e., staff's proposed Condition of Certification **BIO-8** [Impact Avoidance and Minimization Measures (Best Management Practices)].

C.2.5.3 CEQA LEVEL OF SIGNIFICANCE

Staff considers project compliance with LORS and staff's proposed conditions of certification for the proposed project to be insufficient to mitigate the significant impacts to biological resources of the Northern Field Only alternative to less than significant levels under CEQA or fully mitigate the impacts to MGS and DT as required by CESA. This alternative would cause unmitigated significant impacts to MGSs and DTs due to loss of a portion of the physical site even after acquisition of compensation lands. The development of this particular location would result in residual effects as described previously.

C.2.6 ALTERNATIVE 2-SOUTHERN UNIT ONLY

The Southern Unit Only Alternative would eliminate the northern solar unit as part of the proposed project. This alternative would reduce the area proposed for development from 2,002 acres to 908 acres, and reduce the generation capacity of the project from 250 MW under the proposed project to 104 MW (42 percent of the proposed generation capacity). This alternative would avoid a majority of direct impacts to El Paso Wash. This alternative would cause significant impacts to MGSs and DTs due to development of a portion of the RSPP site. This alternative would cause significant unmitigable impacts to MGSs and DTs due to development of a site that has physical characteristics that cannot be fully mitigated as described previously.

C.2.6.1 SETTING AND EXISTING CONDITIONS

The general setting and existing conditions would remain as described in section **C.2.4.1 SETTING AND EXISTING CONDITIONS**. This alternative would be located entirely south of Brown Road. As with the current proposed project, the entire southern field contains 908 acres of suitable habitat for DT, MGS, WBO, desert kit fox, and American badger.

C.2.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Southern Unit Only Alternative would impact 908 acres of Mojave creosote bush scrub and desert wash scrub habitat. The Southern Unit Only Alternative would result in a loss of high value habitat for DT, MGS, and other special status species. There were fewer recorded observations of DT on the southern unit during focused surveys. This and the reduced amount of development may reduce the overall impact to the local DT population. However, it is likely that DT in the project vicinity utilize the entire area on

both sides of the road for foraging and burrowing as part of their home range and the loss of the southern field would likely impact DTs to the north of Brown Road. The reduced level of development may reduce the severity of the loss of MGS connectivity. However, any development in the vicinity of the proposed RSPP site is likely to have severe impacts to MGS connectivity because the existing suitable movement corridor is already narrow (2.5 miles). These impacts would likely result in a residual effect for this alternative even after the acquisition of mitigation lands. Specific mitigation measures for impacts that may occur during construction would be the same as those for the proposed project and include: staff's proposed Conditions of Certification **BIO-8** [(Impact Avoidance and Minimization Measures(Best Management Practices)], **BIO-10** (Desert Tortoise Clearance Surveys), **BIO-12** (Desert Tortoise and Mohave Ground Squirrel Habitat Compensatory Mitigation), **BIO-16** (American Badger and Desert Kit Fox Clearance Surveys, Relocation/Translocation, and Monitoring), and **BIO-19** (Weed Management Plan).

Under this alternative, direct impacts to El Paso Wash would generally be avoided. Smaller washes would be directly impacted. The extent of this impact is currently unknown pending completion of the revised delineation of waters of the state. Indirect impacts to washes would result in reduced capacity of the washes to function due to construction noise, facility operation noise, and facility lighting. Mitigation for these potential indirect impacts would be the same as the proposed project and would include staff's proposed Conditions of Certification **BIO-8** and **BIO-18**.

Although the Southern Unit Only Alternative would result in impacts to fewer acres of American badger and desert kit fox habitat as compared to the proposed project, direct impacts to these species such as substantial loss and fragmentation of habitat would still occur. In addition, crushing or entombing of these animals during construction and facility operation could potentially occur. Mitigation for these impacts would be the same as that proposed under the proposed project (i.e., staff's proposed Condition of Certification **BIO-16**.

The acres impacted for WBO, golden eagle, loggerhead shrike, Le Conte's thrasher, and other special status birds under this alternative would be reduced as compared to the proposed project. The loss of nests, eggs, or young during construction and operation of the facility could potentially occur. In addition, loss of breeding and foraging habitat for these species would occur. Local and migratory bird species may be potentially injured or killed from collisions with project structures, or injured or killed from interactions with concentrated sunlight produced by the facility. Mitigation for these impacts would be the same as those proposed under the proposed project, (i.e., staff's proposed Conditions of Certification **BIO-14** would avoid these potentially significant impacts to nesting birds. It is likely that birds will collide with the facility mirrors or experience retina burn (blinding) or incineration by flying through the concentrated sun light. In order to understand this potential impact, **BIO-15** has been included as a condition of certification. This condition would require monitoring for these impacts to birds. Potential impacts to WBOs would be further mitigated by Condition of Certification **BIO-17**. To further reduce impacts, Condition of Certification **BIO-22** requires an Avian and Bat Protection Plan, and Condition of Certification **BIO-23** requires a Federal Eagle Act Take Permit or show evidence that one is not needed.

Several special status plant species have the potential to occur within the project area, although none were observed within the project area. This alternative could potentially result in direct or indirect impacts to special-status plant species from construction and fragmentation of habitat. Mitigation for these potential impacts would be similar to those proposed under the proposed project (i.e., staff's proposed Conditions of Certification **BIO-19**.

The impacts from roads and traffic to local wildlife would be similar and maybe slightly reduced with the decrease in the size of the solar field. Mitigation for impacts would be the same as mitigation under the proposed project (i.e., staff's proposed Condition of Certification **BIO-8**.

C.2.6.3 CEQA LEVEL OF SIGNIFICANCE

Staff considers project compliance with LORS and staff's proposed conditions of certification for the proposed project to be insufficient to fully mitigate the significant impacts to biological resources of the Southern Field Only alternative to less than significant levels under CEQA or fully mitigate the impacts to MGS and DT as required by CESA. This alternative would cause significant impacts to MGSs and DTs due to loss of a portion of the physical site. The loss of this high value location is irreplaceable.

C.2.7 ALTERNATIVE 3-ORIGINAL PROPOSED PROJECT

The Original Proposed Project Alternative would directly impact 1,794 acres of habitat. This alternative would also directly impact El Paso Wash and its associated ephemeral drainages by rerouting the wash around the development area. This alternative would result in a slight reduction of the impact acreage (from 2,002 acres for the current proposed project to 1,794 acres). The generation capacity of the Original Proposed Project Alternative would remain at 250 MW. This alternative would cause significant unmitigable impacts to MGSs and DTs due to development of a site that has physical characteristics that cannot be fully mitigated as described previously. This alternative would also have the additional impacts resulting from the rerouting of El Paso Wash.

C.2.7.1 SETTING AND EXISTING CONDITIONS

The general setting and existing conditions would remain as described in section **C.2.4.1 SETTING AND EXISTING CONDITIONS** for the current proposed project.

C.2.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Original Proposed Project Alternative would impact 1,794 acres of Mojave creosote bush scrub and Mojave Desert wash scrub habitat. Mojave Desert wash scrub habitat is a unique vegetation community. The Original Proposed Project Alternative would result in a loss of high value habitat for DT, MGS, and other special status species. These impacts would result in residual effects for this alternative even after the acquisition of mitigation lands. The impact to MGS connectivity would be the most severe under this alternative because of the impact to El Paso Wash. Specific mitigation measures for impacts that may occur during construction would be the same as those for the proposed project and include: staff's proposed Conditions of Certification **BIO-8**, **BIO-10**, **BIO-12**, **BIO-16**, and **BIO-19**.

Under this alternative, direct impacts to El Paso Wash and its associated washes would occur. The vegetation community within El Paso Wash (Mojave Desert wash scrub) is a unique community that is relatively rare in the western Mojave Desert. Impacts to these areas cannot be fully mitigated because of the relative rarity of this community. The importance of the physical location to MGSs and DTs, and the difficulty of re-creating the hydrology on which the community depends would make full mitigation impossible. In addition, project construction and facility operation under this alternative would result in indirect impacts to the adjacent habitat resulting in reduced value as habitat. Mitigation for these potential indirect impacts would be the same as the proposed project and would include staff's proposed Conditions of Certification **BIO-8** and **BIO-18**.

Although the Original Proposed Project Alternative would impact fewer acres of American badger and desert kit fox habitat, direct impacts to these species such as substantial loss and fragmentation of habitat would still occur. In addition, crushing or entombing of these animals during construction and facility operation could potentially occur. Mitigation for these impacts would be the same as that proposed under the proposed project (i.e., staff's proposed Condition of Certification **BIO-16**.

Fewer acres of habitat for WBO, golden eagle, loggerhead shrike, Le Conte's thrasher, and other special status birds would be impacted under this alternative. Potential loss of nests, eggs, or young during construction and operation of the facility could potentially occur. In addition, loss of breeding and foraging habitat for these species would occur. Local and migratory bird species may be potentially injured or killed from collisions with project structures, or injured or killed from interactions with concentrated sunlight produced by the facility. Mitigation for these impacts would be the same as those proposed under the proposed project, (i.e., staff's proposed Conditions of Certification **BIO-14** would avoid these potentially significant impacts to nesting birds. It is unknown if birds will collide with the facility mirrors or experience retina burn (blinding) or incineration by flying through the concentrated sun light. In order to understand this potential impact, **BIO-15** has been included as a condition of certification. This condition would require monitoring these impacts to birds for two years. Potential impacts to WBOs would be further mitigated by Condition of Certification **BIO-17**. To further reduce impacts, Condition of Certification **BIO-21** (requires an Avian and Bat Protection Plan), and Condition of Certification **BIO-22**requires a Federal Eagle Act Take Permit or show evidence that one is not needed.

Several special status plant species have the potential to occur within the project area, although none were observed within the project area during the 2009 surveys. This alternative could potentially result in direct or indirect impacts to special status plant species from construction and fragmentation of habitat. Mitigation for these potential impacts would be similar to those proposed under the proposed project (i.e., staff's proposed Conditions of Certification **BIO-19**.

The impacts from roads and traffic to local wildlife from this alternative would be essentially the same as compared with the proposed project. Mitigation for impacts would be the same as mitigation under the proposed project (i.e., staff's proposed Condition of Certification **BIO-8**.

C.2.7.3 CEQA LEVEL OF SIGNIFICANCE

Staff considers project compliance with LORS and staff's proposed conditions of certification for the proposed project to be insufficient to mitigate the significant impacts to biological resources of the Original Proposed Project alternative to levels of less than significant, or fully mitigate the impacts to MGS connectivity and high-density DT habitat as required by CESA. This alternative would cause significant impacts to MGSs and DTs due to loss of a portion of the physical site. The development of this particular location would result in residual effects as described previously. This alternative also has an increased degree of impact to waters of the state because of the proposed rerouting of El Paso Wash associated with this alternative.

C.2.8 NO ACTION ALTERNATIVES

There are three No Project/No Action Alternatives evaluated in this section.

C.2.8.1 NO PROJECT/NO ACTION ALTERNATIVE #1:

No Action on Ridgecrest Solar Power Project application and on CDCA land use plan amendment

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM. The BLM would not amend the California Desert Conservation Area (CDCA) Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended. Any future proposed projects would require preparation of an EIS. Proposed energy projects subject to the California Energy Commission's jurisdiction would also require preparation of a new staff assessment.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site and no new ground disturbance. As a result, none of the impacts to biological resources from construction or operation of the proposed project would occur. No impacts to special status plants and wildlife species would occur and no impacts to desert habitat would occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project with the requisite land use plan amendment. In the absence of this project other renewable energy projects may be constructed to meet state and federal mandates, and those projects may have similar impacts in other locations or they may have much reduced impacts. Development at other locations would not directly affect the linkage connecting the Little Dixie Wash and Olancha core MGS population to populations south and east of the site, or the high-density DT population center found on the project site.

SETTING AND EXISTING CONDITIONS

The general setting and existing conditions would remain as described in section **C.2.4.1 SETTING AND EXISTING CONDITIONS**.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

With the No Action Alternative, the impacts of the proposed project to biological resources, including DT, MGS and other special status species would not occur. The No Action Alternative would not cause any significant impacts to biological resources so no mitigation would be required. It would be possible for other projects to be permitted on the site. A similar environmental review would be required for any future proposed projects.

C.2.8.2 NO PROJECT/NO ACTION ALTERNATIVE #2:

No Action on Ridgecrest Solar Power Project and amend the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980 to allow for development of other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. Any future proposed projects would require preparation of an EIS. Proposed energy projects subject to the California Energy Commission's jurisdiction would also require preparation of a new staff assessment.

SETTING AND EXISTING CONDITIONS

The general setting and existing conditions would remain as described in section **C.2.4.1 SETTING AND EXISTING CONDITIONS**.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Same as No Project- No Action Alt #1

C.2.8.3 NO PROJECT/NO ACTION ALTERNATIVE #3:

No Action on Ridgecrest Solar Power Project application and amend the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unsuitable for future solar development. As a result, prior to future use for solar development, a land use plan amendment and a new EIS would need to be written and the site declared as suitable for solar development. Otherwise, BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended. Any future proposed projects would require preparation of an EIS. Proposed energy projects subject to the California Energy Commission's jurisdiction would also require preparation of a new staff assessment.

SETTING AND EXISTING CONDITIONS

The general setting and existing conditions would remain as described in section **C.2.8.1 SETTING AND EXISTING CONDITIONS**.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Same as No Project- No Action Alt #1

Biological Resources Table 5
Comparison of Proposed Project and Alternatives

	Proposed Project (250 MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250 MW)	No Action*
Impact to desert tortoise habitat	Development of 2,002 acres of high value habitat for desert tortoise, considered irreplaceable. This would be a residual effect of this alternative.	Development of 1,134 acres of high value habitat for desert tortoise, considered irreplaceable. This would be a residual effect of this alternative.	Development of 908 acres of high value habitat for desert tortoise, considered irreplaceable. This would be a residual effect of this alternative.	Development of 1,794 acres of high value habitat for desert tortoise, considered irreplaceable. This would be a residual effect of this alternative.	No loss of desert tortoise habitat.
Impact to Mohave ground squirrel habitat	Development of 2,002 acres of MGS habitat. Impact to # of MGS individuals unknown because MGS population density on the site has not been estimated.	Development of 1,134 acres of MGS habitat. Impact to # of MGS individuals unknown because MGS population density on the site has not been estimated.	Development of 908 acres of MGS habitat. Impact to # of MGS individuals unknown because MGS population density on the site has not been estimated.	Development of 1,794 acres of MGS habitat. Impact to # of MGS individuals unknown because MGS population density on the site has not been estimated.	No loss of Mohave ground squirrel habitat.
Impact to burrowing owl habitat	Development of 2,002 acres of occupied, suitable burrowing owl habitat.	Development of 1,134 acres of occupied, suitable burrowing owl habitat.	Development of 908 acres of occupied, suitable burrowing owl habitat.	Development of 1,794 acres of occupied, suitable burrowing owl habitat.	No loss of burrowing owl habitat.
Impact to American badger habitat	Development of 2,002 acres of suitable American badger habitat.	Development of 1,134 acres of suitable American badger habitat.	Development of 908 acres of suitable American badger habitat.	Development of 1,794 acres of suitable American badger habitat.	No loss of badger habitat.

	Proposed Project (250 MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250 MW)	No Action*
Impact to desert wash habitat	El Paso Wash would be avoided. Impacts to small associated washes would still occur. Extent currently unknown pending revised delineation of waters of the state.	El Paso Wash would be avoided. Impacts to small associated washes would still occur. Extent currently unknown pending revised delineation of waters of the state.	El Paso Wash would be avoided. Impacts to small associated washes would still occur. Extent currently unknown pending revised delineation of waters of the state.	El Paso Wash would be impacted and diverted around the project. Impacts to small associated washes would also occur. Extent currently unknown pending revised delineation of waters of the state. Impacts to El Paso Wash would be significant.	No loss of desert wash habitat.
Impact to Mohave ground squirrel connectivity between populations	The loss of habitat connectivity between remaining MGS populations is significant and no mitigation is available for this impact. This is a residual effect of this alternative.	The loss of habitat connectivity between remaining MGS populations is significant and no mitigation is available for this impact. This is a residual effect of this alternative.	The loss of habitat connectivity between remaining MGS populations is significant and no mitigation is available for this impact. This is a residual effect of this alternative.	The loss of habitat connectivity between remaining MGS populations is significant and no mitigation is available for this impact. This is a residual effect of this alternative.	No loss of habitat connectivity between remaining MGS populations would result.
Ranking(1-5)** **1 being least impactful to biological resources, 5 being most impactful**	4	3	2	5	1

*Includes all No Action Alternatives discussed previously
**All of the alternatives except the no-action alternatives have unmitigable impacts because each includes a loss of high-density DT habitat and MGS connectivity. A low ranking should not be interpreted as being preferred in regards to impacts to biological resources, only that there is less impact to biological resources because of the reduced overall impact acreage.

C.2.9 CUMULATIVE IMPACTS ANALYSIS

C.2.9.1 CEQA AND NEPA DEFINITIONS

A cumulative impact analysis is required under both CEQA and NEPA. “Cumulative impact” is the impact on the environment which results from the incremental impact of the proposed Project when considered with other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal) or person undertakes such other actions (40 CFR §1508.7).

Under CEQA Guidelines, “a cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts” (Title 14 Cal Code Regs §15130(a)(1)). Cumulative

impacts must be addressed if the incremental effect of a project, combined with the effects of other projects is “cumulatively considerable” (Title 14Cal Code Regs §15130(a)). Such incremental effects are to be “viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects” (Title 14 Cal Code Regs §15164(b)(1)). Together, these projects comprise the cumulative scenario which forms the basis of the cumulative impact analysis.
NEPA states that cumulative effects can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR §1508.7). Under NEPA, both context and intensity are considered. When considering intensity of an effect, we consider “whether the action is related to other actions with individually minor but cumulatively significant impacts. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.” 40 CFR §1508.27(b)(7)

Analysis of Cumulative Effects to Biological Resources

Staff used the following steps to develop the cumulative effects analysis described in this subsection:

- Identified resources to consider in the analysis;
- Defined the study area for each resource;
- Described the current health and historical context for each resource;
- Identified direct and indirect impacts of the proposed project that might contribute to a cumulative impact;
- Identified other reasonably foreseeable actions that affect each resource;
- Assessed potential cumulative impacts;
- Reported the results, and;
- Assessed the need for mitigation.

There is the potential for substantial future development in the Ridgecrest area and throughout the southern California desert region. Analysis of cumulative impacts is based on data provided in the following tables and maps (see section **B.3 CUMULATIVE SCENARIO**):

- Cumulative Impacts Table 1A, Renewable Energy Projects in the BLM California Desert District;
- Cumulative Impacts Table 1B, Renewable Energy Projects on State and Private Lands in California Desert District Counties;
- Cumulative Impacts Table 2, Existing Projects in the Ridgecrest Area;
- Cumulative Impacts Table 3, Future Foreseeable Projects in the Ridgecrest Area;
- Cumulative Impacts Figure 1, Renewable Energy Applications in the California Desert District;
- Cumulative Impacts Figure 2, Renewable Energy Applications in the Ridgecrest District Area; and

- Cumulative Impacts Figure 3, Existing and Future/Foreseeable Projects in the Ridgecrest Area.

The analysis in this section defines the geographic area over which cumulative impacts related to biological resources could occur. The cumulative impact analysis describes the potential for significant cumulative impacts to biological resources to occur as a result of construction and operation of the RSPP along with the other local and regional projects. The large renewable projects used in the cumulative analysis for biological resources represent the projects that had applications to the BLM, the Energy Commission, or a county as of February 2010. The project list changes frequently; updates to the data are presented below and in section B.3, Cumulative Scenario. As stated in the Cumulative Scenario, section B.3, not all of the projects shown on the table will be constructed. See section B.3 for details on the likelihood of development of renewable projects on BLM and private lands.

C.2.9.2 GEOGRAPHIC EXTENT

The projects used in this analysis are located within the California Desert District which contains similar flora and fauna as those found on the proposed RSPP site.

This cumulative impact analysis makes a broad, regional evaluation of the impacts of existing and reasonably foreseeable future projects that threaten plant and animal communities within the West Mojave Plan (WEMO) (BLM 2005) area. The WEMO planning area is located in the southeastern California Desert Conservation Area (CDCA), and encompasses 9.3 million acres in Inyo, Kern, Los Angeles, and San Bernardino counties. For most resources the analysis focused on renewable projects proposed on BLM, state and private land in the I-40 corridor west of Barstow to the eastern boundary of the WEMO planning area; in the Highway 395 corridor from SR 58 north to the northern boundary of the WEMO planning area; and in the SR 14 corridor between California City and Ridgecrest.

C.2.9.3 REGIONAL OVERVIEW

This overview of regional impacts is followed by a more detailed discussion of the effects of past, present, and future projects to biological resources of the Project vicinity, with an emphasis on resources found within northeastern Kern County and northwestern San Bernardino County.

The California Desert remained a desolate area for the first few decades of the 20th century. Disturbance was more or less restricted to highways, railroad, and utility corridors, scattered mining, and sheep grazing. Nevertheless, populations of many of the desert's sensitive plants and animals were considered relatively stable until recently, as the push for renewable energy development has placed many populations at risk of local extinctions. Energy providers have submitted project applications that would collectively cover more than one million acres of the region (BLM 2010). However, renewable energy development has its own ecological consequences and portions of the Sonoran and Mojave deserts of California are bearing the brunt of these effects. Poorly planned development could contribute to habitat loss and fragmentation and barriers to species movement and gene flow. Although project permitting and regional planning evaluate basic environmental impacts of such projects, rarely do they consider

impacts on connectivity or conduct thorough cumulative effects analyses. Some of the many sensitive biological resources at risk include: desert washes, DT, MGS, golden eagle, and plant communities.

Some of the primary impacts are related to land-use changes such as urbanization and urban sprawl, conversion of land to agricultural uses, construction of military bases and ongoing military operations, construction and operation of landfills, mining activities, and off-highway activity and recreational use of desert habitats. In addition, there are associated activities that further fragment and degrade habitats for native species such as creation of roads, grazing, and construction of utility corridors such as pipelines and transmission lines (Berry et al. 1996; Avery 1997; Jennings 1997). The introduction of non-native plant species and increases in predators such as ravens has also contributed to population declines and range contractions for many special-status plant and animal species (Boarman 2002). In the context of this large scale habitat loss, the RSPP would contribute to the significant cumulative loss and degradation of habitat for desert plants and wildlife, including DT and MGS, within the Mojave Desert region of southeastern California.

Species such as the DT and MGS are listed as threatened species due to past impacts. They will be additionally impacted by proposed solar projects because solar projects are most often proposed for valleys and other areas that have relatively little topographic relief and receive the highest insolation. These areas provide prime habitat for DT and MGS. Most of the proposed solar projects in the Mojave Desert would encompass several thousand acres per project. The large scale of each individual solar and wind project has a potential to result in extensive losses and impacts to plant and wildlife species and their native habitats in the California desert.

Desert Tortoise

The cumulative impact to DT from renewable projects will be significant. Proposed renewable projects are often sited on prime tortoise habitat due to topography overlap. Wind projects may result in fewer impacts to DTs because of the smaller project footprint. However, large-scale solar projects render the habitat unusable by DT. Also, there is no good way to significantly reduce the impacts to displaced DTs. Translocations and relocations of DT have resulted in high levels of fatalities and can cause the spread of disease into resident tortoise populations at the receiving site.

Mohave Ground Squirrel

Threats to MGS are similar to those for DT and include habitat loss, habitat fragmentation, drought, OHV use in suitable habitat, and spread of potential predators. Proposed large-scale renewable energy projects have the potential to remove large blocks of suitable habitat for this species. The BLM established MGS conservation areas, using available information, in order to assist with maintaining healthy populations of MGS throughout its known range. The southern solar field of the proposed RSPP site is within a designated Mohave Ground Squirrel Conservation Area. The northern portion of the site is contiguous with and the same biologically as the southern portion. Brown's Road was chosen as a convenient border, not a biological boundary. There is no difference in habitat value biologically between the southern and northern portions of the site. The proposed RSPP site would contribute to the

cumulative loss of habitat for MGS within its known range. The loss of the physical location would significantly reduce the connectivity for the MGS populations. There is no known way to fully mitigate for the loss of all or a portion of the proposed RSPP project site regarding connectivity. The cumulative impact to MGSs from renewable projects would be significant.

Western Burrowing Owl

The western burrowing owl is currently a State Species of Special Concern. Western burrowing owls are known to inhabit California's deserts, and exist on the proposed RSPP project site. The numbers of western burrowing owls in California are declining due to urbanization, spread of agriculture, and ground squirrel control measures. Some studies have estimated that the burrowing owl population in California is declining at a rate of 8% per year (DeSante and Ruhlen 1995; DeSante et al. 1996).

The cumulative impact to burrowing owl from renewable projects could potentially be severe. Large-scale solar projects render an area unusable by burrowing owl.
Wind projects have the potential to result in significant impacts to burrowing owls. In addition to loss of habitat, burrowing owls are known to regularly suffer collision fatalities with wind turbines (Smallwood and Karas 2009).

Other Special Status Species

Other special status species such as desert kit fox, American badger, LeConte's thrasher, loggerhead shrike, and golden eagle will experience a loss of foraging, denning, and nesting habitat in the region and in the California deserts in general as a result of existing and proposed projects. While these species are currently not federal or state listed species, the cumulative loss of nesting and foraging habitat in the Mojave Desert may result in eventual listing of these species under CESA or FESA.

C.2.9.4 MAKING CONCLUSIONS ABOUT THE SEVERITY OR SIGNIFICANCE OF THE EFFECT

"No net loss" does not necessarily mean no cumulative impacts. Seemingly minor impacts can result in cumulative impacts that are substantial.
For each cumulative effect the following questions were considered in making conclusions about the severity or significance of an effect:

- The health, status or condition of the resource as a result of past, present and reasonably foreseeable impacts;
- The contribution of the proposed Project to the overall cumulative impact to the resource;
- The Project's mitigated effect, when added to the effects of these planned future projects, and
- Impact avoidance and minimization: any Project design changes that were made, or additional opportunities that could be taken, to avoid and minimize potential impacts in light of cumulative impact concerns.

C.2.9.5 CUMULATIVE IMPACT ANALYSIS

This analysis evaluates the impacts of the proposed Project in addition to past development, present (existing) projects, and reasonably foreseeable or probable future projects in the proposed project vicinity as well as the greater WEMO Planning Area. **Biological Resources Figures 8 and 9** illustrates the numerous proposed renewable projects on BLM, State and private land in the project vicinity. **Biological Resources Figure 10** illustrates the numerous proposed renewable projects on BLM, State and private land in the WEMO planning area. **Biological Resources Table 5** lists the existing and foreseeable future projects (proposed) that were included in the quantitative analysis of cumulative effects.

Biological Resources Table 5
Existing and Proposed Future Projects Considered in Cumulative Effects Analysis

Existing Impacts	Area (ac)
Urban lands mapped in the WEMO planning area (includes the Cities of Ridgecrest, Lancaster, Palmdale, Barstow, Victorville, Hesperia, Apple Valley, Yucca Valley, and Twentynine Palms)	219,644
Agricultural lands mapped in the WEMO planning area	182,360
Total Existing Projects Acreage	**402,004**

Foreseeable Future Projects ** [Proposed] (analyzed quantitatively)	ROW Area* (ac)
Advanced Development Services - Barren Ridge	11,541
AES Seawest - Daggett Ridge	1,574
AES SeaWest Daggett	2,593
AES Seawest, Inc.	8,598
AES Wind Generation - North Daggett	1,642
AES Wind Generation - Sand Ridge	3,898
AES Wind Generation - Sand Ridge	4,176
AES Wind Generation - Sand Ridge 2	801
AES Wind Generation, Inc.	211
Airtricity / E On	15,485
Alta Gas - Ghost Town	7,954
Boulevard Associates - Tehachapi	9,712
BP Orion- Sidewinder Mtn.	2,398
Brewer Energy- Black Hills	4,503
Caithness LLC- Soda Mountain	7,987
Calico Solar LLC, Phase 1	5,207
Calico Solar LLC, Phase 2	3,389
Cameron Ridge, LLC	546
Chevron Energy Solutions - Lucerne Valley	518
Competitive Power Ventures, LLC - Saltdale	38,364
Debenham Energy-Haiwee Reservoirs	19,031
Debenham Energy-Searles Hills	7,943
DPT Broadwell Lake	8,616
enXco - Donut	5,033
enXco Avalon One	276
enXco Troy Lake Solar	3,707
First Solar - Desert Garnet	6,719
First Solar - Desert Obsidian	8,943
First Solar - Desert Opal	15,803
First Solar - Desert Sapphire	5,327
FPL Energy - West Fry Wind Project	2,908

Foreseeable Future Projects** [Proposed], cont. (analyzed quantitatively)	ROW Area* (ac)
Granite Wind LLC - Granite Mountains	2,085
GreenWing- Mojave Valley	640
Horizon - Daggett Camp Rock	4,741
Horizon Waterman Hills	724
Horizon Wind - Calico Mtns.	27,945
Horizon Wind - Iron Mountain	10,103
Horizon Wind - Stoddard/Daggett	24,380
IDIT, Inc. - Rabbit Dry Lake	477
Little Mountain Wind Power- Bristol Lake	14,786
LSR Pisgah, LLC - Barstow Road	7,440
LSR Pisgah, LLC - Reche Road	17,685
Oak Creek Energy - Black Butte	36,315
Oak Creek Energy - Lucchese	7,250
Oak Creek Energy - Ludlow South	23,664
Oak Creek Energy - Mojave/Tehachapi	1,442
Oak Creek Energy - Rand Mountain	9,215
Oak Creek Energy - Soledad Mtn.	1,229
Oak Creek Energy - Tehachapi	160
Pacific Crest Power, LLC	21
Padoma Wind Power - Flat Top Mountain	12,680
Padoma Wind Power - Pinto Mountains	23,797
Power Partners SW - Tylerhorse Canyon	1,531
Power Partners SW - Tylerhorse Canyon	1,207
Power Partners SW/EnXco- Troy Lake	10,118
Renewergy, LLC - El Paso Peaks	7,646
RES North America/Granite Wind	2,085
Ridgecrest/Solar Millennium	3,884
Sean Roberts RMC	536
Sierra Renewables LLC - Black Lava Butte	4,042
Sierra Renewables- Pearsonville	4,121
Sierra Renewables- Rose Valley	13,994
Solel, Inc. - Johnson Valley	1,798
Solel, Inc.- Stedman	7,443
Verde Resources	3,105
West Fry Wind LLC - West Fry Mtns.	3,060
Wind Power Partners - Short Canyon	2,258
Total BLM Solar and Wind Renewable Projects - 02/16/2010	**509,013 acres**

* According to the WEMO Plant Communities dataset (BLM 2005) and geospatial data for Kern County projects.
** Not all of the projects depicted here will be constructed, and many will not use the entire ROW area

The dataset for existing projects was limited to WEMO vegetation mapping for urban, agricultural, and ruderal areas, as well as available GIS-based geospatial data for Kern County. The data set for reasonably foreseeable future projects was limited to available GIS-based spatial data for proposed energy projects, and does not include any residential or commercial projects planned within the area. Therefore, the quantitative may under-represent the number of projects. However, it also over-estimates, to some degree, the actual impacts of the future BLM Renewable projects because the entire right-of-way (ROW) was included in the calculations; not all of the projects depicted in **Biological Resources Figure 10** will be constructed, and many will not develop the entire ROW area.

Waters of the State

The geographic scope for the analysis of cumulative impacts to waters of the state is the China Lake watershed; the watershed encompassing the RSPP. The analysis was based on the USGS National Hydrographic Dataset (2010) within the watershed boundary as defined by the California Interagency Watershed Map of 1999 (Calwater 2.2.1). **Biological Resources Table 6** summarizes the direct loss of desert washes that would result from anticipated future projects within the China Lake watershed. These effects are also illustrated spatially in **Biological Resources Figure 11.**

The contribution of the project to cumulative effects from future projects is provided as the sum of all drainages within the project boundaries. Cumulative effects to these features include: impacts to water quality and sediment transport from the numerous channel diversions, culverts and road crossings, fragmentation of the habitat and the corresponding loss of habitat function and values. Although the projects' impacts to desert washes is minor, relative to the total linear miles of desert wash in the watershed, the impact on desert washes resulting from the incremental impact of the proposed project, when added to other past, present, and reasonably foreseeable future actions, is cumulatively significant, as 4.4 percent of the watershed streams (44.1 miles of desert washes) would be impacted. The USGS hydrologic modeling depicts 3.4 miles of desert wash in the project area, compared to 1,013.5 miles in the watershed; as such, the washes on the project site comprise only 0.3 percent of the total miles of desert wash in the watershed. The project's contribution to future cumulative effects within the China Lake watershed (7.7 percent) would be significant if considered before the proposed mitigation, particularly when considering the indirect impacts to water quality, fragmentation of the habitat, impacts to sediment transport, and other indirect effects of water diversions, but relatively minor after considering the mitigation measures proposed in staff's Condition of Certification **BIO-18**. The project also proposes to reroute minor existing washes around Project features, revegetating the new channels in a manner that approximates existing channel vegetation, and returning the channels to approximately the same locations where they exit the site under existing conditions. Staff's proposed Condition of Certification **BIO-18** requires all conditions that would have been in CDFG's 1602 Lake or Streambed Alteration Agreement into the final conditions of certification and the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP). Mitigation for impacts to desert washes would be determined in consultation with the CDFG.

Biological Resources Table 6
Desert Washes in China Lake Watershed – Cumulative Effects

Total Desert Washes* in China Lake Watershed	**Impacts to Habitat from Existing Projects**** (Percent of total watershed)	**Impacts to Habitat from Foreseeable Future Projects***** (Percent of total watershed)	**Contribution of RSPP to future cumulative impacts** (Percent of total impacts from Future projects)
1,013.5 mi.	**19.5 mi. (1.9%)**	**44.1 mi. (4.4%)**	**3.4 mi. (7.7%) (based on USGS dataset)**

*Based on the USGS National Hydrographic Dataset (2010) and California Interagency Watershed Map of 1999 (Calwater 2.2.1).
** Includes only those areas mapped as agriculture, ruderal, or urban pursuant to the WEMO Plant Communities dataset (BLM 2005); see Biological Resources Table 5.
*** Includes only BLM Renewables that had submitted a Plan of Development (POD) at the time of this analysis and those additional future projects listed in Biological Resources Table 5.

Special-Status Wildlife

Desert Tortoise

This analysis addresses cumulative impacts to DT as defined by the current USGS Desert Tortoise Habitat Model (Nussear et al. 2009). It is a predictive model for mapping the potential distribution of DT habitat and is a useful tool for evaluating different land-use issues that tortoises face at a landscape scale. **Biological Resources Figure 12** is a spatial representation of the predicted habitat potential index values for DT, based on the 2009 model. The model is not intended to be used, or viewed, as a substitute for ground-based and site-specific field surveys. Model scores reflect a hypothesized habitat potential given the range of environmental conditions where tortoise occurrence was documented. The report (USGS 2009) specifically states:

> "*As such, there are likely areas of potential habitat for which habitat potential was not predicted to be high, and likewise, areas of low potential for which the model predicted higher potential. Finally, the map of desert tortoise potential habitat that we present does not account either for anthropogenic effects, such as urban development, habitat destruction, or fragmentation, or for natural disturbances, such as fire, which might have rendered potential habitat into habitat with much lower potential in recent years*".

GIS-based files for the boundaries of the Western Mojave Recovery Unit of the 1994 Desert Tortoise Recovery Plan were not available from the USFWS at the time of this analysis. The proposed new boundaries as depicted in the USFWS 2008 Draft Revised Recovery Plan were not available either. Consequently, the WEMO boundary was used for this analysis. The WEMO boundary closely approximates the boundaries of the USFWS recovery unit; however, the USFWS boundaries extend further north of the WEMO boundary, past SR 190.

Large expanses of DT critical habitat and numerous ACEC/DWMA areas have been identified or established within the WEMO planning area. The Ridgecrest project site is not located in designated critical habitat nor is it located within a WEMO-designated DT conservation area (i.e., ACEC/DWMA). The closest designated critical habitat for DT occurs just over seven miles south of the Project site.

The Project's unmitigated effects to DT habitat (based on the 2009 USGS habitat model) are quantified below in **Biological Resources Table 7** (and **Biological Resources Figure 12**). The Ridgecrest Project supports a high density of tortoises compared to other locations in the western Mojave Desert, and contains high quality DT habitat according to the USGS model. The cumulative effects before mitigation are significant given that nearly 54 percent of the acreage comprised by future projects is within high value DT habitat (rated between 0.8 and 1.0). The proposed project also could significantly impact DT dispersal and connectivity between local populations.

Biological Resources Table 7
Cumulative Effects: Desert Tortoise Habitat*

Habitat Value*	**Total Desert Tortoise habitat* in WEMO**	**Impacts to Habitat from Existing** Projects** (Percent of total in WEMO)	**Impacts to Habitat from Foreseeable Future*** Projects** (Percent of total in WEMO)	**Contribution of RSPP to future cumulative impacts** (Percent of total impacts from Future projects)
0	833,990 acres	12,547 acres (1.5%)	36,678 acres (4.4%)	0 acres
0.1	480,313 acres	36,482 acres (7.6%)	24,471 acres (5.1%)	0 acres
0.2	405,839 acres	43,260 acres (10.7%)	26,038 acres (6.4%)	0 acres
0.3	406,093 acres	23,107 acres (5.7%)	20,339 acres (5.0%)	0 acres
0.4 – 0.5	895,828 acres	68,394 acres (7.6%)	38,161 acres (4.3%)	0 acres
0.6 – 0.7	1,359,657 acres	70,201 acres (5.2%)	92,292 acres (6.8%)	0 acres
0.8 – 0.9	4,881,903 acres	138,505 acres (2.8%)	2,495,543 acres (51.1%)	1,738 acres (0.08%)
1.0	84,001 acres	0 acres	2,227 acres (2.7%)	0 acres

*Based on the USGS Desert Tortoise Habitat Model (Nussear et al. 2009)
** Includes only those areas mapped as agriculture, ruderal, or urban pursuant to the WEMO Plant Communities dataset (BLM 2005); see Biological Resources Table 5
*** Includes only BLM Renewables that had submitted a Plan of Development (POD) at the time of the analysis and those additional future projects listed in Biological Resources Table 5

The project contributes incrementally to overall impacts to high value DT habitat and connectivity. The cumulative effects of all projects are likely to remain significant after mitigation, even after project-specific mitigation for habitat loss is considered, due to the high value of this physical location with a high DT density compared to the surrounding area.

Mohave Ground Squirrel

The geographic scope of the analysis of cumulative effects on MGS habitat was based on the WEMO Planning Area and used the WEMO range map for the MGS as well as landform mapping from the Mojave Desert Ecosystem Project (MDEP) to map and quantify cumulative effects on MGS habitat. WEMO plant communities that intersect with suitable landforms in the MGS's range are quantified in **Biological Resources Table 8**. **Biological Resources Figure 13** depicts the locations of MGS conservation areas and the overall range of this species, pursuant to WEMO.

In spite of its protected status, little is known of its habitat extent and needs. In many areas within its historic range, there are no recent records

A portion of the Project site is located within a WEMO-designated Mohave Ground Squirrel Conservation Area, as are several of the proposed future projects. The project's contribution to the cumulative impacts to MGS (**Biological Resources Table 8**) is significant since much of the project site is considered medium to high potential habitat for this species. In addition, connectivity between populations of this species occurring to the north and south of the site could be affected by the proposed project. The RSPP's contribution to cumulative effects on MGS habitat and connectivity, even after mitigation, are significant given the Project site's location in and adjacent to a MGS conservation area and its potential effects on population connectivity. Staff's proposed Condition of Certification **BIO-12**, which specifies that compensation habitat acquisitions occur at a 5:1 ratio within the Western Mojave Desert in areas with MGS will lessen the impact, but due to the physical location of the site it will not fully mitigate the impact under CESA nor reduce the impacts to less than significant under CEQA.

Biological Resources Table 8
Cumulative Effects: Mohave Ground Squirrel Habitat*

Plant Community Type	Total Mohave Ground Squirrel habitat* in WEMO	Impacts to Habitat from Existing** Projects (Percent of total in WEMO)	Impacts to Habitat from Foreseeable Future*** Projects (Percent of total in WEMO)	Contribution of RSPP to future cumulative impacts (Percent of total impacts from Future projects)
Mojave Creosote Scrub	1,528,590 acres	1,462 acres (0.1%)	54,845 acres (3.6%)	1,738 acres (3.0%)
Saltbush Scrub	529,384 acres	1,057 acres (0.2%)	13,660 acres (2.6%)	0 acres
Mixed Desert Scrubs	168,228 acres	0 acres	17,380 acres (10%)	0 acres
Urban	134,692 acres	132,761 acres (99%)	0 acres	0 acres
Agriculture	75,307 acres	75,307 acres (100%)	0 acres	0 acres
Desert Wash Scrub	18,354 acres	0 acres	54 acres (0.3%)	8.2 acres (15.2%)
Desert Sink Scrub	9,416 acres	0 acres	63 acres (0.7%)	0 acres
Sand Dunes	8,505 acres	0 acres	0 acres	0 acres
Oak/Juniper/Pine/ Joshua Tree Woodland	6,917 acres	0 acres	0 acres	0 acres
Playa/Dry Lake	6,017 acres	0 acres	8.1 acres (0.1%)	0 acres
Riparian Scrub/Forest	845 acres	0 acres	0 acres	0 acres
Chaparral	646 acres	0 acres	0 acres	0 acres
Mesquite Bosque	488 acres	0 acres	0 acres	0 acres
Native Grassland	189 acres	0 acres	0 acres	0 acres
Non-native Grassland	88 acres	0 acres	0 acres	0 acres
Seeps	59 acres	0 acres	0 acres	0 acres

*Based on plant communities occurring on the following MDEP landforms within the range of the Mohave ground squirrel pursuant to WEMO Figure 3-15: fluvial floodplain, fluvial terrace, older alluvial deposits, bajada, active alluvial plain, older alluvial plain, alluvial fan, undifferentiated dune field, and disturbed.
**According to the WEMO Plant Communities dataset (BLM 2005) and geospatial data for Kern County projects; see Biological Resources Table 5.
*** Includes only BLM Renewables that had submitted a Plan of Development (POD) at the time of the analysis and those additional future projects listed in Biological Resources Table 5.

Golden Eagle

The geographic scope of the analysis of cumulative effects on golden eagle foraging habitat was completed for the entire WEMO planning area, as well as on foraging habitat within 10 miles of nests occurring within 10 miles of the proposed project, and

used the WEMO plant communities dataset to map and quantify cumulative effects on foraging habitat (**Biological Resources Tables 9 and 10** and **Biological Resources Figures 14 and 15**). The WEMO plant communities dataset is based on the 1996 California Gap Analysis Project conducted by the Biogeography Lab at the University of California, Santa Barbara and coordinated through the USGS Biological Resources Division.

Biological Resources Figure 14 depicts the locations of known and documented golden eagle nest locations within a 10-mile radius of the project site. **Biological Resources Figure 15** depicts the locations of known and documented golden eagle nest locations within the WEMO planning area. The source of this information include the "nest card" database--helicopter surveys conducted in 1978 and 1979 desert-wide--and on locations depicted in a 1984 BLM California Desert Conservation Area (CDCA) map of “Sensitive, Rare, Threatened and Endangered Fish and Wildlife”.

The project contribution to the cumulative impacts to golden eagle foraging habitat within 10 miles of the project site is potentially significant (3.6 percent) when combined with the indirect effects of habitat fragmentation associated with future projects. The USFWS (2010) estimates there are approximately 30,000 golden eagles in the western United States, down from an estimated 100,000 in the late 1970s. Although a short sample time, survey data from 2003 and 2006-2008 indicate a decline of 26 percent since 2003. Climate change is expected to impact golden eagle by increasing drought severity. The project contribution to these effects would be minimized to a level less than significant through mitigation measures for acquisition of 10,010 acres of habitat, as specified in staff’s proposed Condition of Certification **BIO-12.** While acquisition does not address the net loss of foraging habitat in the immediate future, it is expected to prevent future losses of some habitat by acquiring private lands that could otherwise be converted for energy development, urban, or agricultural uses.

Biological Resources Table 9
Cumulative Effects: Golden Eagle Foraging Habitat for Nests within 10 Miles of Project

Foraging Habitat* (by plant community)	**Total Plant Communities* in 10-mile radii**	**Impacts to Foraging Habitat from Existing** Projects** (Percent of all Community type in 10-mile radii)	**Impacts to Foraging Habitat from Foreseeable Future*** Projects** (Percent of all Community type in 10-mile radii)	**Contribution of RSPP to future cumulative impacts** (Percent of total impacts from Future projects)
Mojave Creosote Scrub	421,620 acres	0 acres	40,156 acres (9.5%)	1,738 acres (4.0%)
Mixed Desert Scrubs	83,271 acres	0 acres	8,998 acres (10.8%)	0 acres
Saltbush Scrub	7,981 acres	0 acres	0 acres	0 acres
Oak/Juniper/Pine/Joshua Tree Woodland	11,552 acres	0 acres	0 acres	0 acres
Urban	10,787 acres	10,787acres (100%)	0 acres	0 acres
Chaparral	0 acres	0 acres	0 acres	0 acres
Agriculture	4,055 acres	4,055 acres (100%)	0 acres	0 acres
Playa/Dry Lake	10,038 acres	0 acres	0 acres	0 acres
Desert Wash Scrub	3,291 acres	0 acres	83 acres (2.5%)	8.2 acres (10.0%)
Non-native Grassland	0 acres	0 acres	0 acres	0 acres
Sand Dunes	2,686 acres	0 acres	0 acres	0 acres
Desert Sink Scrub	1,581 acres	0 acres	0 acres	0 acres
Riparian Scrub/Forest	2,231 acres	0 acres	0 acres	0 acres
Lava	0 acres	0 acres	0 acres	0 acres
Mesquite Bosque	0 acres	0 acres	0 acres	0 acres
Native Grassland	0 acres	0 acres	0 acres	0 acres
Montane Meadow	0 acres	0 acres	0 acres	0 acres
Sand Fields	0 acres	0 acres	0 acres	0 acres
Seeps	0 acres	0 acres	0 acres	0 acres

* Based on the WEMO Plant Communities dataset (BLM 2005)
**According to the WEMO Plant Communities dataset (BLM 2005) and geospatial data for Kern County projects; see Biological Resources Table 5
*** Includes only BLM Renewables that had submitted a Plan of Development (POD) at the time of the analysis and those additional future projects listed in Biological Resources Table 5

Biological Resources Table 10
Cumulative Effects: Golden Eagle Foraging Habitat in WEMO Planning Area

Foraging Habitat* (by plant community)	**Total Plant Communities* in WEMO**	**Impacts to Foraging Habitat from Existing** Projects** (Percent of all Community type in WEMO)	**Impacts to Foraging Habitat from Foreseeable Future*** Projects** (Percent of all Community type in WEMO)	**Contribution of RSPP to future cumulative impacts** (Percent of total impacts from Future projects)
Mojave Creosote Scrub	5,685,847 acres	2,272 acres (0.04%)	362,587 acres (6.4%)	1,738 (0.6%)
Mixed Desert Scrubs	1,462,366 acres	32 acres (0.002%)	73,128 acres (5.0%)	0 acres
Saltbush Scrub	845,157 acres	1,569 acres (0.2%)	21,247 acres (2.5%)	0 acres
Oak/Juniper/Pine/Joshua Tree Woodland	320,031 acres	0 acres	14,812 acres (4.6%)	0 acres
Urban	219,644 acres	211,399 acres (96%)	46 acres (0.02%)	0 acres
Chaparral	194,551 acres	0 acres	11,546 acres (5.9%)	0 acres
Agriculture	182,360 acres	182,360 acres (100%)	0 acres	0 acres
Playa/Dry Lake	153,593 acres	0 acres	3,329 acres (2.2%)	0 acres
Desert Wash Scrub	81,683 acres	0 acres	1,387 acres (1.7%)	8.2 acres (0.6%)
Non-native Grassland	69,563 acres	0 acres	344 acres (0.5%)	0 acres
Sand Dunes	41,416 acres	0 acres	8 acres (<0.1%)	0 acres
Desert Sink Scrub	30,586 acres	0 acres	853 acres (2.8%)	0 acres
Riparian Scrub/Forest	26,671 acres	0 acres	378 acres (1.4%)	0 acres
Lava	23,789 acres	0 acres	17 acres (0.1%)	0 acres
Mesquite Bosque	7,576 acres	0 acres	0 acres	0 acres
Native Grassland	3,375 acres	0 acres	24 acres (0.7%)	0 acres
Montane Meadow	974 acres	0 acres	2 acres (0.2%)	0 acres
Sand Fields	547 acres	0 acres	0 acres	0 acres
Seeps	447 acres	0 acres	0 acres	0 acres
Palm Oasis	33 acres	0 acres	0 acres	0 acres

* Based on the WEMO Plant Communities dataset (BLM 2005).
**According to the WEMO Plant Communities dataset (BLM 2005) and geospatial data for Kern County projects; see Biological Resources Table 5.
*** Includes only BLM Renewables that had submitted a Plan of Development (POD) at the time of the analysis and those additional future projects listed in Biological Resources Table 5.

Plant Communities

Thirty-two distinct plant communities are found within the western Mojave Desert (BLM 2005), some of which have been consolidated into more general categories in

Biological Resources Table 11. Creosote bush scrub and saltbush scrub are the most common, occupying 75 percent of the natural lands. The geographic scope of the analysis of cumulative effects on plant communities and general wildlife habitat encompasses the WEMO Planning Area and uses the WEMO plant communities dataset to map and quantify cumulative effects on plant communities (**Biological Resources Table 11** and **Biological Resources Figure 16**). Significant cumulative effects to plant communities from future projects are seen in many community types, particularly Mojave creosote scrub, mixed desert scrubs, woodland habitats, playa and desert sink scrub, desert wash scrub, and riparian scrub. The project contributes incrementally to the cumulative impacts of future projects to Mojave creosote scrub. Mojave creosote scrub is a common and widespread community in the southeastern deserts of California; however, this broad designation does not reflect the many uncommon and even rare plant assemblages within creosote scrub that have been documented and are monitored by the CNDDB. The project's contribution to the loss of creosote scrub would be minimized through the compensatory mitigation of DT habitat, MGS habitat, golden eagle foraging habitat, desert wash habitat, and the implementation of Best Management Practices for minimizing construction impacts. While acquisition does not address the net loss of habitat), it is expected to prevent some future losses of habitat by acquisition of private lands that could otherwise be converted for urban, agricultural or energy development.

The analysis of impacts to foraging habitat based on the WEMO plant communities dataset concludes that the project would impact 4.0 percent of all the Mojave creosote bush scrub affected by future projects. The project contributes minor cumulative effects to desert wash scrub and Mojave creosote scrub plant communities (0.6 percent of impacts from future projects).

Biological Resources Table 11
Cumulative Effects: Plant Communities

Plant Community*	Total Plant Communities* in WEMO	Impacts to Habitat from Existing** Projects (Percent of all Community type in WEMO)	Impacts to Habitat from Foreseeable Future*** Projects (Percent of all Community type in WEMO)	Contribution of RSPP to future cumulative impacts (Percent of total impacts from Future projects)
Mojave Creosote Scrub	5,685,847 acres	2,272 acres (0.04%)	362,587 acres (6.4%)	1,738 (0.6%)
Mixed Desert Scrubs	1,462,366 acres	32 acres (0.002%)	73,128 acres (5.0%)	0 acres
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*Based on the BLM WEMO Plant Communities dataset
**According to the WEMO Plant Communities dataset (BLM 2005) and geospatial data for Kern County projects; see Biological Resources Table 5
*** Includes only BLM Renewables that had submitted a Plan of Development (POD) at the time of the analysis and those additional future projects listed in Biological Resources Table 5

Decommissioning

The decommissioning of the proposed RSPP site is expected to result in potential adverse impacts related to biological resources similar to construction impacts. Since the proposed RSPP project site would have already been graded, its value to plant and wildlife species at the time of decommissioning would be relatively low. However, indirect impacts could occur to adjacent habitats such as increased construction traffic, human activity, lighting, and noise.

It is unlikely that the construction or decommissioning of any of the cumulative projects mentioned previously would occur concurrently with the decommissioning of the proposed RSPP project site, because the decommissioning is not expected to occur for approximately 40 years. As a result, the impacts of the decommissioning of the proposed RSPP project would not be expected to contribute significantly to cumulative impacts.

C.2.9.6 CUMULATIVE IMPACT CONCLUSION

The proposed RSPP will result in significant cumulative impacts to biological resources in the region when considered in conjunction with current and future local and regional projects. Proposed projects in the local area, including the proposed RSPP, would result in significant cumulative habitat loss for a range of biological species such as DT, MGS, WBO and a host of other plant and wildlife species. Proposed renewable energy projects in California deserts will require acquisition of mitigation lands. These mitigation lands will contribute to a minimum acreage available for the species in the future, but will still result in a significant cumulative loss of habitat. The enhancement of acquisition lands may reduce the cumulative impacts in regards to habitat loss to some extent.

Staff considers the cumulative effects to the China Lake watershed ephemeral and intermittent streams from all proposed future projects (only 4.4 percent of all stream reaches) to be reduced to a level below CEQA significance following implementation of Staff's proposed Condition of Certification BIO-18 and the avoidance El Paso Wash.

Staff believes that implementation of the conditions of certification described below will minimize the contributions of the proposed RSPP to the cumulative loss of native plant communities and wildlife and their habitats, including special status species other than MGS and DT. Staff's proposed Condition of Certification BIO-12 requires the applicant to acquire at least 10,010 acres of suitable habitat for DT and MGS. Staff's proposed Condition of Certification BIO-13, the Raven Management and Monitoring Plan, specifically includes measures that would address the cumulative regional increases in raven predation on DT.

There is no way to fully mitigate for the loss of the proposed RSPP site's connectivity for MGS populations and the loss of a high value site for DT. Therefore, these aspects of cumulative impacts would not be fully mitigated under CESA nor reduced to less than significant impacts under CEQA.

C.2.10 COMPLIANCE WITH LAWS, ORDIANANCES, REGULATIONS, AND STANDARDS (LORS)

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS COMPLIANCE

The proposed project must comply with state and federal laws, ordinances, regulations, and standards that address state and federally listed species, as well as other sensitive species and their habitats as listed in **Biological Resources Table 6**

Biological Resources Table 12
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
Federal Endangered Species Act (Title 16, United States Code, section 1531 et seq., and Title 50, Code of Federal Regulations, part 17.1 et seq.)	Designates and provides for protection of threatened and endangered plant and animal species, and their critical habitat.
Migratory Bird Treaty (Title 16, United States Code, sections 703 through 711)	Makes it unlawful to take or possess any migratory nongame bird (or any part of such migratory nongame bird) as designated in the Migratory Bird Treaty Act.
Permit for take under the Bald and Golden Eagle Protection Act, (Title 50, Code of Federal Regulations, section 22.26)	Authorizes limited take of bald eagles and golden eagles under the Bald and Golden Eagle Protection Act, where the taking is associated with, but not the purpose of the activity, and cannot practicably be avoided.
Permit for take under the Bald and Golden Eagle Protection Act, (Title 50, Code of Federal Regulations, section 22.27)	Authorizes intentional take of eagle nests where: necessary to alleviate a safety hazard to people or eagles; necessary to ensure public health and safety; the nest prevents the use of a human-engineered structure; the activity, or mitigation for the activity, will provide a net benefit to eagles; and only allows inactive nests to be taken except in the case of safety emergencies.
Bald and Golden Eagle Protection Act (Title 16, United States Code section 668)	This law provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the take, possession, and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the Act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the Act.

Applicable Law	Description
National Environmental Policy Act (NEPA), (Title 42, United States Code, section 4321 et seq.)	NEPA requires an evaluation of environmental impacts of projects proposed on federal lands or receiving federal funding.
California Desert Conservation Area Plan	The California Desert Conservation Area (CDCA) comprises one of two national conservation areas established by Congress at the time of the passage of the Federal Land and Policy Management Act (FLPMA). The FLPMA outlines how the BLM would manage public lands. Congress specifically provided guidance for the management of the CDCA and directed the development of the 1980 CDCA Plan.
West Mojave Plan (WEMO)	Protects and conserves natural resources while simultaneously balancing human uses of the California portion of the Mojave Desert ecosystem. The WEMO is an amendment to the CDCA Plan (see below)
Executive Order 13112 of February 3, 1999 – Invasive Species (FR doc 99-3184; FR V. 64, No. 25, Presidential documents 6183-6186)	Federal agencies are mandated to take actions to prevent the introduction of invasive species, provide for their control, and minimize the economic, ecological, and human health impacts that invasive species cause.
State	
California Endangered Species Act of 1984 (Fish and Game Code, sections 2050 through 2098)	Protects California's rare, threatened, and endangered species.
Protected furbearing mammals California Code of Regulations (Title 14, section 460)	Fisher, marten, river otter, desert kit fox and red fox may not be taken at any time.
California Code of Regulations (Title 14, sections 670.2 and 670.5)	Lists the plants and animals of California that are declared rare, threatened, or endangered.
California Native Plant Protection Act of 1977 (Fish and Game Code section 1900 et seq.)	Designates state rare, threatened, and endangered plants.
Significant Natural Areas (Fish and Game Code section 1930 et seq.)	Designates certain areas such as refuges, natural sloughs, riparian areas, and vernal pools as significant wildlife habitat.
Nest or Eggs (Fish and Game Code section 3503)	Protects California's birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird.

Applicable Law	Description
Birds of Prey (Fish and Game Code section 3503.5	Unlawful to take, possess, or destroy any birds in the orders Falconiformes and Strigiformes or to take, possess, or destroy the nest or eggs of any such bird.
Fully Protected Species (Fish and Game Code, sections 3511, 4700, 5050, and 5515)	Designates certain species as fully protected and prohibits the take of such species or their habitat unless for scientific purposes (see also California Code of Regulations, Title 14, section 670.7).
Migratory Birds (Fish and Game Code section 3513)	Protects California's migratory birds by making it unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame birds.
California Environmental Quality Act (CEQA), CEQA Guidelines Section 15380	CEQA defines rare species more broadly than the definitions for species listed under the state and federal Endangered Species Acts. Under section 15830, species not protected through state or federal listing but nonetheless demonstrable as "endangered" or "rare" under CEQA should also receive consideration in environmental analyses. Included in this category are many plants considered rare by the California Native Plant Society (CNPS) and some animals on the CDFG's Special Animals List.
Streambed Alteration Agreement (Fish and Game Code sections 1600 et seq.)	Regulates activities that may divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake in California designated by CDFG in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit. Impacts to vegetation and wildlife resulting from disturbances to waterways are also reviewed and regulated during the permitting process.
Water Quality Control Plan for the Lahontan Region (Basin Plan)	The Basin Plan establishes water quality objectives that protect the beneficial uses of surface water and groundwater in the Region. The Basin Plan describes implementation plans and other control measures designed to ensure compliance with statewide plans and policies and provide comprehensive water quality planning. Beneficial uses for minor surface water bodies of the Koehn Hydrologic Area include wildlife habitat.
California Desert Native Plants Act of 1981 (Food and Agricultural Code section 80001 et seq. and California Fish and Game Code sections 1925-1926)	Protects non-listed California desert native plants from unlawful harvesting on both public and private lands in Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego counties. Unless issued a valid permit, wood receipt, tag, and seal by the commissioner or sheriff, harvesting, transporting, selling, or possessing specific desert plants is prohibited.
Local	
Kern County General Plan Land Use, Open Space, and Conservation Element (Kern County 2007)	Directs the county to work closely with state and federal agencies to assure that discretionary projects avoid or minimize impacts to fish, wildlife, and botanical resources.

The RSPP project is located on federal land under BLM's jurisdiction and is therefore subject to the provisions of BLM's California Desert Conservation Area (CDCA) Plan (Revised 1999). As an amendment to the CDCA Plan, BLM produced the Western Mojave (WEMO) Coordinated Management Plan (BLM 2005). This document consists of proposed management actions and alternatives for public lands in the WEMO Planning Area.

The BLM has worked with the USFWS to develop a variety of land designations as tools to protect sensitive biological resources, including the DT. The siting of the RSPP project is consistent with the management direction of these designations, as described below:

- **Desert Wildlife Management Areas** (DWMAs) are general areas recommended by the Desert Tortoise Recovery Plan (USFWS 1994) within which recovery efforts for the DT would be concentrated. DWMAs had no specific legal boundaries in the 1994 Recovery Plan. The BLM formalized the general DWMAs from the 1994 Recovery Plan through its planning process and administers them as Areas of Critical Environmental Concern (see below). The RSPP project does not fall within any DWMA.
- **Area of Critical Environmental Concern** (ACEC) are specific, legally defined, BLM designations where special management is needed to protect and prevent irreparable damage to important historical, cultural, scenic values, fish and wildlife, and natural resources or to protect life and safety from natural hazards. The RSPP project is not included within a designated ACEC. The southern portion of the RSPP is within Mohave Ground Squirrel Conservation Area.
- **Critical Habitat** consists of specific areas defined by the USFWS as areas essential for the conservation of the listed species, which support physical and biological features essential for survival and that may require special management considerations or protection. Critical habitat for the DT was designated in 1994, largely based on proposed DWMAs in the draft Recovery Plan. The RSPP project is approximately seven miles north of the nearest DT critical habitat.

BLM provides management direction for species such as DT within the WEMO, which include five geographical areas of tortoise habitat in the planning area. The current designation for the RSPP area is Category III DT habitat (BLM 2005). Category III management goals are to limit tortoise habitat and population declines to the extent possible by mitigating impacts.

PERMITS/CONSULTATIONS REQUIRED

Due to the Energy Commission's exclusive licensing authority over thermal power plants; CDFG will not be issuing either an Incidental Take Permit or a Streambed Alteration Agreement. The terms and conditions that would have been included in these permits will be incorporated into the Energy Commission's license through Conditions of Certification (Pub. Resources Code § 25500). Construction of the project will require the following permits to achieve consistency with state and federal LORS:

- Incidental Take Permit for California Endangered Species Act of 1984 (CCR 14 §783, Fish and Game Code, §2050 through 2098) for impacts to the threatened DT and MGS.

- Lake or Streambed Alteration Agreement (LSA), Fish and Game Code §1600, from the California Department of Fish and Game for impacts to state waters.
- Section 7 Consultation with U.S. Fish and Wildlife Service (Endangered Species Act of 1973) for take of the threatened desert tortoise. A Biological Assessment will be developed by the applicant and be revised by BLM in preparation for submittal to the USFWS and initiation of formal consultation resulting in a Biological Opinion.
- Federal Eagle Act Take Permit for take of golden eagles under the Bald and Golden Eagle Act.

The proposed project must comply with state and federal laws, ordinances, regulations, and standards (LORS) (see summary in **Biological Resources Table 12**) that address state and federally listed species, as well as other sensitive species and habitats, and must secure the appropriate permits to satisfy these LORS. The Energy Commission has a one-stop permitting process for all thermal power plants rated 50 MW or more under the Warren-Alquist Act (Pub. Resources Code § 25500). Under the Act, the Energy Commission's certificate is "in lieu of" other state, local, and regional permits (*Ibid*.), and federal permits to the extent allowed by federal law. The Commission's streamlined permitting process accomplishes a primary objective of the Renewable Energy Action Team, as identified in the Governor's Executive Order S-14-08, – to create a "one stop" process for permitting renewable energy generation facilities under California law. Accordingly, Energy Commission staff has coordinated joint environmental review with the CDFG, as well as the BLM, and USFWS. Staff will incorporate all terms and conditions that would otherwise be included in state permits into staff's proposed conditions of certification to be included in the Energy Commission's license. The conditions of certification described below take the place of terms and conditions that, but for the Commission's exclusive authority, would have been included in the SAA and 2081 state permits.

Incidental Take Permit: California Endangered Species Act (Fish and Game Code §§2050 et seq.)

The California Endangered Species Act (CESA) prohibits the "take" (defined as "to hunt, pursue, catch, capture, or kill" or attempt to hunt, pursue, catch, capture, or kill") of state-listed species except as otherwise provided in state law. Construction and operation of the RSPP project would result in the take of DT and potentially MGS, both listed as threatened under CESA.

Staff has reviewed information supplied by the applicant (SM 2009a) and has coordinated closely with CDFG to develop the conditions of certification in this Staff Assessment. Energy Commission staff has determined, in consultation with the CDFG, that staff's proposed Conditions of Certification will not fully mitigate the impacts for either MGS or DT. Staff believes the high value habitat and species values currently found at the proposed RSPP site and the proposed alternatives that will be lost if the project is developed cannot be fully mitigated and are irreplaceable.

Lake or Streambed Alteration: California Fish and Game Code §§1600-1607.

Staff has directed the applicant to file a complete LSA application with CDFG for impacts to washes present on the site. The LSA application is not complete at this time. The applicant is completing a re-delineation of streambeds on the proposed project site and preparing complete plans for structures and other alterations proposed within streambeds. When a complete application is received by CDFG, CDFG and staff will work together to include appropriate conditions in the Conditions of Certification for the RSPP.

Federal LORS

The applicant will require a federal take permit for the loss of DT habitat and for the relocation or translocation of the federally listed DT. This federal take permit will be issued in the form of a federal Biological Opinion to be provided to BLM by the U. S. Fish and Wildlife Service.

The applicant may be required to obtain a Federal Eagle Act Take Permit for golden eagles.

C.2.11 NOTEWORTHY PUBLIC BENEFITS

Construction and operation of the RSPP would not result in any noteworthy public benefits with regard to biological resources because a unique site with robust biological resources will be eliminated if the project is constructed.

C.2.12 STAFF'S PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

All Conditions of Certification are recommendations by Energy Commission staff under CEQA and Commission regulations.

If the Commission approves this project, staff recommends the following Conditions of Certification be incorporated to at least provide some level of biological impact reduction.

The project applicant intends to perform vegetation mapping and update the wetland delineation of the revised impact area in the spring of 2010. Additional information from these studies will assist the applicant and Commission staff to adjust the implementation of the required mitigation. Given the assumption and existing evidence that the habitat across the entire ROW is similar staff does not anticipate new survey results to be substantially different from prior results. Therefore the recommended mitigation will not likely change even after surveys are completed.

DESIGNATED BIOLOGIST SELECTION[1]

BIO-1 The project owner shall assign at least one Designated Biologist to the project. The project owner shall submit the resume of the proposed Designated Biologist, with at least three references and contact information, to the Energy Commission Compliance Project Manager (CPM) and BLM's Authorized Officer for approval.

The Designated Biologist must meet the following minimum qualifications:

- Bachelor's degree in biological sciences, zoology, botany, ecology, or a closely related field;
- Three years of experience in field biology or current certification of a nationally recognized biological society, such as The Ecological Society of America or The Wildlife Society; and
- At least one year of field experience with biological resources found in or near the project area.

In lieu of the above requirements, the resume shall demonstrate to the satisfaction of the CPM and BLM's Authorized Officer, that the proposed Designated Biologist or alternate has the appropriate training and background to effectively implement the conditions of certification.

Verification: Verification: No fewer than 30 days prior to construction-related ground disturbance, the Designated Biologists shall complete a USFWS Desert Tortoise Authorized Biologist Request Form (www.fws.gov/ventura/speciesinfo/protocols_guidelines) and submit it to the USFWS, BLM's Authorized Officer, and the CPM for review and final approval.

The project owner shall submit the CPM and BLM's Authorized Officer-approved Designated Biologist within seven days of receiving the Energy Commission Decision. No construction-related or decommissioning/project closure ground disturbance, grading, boring, or trenching shall commence until an approved Designated Biologist is available to be on site.

If a Designated Biologist needs to be replaced, the specified information of the proposed replacement must be submitted to the CPM and BLM's Authorized Officer at least ten working days prior to the termination or release of the preceding Designated Biologist. In an emergency, the project owner shall immediately notify the CPM and

[1] USFWS <www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/dt> designates biologists who are approved to handle tortoises as "Authorized Biologists." Such biologists have demonstrated to the USFWS that they possess sufficient desert tortoise knowledge and experience to handle and move tortoises appropriately, and have received USFWS approval. Authorized Biologists are permitted to then approve specific monitors to handle tortoises, at their discretion. The California Department of Fish and Game (CDFG) must also approve such biologists, potentially including individual approvals for monitors approved by the Authorized Biologist. **Designated Biologists are the equivalent of Authorized Biologists.** Only Designated Biologists and certain Biological Monitors who have been approved by the Designated Biologist would be allowed to handle desert tortoises.

BLM's Authorized Officer to discuss the qualifications and approval of a short-term replacement while a permanent Designated Biologist is proposed to the CPM and BLM's Authorized Officer for consideration.

DESIGNATED BIOLOGIST DUTIES

BIO-2 The project owner shall ensure that the Designated Biologist performs the following during any site (or related facilities) mobilization, ground disturbance, grading, construction, operation, closure, and restoration activities. The Designated Biologist may be assisted by the approved Biological Monitor(s) but remains the contact for the project owner, BLM's Authorized Officer, and CPM. The Designated Biologist Duties shall include the following:

1. Advise the project owner's Construction and Operation Managers on the implementation of the biological resources conditions of certification;

2. Consult on the preparation of the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) to be submitted by the project owner;

3. Be available to directly supervise, conduct and coordinate mitigation, monitoring, and other biological resources compliance efforts, particularly in areas requiring avoidance of sensitive biological resources, such as special status species or their habitat;

4. Clearly mark sensitive biological resource areas to be avoided and inspect these areas at appropriate intervals for compliance with regulatory terms and conditions;

5. Inspect active construction areas where animals may have become trapped prior to construction commencing each day. At the end of the day, inspect for the installation of structures that prevent entrapment or allow escape during periods of construction inactivity. Periodically inspect areas with high vehicle activity (e.g., parking lots) for animals in harm's way;

6. Notify the project owner, BLM's Authorized Officer, and the CPM of any non-compliance with any biological resources condition of certification;

7. Respond directly to inquiries of BLM's Authorized Officer and the CPM regarding biological resource issues;

8. Maintain daily written records of the tasks specified above and those included in the BRMIMP. Summaries of these records shall be submitted in the Monthly Compliance Report and the Annual Compliance Report;

9. Train the Biological Monitors as appropriate, and ensure their familiarity with the BRMIMP, Worker Environmental Awareness Program (WEAP) training, all permits, and USFWS guidelines on desert tortoise surveys and handling procedures <www.fws.gov/ventura/speciesinfo/protocols_guidelines>; and

10. Maintain the ability to be in regular, direct communication with representatives of CDFG, USFWS, BLM's Authorized Officer, and CPM, including notifying these agencies of dead or injured special status species and reporting special status species observations to the California Natural Diversity Database.

Verification: The Designated Biologist shall submit in the Monthly Compliance Report to the BLM's Authorized Officer and the CPM copies of all written reports and summaries that document biological resources activities. If actions may affect biological resources during operation, a Designated Biologist shall be available for monitoring and reporting. During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report unless their duties cease, as approved by BLM's Authorized Officer and the CPM.

BIOLOGICAL MONITOR QUALIFICATIONS

BIO-3 The project owner's BLM- and CPM-approved Designated Biologist shall submit the resume, at least three references, and contact information of the proposed Biological Monitors to BLM's Authorized Officer and the CPM for approval. The monitors' resumes shall demonstrate, to the satisfaction of the CPM, the appropriate education and experience to accomplish the assigned biological resource tasks. The Biological Monitor is the equivalent of the USFWS designated Desert Tortoise Monitor (USFWS 2008). The project owner must hire sufficient biological monitors to ensure that all perimeter fence construction and initial grading and ground disturbance activity is directly monitored to avoid impacts to special status species or sensitive vegetation communities that are slated for preservation on the site.

Biological Monitor(s) training by the Designated Biologist shall include familiarity with the conditions of certification, BRMIMP, WEAP, all permits, and USFWS guidelines on desert tortoise surveys and handling procedures <www.fws.gov/ventura/speciesinfor/protocols_guidelines>.

Verification: The project owner shall submit the specified information to BLM's Authorized Officer and the CPM for approval at least 30 days prior to the start of any project-related site disturbance activities. The Designated Biologist shall submit a written statement to BLM's Authorized Officer and the CPM confirming that individual Biological Monitor(s) have been trained including the date when training was completed. If additional biological monitors are needed during construction the specified information shall be submitted to BLM's Authorized Officer and the CPM for approval at least 10 days prior to their first day of monitoring activities.

BIOLOGICAL MONITOR DUTIES

BIO-4 The Biological Monitors shall assist the Designated Biologist in conducting surveys and in monitoring of site mobilization activities, construction-related ground disturbance, grading, boring or trenching. The Designated Biologist shall remain the contact for the Project owner, BLM's Authorized Officer and the CPM.

Verification: The Designated Biologist shall submit in the Monthly Compliance Report to BLM's Authorized Officer and the CPM and copies of all written reports and summaries that document biological resources compliance activities, including those conducted by Biological Monitors. If actions may affect biological resources during operation a Biological Monitor, under the supervision of the Designated Biologist, shall be available for monitoring and reporting. During Project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report unless their duties cease, as approved by BLM's Authorized Officer and the CPM.

DESIGNATED BIOLOGIST AND BIOLOGICAL MONITOR AUTHORITY

BIO-5 The Project owner's construction/operation manager shall act on the advice of the Designated Biologist and Biological Monitor(s) to ensure conformance with the biological resources conditions of certification. The Designated Biologist shall have the authority to immediately stop any activity that is not in compliance with these conditions and/or order any reasonable measure to avoid take of an individual of a listed species. If required by the Designated Biologist and Biological Monitor(s) the Project owner's construction/operation manager shall halt all site mobilization, ground disturbance, grading, boring, trenching and operation activities in areas specified by the Designated Biologist. The Designated Biologist shall:

1. Require a halt to all activities in any area when determined that there would be an unauthorized adverse impact to biological resources if the activities continued;

2. Inform the Project owner and the construction/operation manager when to resume activities; and

3. Notify BLM's Authorized Officer and the CPM and if there is a halt of any activities and advise them of any corrective actions that have been taken or would be instituted as a result of the work stoppage.

If the Designated Biologist is unavailable for direct consultation, the Biological Monitor shall act on behalf of the Designated Biologist.

Verification: The Project owner shall ensure that the Designated Biologist or Biological Monitor notifies BLM's Authorized Officer and the CPM immediately (and no later than the morning following the incident, or Monday morning in the case of a weekend) of any non-compliance or a halt of any site mobilization, ground disturbance, grading, construction, and operation activities. The Project owner shall notify BLM's Authorized Officer and the CPM of the circumstances and actions being taken to resolve the problem.

Whenever corrective action is taken by the Project owner, a determination of success or failure would be made by BLM's Authorized Officer and the CPM within five working days after receipt of notice that corrective action is completed, or the Project owner would be notified by BLM's Authorized Officer and the CPM that coordination with other agencies would require additional time before a determination can be made.

WORKER ENVIRONMENTAL AWARENESS PROGRAM (WEAP)

BIO-6 The project owner shall develop and implement an RSPP-specific Worker Environmental Awareness Program (WEAP) and shall secure approval for the WEAP from BLM's Authorized Officer, USFWS, CDFG, and the CPM. The WEAP shall be administered to all onsite personnel including surveyors, construction engineers, employees, contractors, contractor's employees, supervisors, inspectors, subcontractors, and delivery personnel. The WEAP shall be implemented during site mobilization, ground disturbance, grading, construction, operation, and decommissioning/project closure. The WEAP shall:

1. Be developed by or in consultation with the Designated Biologist and consist of an on-site or training center presentation in which supporting electronic media and written material, including wallet-sized cards with summary information on special status species and sensitive biological resources and vegetation communities, is made available to all participants;

2. Discuss the locations and types of sensitive biological resources on the project site and adjacent areas, explain the reasons for protecting these resources, provide information to participants that no snakes, reptiles, or other wildlife shall be harmed, and the function of flagging that marks designating sensitive resources to be avoided and authorized work areas;

3. Place special emphasis on desert tortoise, Mohave ground squirrel, and western burrowing owl including information on physical characteristics, distribution, behavior, ecology, sensitivity to human activities, legal protection and status, penalties for violations, reporting requirements, and protection measures;

4. Include a discussion of fire prevention measures to be implemented by workers during project activities; request workers to dispose of cigarettes and cigars appropriately and not leave them on the ground or buried;

5. Describe the various temporary and permanent habitat protection measures to be implemented at the project site;

6. Identify whom to contact if there are further comments and questions about the material discussed in the program; and

7. Include a training acknowledgment form to be signed by each worker indicating that they received the WEAP training and shall abide by the guidelines.

The specific program can be administered by a competent individual(s) acceptable to the Designated Biologist.

Verification: Within seven days of publication of the Energy Commission's License Decision, or the Record of Decision/ROW Issuance, whichever comes first, the project owner shall provide to BLM's Authorized Officer and the CPM a copy of the final WEAP and all supporting written materials and electronic media prepared or reviewed by the Designated Biologist and a resume of the person(s) administering the program.

The project owner shall provide in the Monthly Compliance Report the number of persons who have completed the training in the prior month and a running total of all persons who have completed the training to date. At least 10 days prior to site and related facilities mobilization, the project owner shall submit two copies of the BLM- and CPM-approved final WEAP.

Signed training acknowledgement forms from construction personnel shall be kept on file and a copy kept on the project site by the project owner for at least six months after the start of commercial operation.

Throughout the life of the project, the worker education program shall be repeated annually for permanent employees, and shall be routinely administered within one week of arrival to any new construction personnel, foremen, contractors, subcontractors, and other personnel potentially working within the project area. Upon completion of the orientation, employees shall sign a form stating that they attend the program and understand all protection measures. These forms shall be maintained by the project owner and shall be made available to BLM's Authorized Officer and the CMP upon request. Workers shall receive and be required to visibly display a hardhat sticker or certificate that they have completed the training.

During project operation, signed statements for operational personnel shall be kept on file for six months following the termination of an individual's employment.

BIOLOGICAL RESOURCES MITIGATION IMPLEMENTATION AND MONITORING PLAN (BRMIMP)

BIO-7 The project owner shall develop a BRMIMP and submit two copies of the proposed BRMIMP to BLM's Authorized Officer and the CPM (for review and approval) and shall implement the measures identified in the approved BRMIMP. The BRMIMP shall incorporate avoidance and minimization measures described in Commission and BLM-approved final versions of the Desert Tortoise Relocation/Translocation Plan, Mohave Ground Squirrel Relocation/Translocation Plan, American Badger and Desert Kit Fox Relocation/Translocation Plan, Raven Monitoring, Management, and Control Plan, Burrowing Owl Relocation/Translocation Plan, the Weed Management Plan, Revegetation Plan, and the Decommissioning and Reclamation Plan. The BRMIMP shall be prepared in consultation with the Designated Biologist and shall and shall include detailed descriptions of the following:

1. All biological resources mitigation, monitoring, and compliance measures proposed and agreed to by the project owner;

2. All biological resources conditions of certification identified as necessary to avoid or mitigate impacts;

3. All biological resource mitigation, monitoring and compliance measures required in federal agency terms and conditions, such as those provided in the USFWS Biological Opinion;

4. All sensitive biological resources to be impacted, avoided, or mitigated by project construction, operation, and decommissioning/closure activities;

5. All required mitigation measures for each sensitive biological resource;

6. A detailed description of measures that shall be taken to avoid or mitigate temporary disturbances from construction and decommissioning/project closure activities;

7. All locations on up-to-date maps, at an approved scale, of sensitive biological resource areas subject to disturbance and areas requiring temporary and permanent protection and avoidance during construction, operation, and decommissioning/project closure;

8. Aerial photographs, at an approved scale, of all areas to be disturbed during project construction activities; include one set prior to any construction mobilization or site disturbance and one set subsequent to completion of project construction. Provide planned timing of aerial photography and a description of why times were chosen. Provide a final accounting of the estimated and actual impact acreage and a determination of whether additional habitat compensation is necessary in the Construction Termination Report;

9. Duration for each type of monitoring and a description of monitoring methodologies and frequency;

10. Performance standards to be used to help decide if/when proposed mitigation and conditions are or are not successful;

11. All performance standards and remedial measures to be implemented if performance standards are not met including adaptive management guidelines for changing monitoring or mitigation procedures as necessary;

12. A discussion of biological resources-related facility closure measures including a description of funding mechanism(s) for restoration of the site after closure;

13. A process for proposing plan modifications to the CPM, BLM's Authorized Officer, and appropriate agencies for review and approval; and

14. A requirement to submit any sightings of any special-status species that are observed on or in proximity to the project site, or during project surveys, to the California Natural Diversity Data Base (CNDDB) per CDFG requirements.

Verification: The project owner shall submit the BRMIMP to BLM's Authorized Officer and the CPM at least 30 days prior to start of any project-related construction mobilization and construction-related ground disturbance, grading, boring, and trenching. The BRMIMP shall contain all of the required measures included in all biological conditions of certification. No ground disturbance may occur prior to approval of the final BRMIMP by BLM's Authorized Officer and the CPM.

If there are any permits that have not yet been received when the BRMIMP is first submitted, these permits shall be submitted to BLM's Authorized Officer and the CPM within five days of their receipt, and the BRMIMP shall be revised or supplemented to reflect the permit condition within at least 10 days of their receipt by the project owner. 10 days prior to site and related facilities mobilization the revised BRMIMP shall be resubmitted to BLM's Authorized Officer and the CPM.

To verify the extent of construction disturbance does not exceed that described in this analysis, the project owner shall submit aerial photographs, at an approved scale, taken before and after construction to the CPM and BLM's Authorized Officer. The first set of aerial photographs reflecting site conditions prior to any preconstruction site mobilization and construction-related ground disturbance, grading, boring, and trenching shall be submitted at least 60 days prior to initiation of such activities. The second set of aerial photographs shall be taken subsequent to completion of construction, and shall be submitted to the CPM and BLM's Authorized Officer no later than 90 days after completion of construction.

Any changes to the approved BRMIMP must also be approved by BLM's Authorized Officer and the CPM in consultation with USFWS.

Implementation of BRMIMP measures (construction activities that were monitored, species observed, intervention measures taken) would be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of project construction, the project owner shall provide to BLM's Authorized Officer and the CPM, for review and approval, a written construction termination report identifying which items of the BRMIMP have been completed, a summary of all modifications to mitigation measures made during the project's site mobilization, ground disturbance, grading, boring, trenching, and construction phases, and which mitigation and monitoring items are still outstanding.

IMPACT AVOIDANCE AND MINIMIZATION MEASURES (BEST MANAGEMENT PRACTICES)

BIO-8 The Project owner shall undertake the following measures to manage the construction site and related facilities in a manner to avoid or minimize impacts to biological resources:

1. Limit Disturbance Areas. The boundaries of all areas to be disturbed (including staging areas, access roads, and sites for temporary

placement of spoils) shall be delineated with stakes and flagging prior to construction activities in consultation with the Designated Biologist. Spoils and topsoil shall be stockpiled in disturbed areas lacking native vegetation and which do not provide habitat for special-status species. Parking areas, staging and disposal site locations shall similarly be located in areas without native vegetation or special-status species habitat. All disturbances, Project vehicles and equipment shall be confined to the flagged areas.

2. Minimize Road Caused Impacts. New and existing roads that are planned for construction, widening, or other improvements shall not extend beyond the flagged impact area as described above. All vehicles passing or turning around would do so within the planned impact area or in previously disturbed areas. Where new access is required outside of existing roads or the construction zone, the route shall be clearly marked (i.e., flagged and/or staked) prior to the onset of construction.

3. Minimize Traffic Impacts. Vehicular traffic during Project construction and operation shall be confined to existing routes of travel to and from the Project site, and cross country vehicle and equipment use outside designated work areas shall be prohibited. The speed limit shall not exceed 25 miles per hour within the Project area, on maintenance roads for linear facilities, or on access roads to the Project site.

4. Monitor During Construction. In areas that have not been fenced with desert tortoise exclusion fencing and cleared, the Designated Biologist shall be present at the construction site during all Project activities that have potential to disturb soil, vegetation, and wildlife. The Designated Biologist or Biological Monitor shall walk immediately ahead of equipment during brushing and grading activities.

5. Minimize Impacts of Transmission/Pipeline Alignments, Roads, Staging Areas. Staging areas for construction on the plant site shall be within the area that has been fenced with desert tortoise exclusion fencing and cleared. For construction activities outside of the plant site (transmission line, pipeline alignments) access roads, pulling sites, and storage and parking areas shall be designed, installed, and maintained with the goal of minimizing impacts to native plant communities and sensitive biological resources. Transmission lines and all electrical components shall be designed, installed, and maintained in accordance with the Avian Power Line Interaction Committee's (APLIC's) S*uggested Practices for Avian Protection on Power Lines* (APLIC 2006) and *Mitigating Bird Collisions with Power Lines* (APLIC 2004) to reduce the likelihood of large bird electrocutions and collisions.

6. Avoid Use of Toxic Substances. Soil bonding and weighting agents used on unpaved surfaces shall be non-toxic to wildlife and plants.

7. Minimize Lighting Impacts. Facility lighting shall be designed, installed, and maintained to prevent side casting of light towards wildlife habitat.

8. Avoid Vehicle Impacts to Desert Tortoise. Parking and storage shall occur within the area enclosed by desert tortoise exclusion fencing to the extent feasible. No vehicles or construction equipment parked outside the fenced area shall be moved prior to an inspection of the ground beneath the vehicle for the presence of desert tortoise. If a desert tortoise is observed, it would be left to move on its own. If it does not move within 15 minutes, a Designated Biologist or Biological Monitor under the Designated Biologist's direct supervision may remove and relocate the animal to a safe location if temperatures are within the range described in the USFWS' 2009 *Desert Tortoise Field Manual* (http://www.fws.gov/ventura/speciesinfo/protocols_guidelines

9. Avoid Wildlife Pitfalls:

   a. Backfill Trenches. At the end of each work day, the Designated Biologist shall ensure that all potential wildlife pitfalls (trenches, bores, and other excavations) outside the area fenced with desert tortoise exclusion fencing have been backfilled. If backfilling is not feasible, all trenches, bores, and other excavations shall be sloped at a 3:1 ratio at the ends to provide wildlife escape ramps, or covered completely to prevent wildlife access, or fully enclosed with desert tortoise-exclusion fencing. All trenches, bores, and other excavations outside the areas permanently fenced with desert tortoise exclusion fencing shall be inspected periodically throughout the day and at the end of each workday by the Designated Biologist or a Biological Monitor. Should a tortoise or other wildlife become trapped, the Designated Biologist or Biological Monitor shall remove and relocate the individual as described in the Desert Tortoise Relocation/Translocation Plan. Any wildlife encountered during the course of construction shall be allowed to leave the construction area unharmed.

   b. Avoid Entrapment of Desert Tortoise. Any construction pipe, culvert, or similar structure with a diameter greater than three inches, stored less than eight inches aboveground and within desert tortoise habitat (i.e., outside the permanently fenced area) for one or more nights, shall be inspected for tortoises before the material is moved, buried or capped. As an alternative, all such structures may be capped before being stored outside the fenced area, or placed on pipe racks. These materials would not need to be inspected or capped if they are stored within the permanently fenced area after the clearance surveys have been completed.

10. Minimize Standing Water. Water applied to dirt roads and construction areas (trenches or spoil piles) for dust abatement shall use the minimal amount needed to meet safety and air quality standards in an effort to prevent the formation of puddles, which could attract desert tortoises and

common ravens to construction sites. A Biological Monitor shall patrol these areas to ensure water does not puddle and shall take appropriate action to reduce water application where necessary.

11. Dispose of Road-killed Animals. Road killed animals or other carcasses detected on roads near the Project area shall be picked up immediately and delivered to the Biological Monitor. For special-status species roadkill, the Biological Monitor shall contact CDFG within 1 working day of receipt of the carcass for guidance on disposal or storage of the carcass. The Biological Monitor shall report the special-status species record as described in **BIO-10** below.

12. Minimize Spills of Hazardous Materials. All vehicles and equipment shall be maintained in proper working condition to minimize the potential for fugitive emissions of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials. The Designated Biologist shall be informed of any hazardous spills immediately as directed in the Project Hazardous Materials Plan. Hazardous spills shall be immediately cleaned up and the contaminated soil properly disposed of at a licensed facility. Servicing of construction equipment shall take place only at a designated area. Service/maintenance vehicles shall carry a bucket and pads to absorb leaks or spills.

13. Worker Guidelines. During construction all trash and food-related waste shall be placed in self-closing containers and removed daily from the site. Workers shall not feed wildlife or bring pets to the Project site. Except for law enforcement personnel, no workers or visitors to the site shall bring firearms or weapons. Vehicular traffic shall be confined to existing routes of travel to and from the Project site, and cross country vehicle and equipment use outside designated work areas shall be prohibited. The speed limit when traveling on dirt access routes within desert tortoise habitat shall not exceed 25 miles per hour.

14. Implement Erosion Control Measures. Standard erosion control measures shall be implemented for all phases of construction and operation where sediment run-off from exposed slopes threatens to enter “Waters of the State”. Sediment and other flow-restricting materials shall be moved to a location where they shall not be washed back into the stream. All disturbed soils and roads within the Project site shall be stabilized to reduce erosion potential, both during and following construction. Areas of disturbed soils (access and staging areas) with slopes toward a drainage shall be stabilized to reduce erosion potential.

15. Monitor Ground Disturbing Activities Prior to Pre-Construction Site Mobilization. If pre-construction site mobilization requires ground-disturbing activities such as for geotechnical borings or hazardous waste evaluations, a Designated Biologist or Biological Monitor shall be present to monitor any actions that could disturb soil, vegetation, or wildlife.

16. Revegetation of Temporarily Disturbed Areas. The Project owner shall prepare and implement a Revegetation Plan to restore all areas subject to temporary disturbance to pre-project grade and conditions. Temporarily disturbed areas within the Project area include, but are not limited to: all proposed location for linear facilities, temporary access roads, construction work temporary lay-down areas, and construction equipment staging areas. The Revegetation Plan shall include a description of topsoil salvage and seeding techniques and a monitoring and reporting plan, and the following performance standards by the end of monitoring year 2:

    - At least 80 percent of the species observed within the temporarily disturbed areas shall be native species that naturally occur in desert scrub habitats; and
    - Relative cover and density of plant species within the temporarily disturbed areas shall equal at least 60 percent.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP and implemented. Implementation of the measures would be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of Project construction, the Project owner shall provide to BLM's Authorized Officer and the CPM, for review and approval, a written construction termination report identifying how measures have been completed.

No less than 30 days following the publication of the Energy Commission License Decision or the Record of Decision/ROW Issuance, whichever comes first, the project owner shall submit to the CPM and BLM's Authorized Officer a final agency-approved Revegetation Plan that has been reviewed and approved by BLM's Authorized Officer and the CPM. All modifications to the Revegetation Plan shall be made only after approval from BLM's Authorized Officer and the CPM.

Within 30 days after completion of project construction, the project owner shall provide to the CPM for review and approval, a written report identifying which items of the Revegetation Plan have been completed, a summary of all modifications to mitigation measures made during the project's construction phase, and which items are still outstanding.

On January 31st of each year following construction until the completion of the revegetation monitoring specified in the Revegetation Plan, the Designated Biologist shall provide a report to the CPM and BLM's Authorized Officer that includes: a summary of revegetation activities for the year, a discussion of whether revegetation performance standards for the year were met; and recommendations for revegetation remedial action, if warranted, are planned for the upcoming year.

DESERT TORTOISE RELOCATION/TRANSLOCATION PLAN

BIO-9 The project owner shall develop and implement a final Desert Tortoise Relocation/Translocation Plan (Plan) that is consistent with current USFWS approved guidelines, and meets the approval of BLM, USFWS, CDFG, and Energy Commission staff. The final Plan shall be based on the draft Desert

Tortoise Relocation/Translocation Plan prepared by the applicant dated January 2010 (SM 2010a) and shall include all revisions deemed necessary by BLM, USFWS, CDFG, and the Energy Commission staff. The USFWS is currently drafting relocation/translocation guidelines specifically for the RSPP site. The final plan shall include all components of the USFWS guidelines.

Verification: Within 30 days of any ground disturbance activities, the project owner shall provide BLM's Authorized Officer and the CPM with the final version of a Desert Tortoise Relocation/Translocation Plan that has been reviewed and approved by BLM's Authorized Officer and the CPM in consultation with USFWS and CDFG. All modifications to the approved Plan shall be made only after approval by BLM's Authorized Officer and the CPM, in consultation with USFWS and CDFG.

Within 30 days after initiation of relocation and/or translocation activities, the Designated Biologist shall provide to BLM's Authorized Officer and the CPM for review and approval, a written report identifying which items of the Plan have been completed, and a summary of all modifications to measures made during implementation of the Plan.

DESERT TORTOISE CLEARANCE SURVEYS AND EXCLUSION FENCING

BIO-10 The project owner shall undertake appropriate measures to manage the construction site and related facilities in a manner to avoid or minimize impacts to desert tortoise. Methods for clearance surveys, fence specification and installation, tortoise handling, artificial burrow construction, egg handling and other procedures would be consistent with those described in the USFWS 2009 *Desert Tortoise Manual* (<http://www.fws.gov/ventura/speciesinfo/protocols_guidelines>) or more current guidance provided by CDFG and USFWS. The project owner shall also implement all terms and conditions described in the Biological Opinion prepared by USFWS. These measures include, but are not limited to, the following:

1. Fence Installation. To avoid impacts to desert tortoises, permanent desert tortoise exclusion fencing shall be installed along the permanent perimeter security fence and temporarily installed along the utility corridors. The proposed alignments for the permanent perimeter fence and utility rights-of-way (ROW) fencing shall be flagged and surveyed within 24 hours prior to the initiation of fence construction. Clearance surveys of the perimeter fence and utility ROW alignments shall be conducted by the Designated Biologist(s) using techniques approved by the USFWS and CDFG and may be conducted in any season with USFWS and CDFG approval. Biological Monitors may assist the Designated Biologist under his or her supervision. These fence clearance surveys shall provide 100-percent coverage of all areas to be disturbed and an additional transect along both sides of the fence line. This fence line transect will cover an area approximately 90 feet wide centered on the fence alignment. Transects would be no greater than 15 feet apart. All desert tortoise burrows, and burrows constructed by other species that might be used by desert

tortoises, shall be examined to assess occupancy of each burrow by desert tortoises and handled in accordance with USFWS 2009 *Desert Tortoise Field Manual*.

a. Timing, Supervision of Fence Installation. The exclusionary fencing shall be installed prior to the onset of site clearing and grubbing. The fence installation shall be supervised by the Designated Biologist and monitored by the Biological Monitors to ensure the safety of any tortoise present.

b. Fence Material and Installation. The permanent tortoise exclusionary fencing shall be constructed in accordance with the USFWS 2009 *Desert Tortoise Field Manual* (Chapter 8 – Desert Tortoise Exclusion Fence).

c. Security Gates. Security gates shall be designed with minimal ground clearance to deter ingress by tortoises. The gates may be electronically activated to open and close immediately after the vehicle(s) have entered or exited to prevent the gates from being kept open for long periods of time. Cattle grating designed to safely exclude desert tortoise shall be installed at the gated entries to discourage tortoises from gaining entry

d. Utility Corridor Fencing. The utility rights-of-way shall be temporarily fenced on each side of the right-of-way prior to ground disturbing activities to prevent desert tortoise entry during construction. Temporary fencing must follow guidelines for permanent fencing and supporting stakes shall be sufficiently spaced to maintain fence integrity.

e. Fence Inspections. Following installation of the desert tortoise exclusion fencing for both the permanent site fencing and temporary fencing in the utility corridors, the fencing shall be regularly inspected. If tortoise were moved out of harm's way during fence construction, permanent and temporary fencing shall be inspected at least two times a day for the first seven days to ensure a recently moved tortoise has not been trapped within the fence. Thereafter, permanent fencing shall be inspected monthly and within 24 hours following all major rainfall events. Any damage to the fencing shall be temporarily repaired immediately to keep tortoises out of the site, and permanently repaired within 48 hours of observing damage. Inspections of permanent site fencing shall occur for the life of the project. Temporary fencing shall be inspected weekly and, where drainages intersect the fencing, during and within 24 hours following major rainfall events. All temporary fencing shall be repaired immediately upon discovery and, if the fence may have permitted tortoise entry while damaged, the Designated Biologist shall inspect the area for tortoise.

2. Clearance Surveys. Following construction of the permanent perimeter security fence and the attached tortoise exclusion fence, the permanently

fenced area shall be cleared of tortoises by the Designated Biologist, who may be assisted by Biological Monitors. Clearance surveys shall be conducted in accordance with the USFWS 2009 *Desert Tortoise Field Manual* (Chapter 6 – Clearance Survey Protocol for the Desert Tortoise – Mojave Population) and shall consist of two surveys covering 100 percent of the project area by walking transects no more than 15 feet apart. If a desert tortoise is located on the second survey, a third survey shall be conducted. Each separate survey shall be walked in a different direction to allow opposing angles of observation. Clearance surveys may only be conducted when tortoises are most active (April through May or September through October). Surveys outside of these time periods require approval by USFWS and CDFG. Any tortoise located during clearance surveys shall be relocated and monitored in accordance with the Desert Tortoise Relocation/Translocation Plan. Vegetation salvage operations shall not begin until the area is deemed free of desert tortoises.

a. Burrow Searches. During clearance surveys all potential desert tortoise burrows and burrows constructed by other species that might be used by desert tortoises, shall be examined by the Designated Biologist, who may be assisted by the Biological Monitors, to assess occupancy of each burrow by desert tortoises and handled in accordance with the USFWS 2009 *Desert Tortoise Field Manual*. To prevent reentry by a tortoise or other wildlife, all burrows shall be collapsed once absence has been determined. Tortoises taken from burrows and from elsewhere on the site shall be relocated or translocated as described in the Desert Tortoise Relocation/Translocation Plan.

b. Burrow Excavation/Handling. All potential desert tortoise burrows located during clearance surveys would be excavated by hand, tortoises removed, and collapsed or blocked to prevent occupation by desert tortoises. All desert tortoise handling and removal, and burrow excavations, including nests, would be conducted by the Designated Biologist who may be assisted by a Biological Monitor in accordance with the USFWS *Desert Tortoise Field Manual*.

3. Monitoring During Clearing. Following the tortoise clearance and removal from the power plant site and utility corridors, workers and heavy equipment shall be allowed to enter the project site to perform vegetation salvage and earth work such as clearing, grubbing, leveling, and trenching. A Designated Biologist shall monitor clearing and grading activities to find and move tortoises missed during the initial tortoise clearance survey. Should a tortoise be discovered, it shall be relocated or translocated as described in the Desert Tortoise Relocation/Translocation Plan to an area approved by the Designated Biologist.

4. Reporting. The Designated Biologist shall record the following information for any desert tortoises handled: a) the locations (narrative and maps) and dates of observation; b) general condition and health, including injuries, state of healing and whether desert tortoise voided their bladders; c) location moved from and location moved to (using GPS technology); d)

gender, carapace length, and diagnostic markings (i.e., identification numbers or marked lateral scutes); e) ambient temperature when handled and released; and f) digital photograph of each handled desert tortoise as described in the paragraph below. Desert tortoise moved from within project areas shall be marked and monitored in accordance with the Desert Tortoise Relocation/Translocation Plan.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP and implemented. Implementation of the measures shall be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of desert tortoise clearance surveys the Designated Biologist shall submit a report to BLM's Authorized Officer, the CPM, USFWS, and CDFG describing how each of the mitigation measures described above has been satisfied. The report shall include the desert tortoise survey results, capture and release locations of any relocated desert tortoises, and any other information needed to demonstrate compliance with the measures described above.

MOHAVE GROUND SQUIRREL CLEARANCE SURVEYS

BIO-11 The project owner shall undertake appropriate measures to manage construction at the plant site and linear facilities in a manner to avoid or minimize impacts to Mohave ground squirrel. These measures include, but are not limited to the following:

- Trapping in season prior to construction in order to translocate individual MGSs from the site, and
- Monitoring the translocated MGS individuals .

Energy Commission staff and CDFG are working on the details of this condition of certification.

Verification: To be determined.

DESERT TORTOISE AND MOHAVE GROUND SQUIRREL HABITAT COMPENSATORY MITIGATION AND CESA INCIDENTAL TAKE AUTHORIZATION

BIO-12 To fully mitigate for habitat loss and potential take of desert tortoise, Mohave ground squirrel and other special status species, the RSPP owner shall provide compensatory mitigation at a 5:1 ratio for impacts to 2,002 acres or the area disturbed by the final Project footprint. The requirements for acquisition of 10,010 acres of compensation lands shall include the following:

1. Responsibility for Acquisition of Lands: The responsibility for acquisition of lands may be delegated by written agreement from the Energy Commission to a third party, such as a non-governmental organization supportive of habitat conservation. Such delegation shall be subject to approval by the CPM in consultation with CDFG, BLM, and USFWS, prior to land acquisition, enhancement or management activities. If habitat disturbance exceeds that described in this analysis, the Project owner shall be responsible for funding acquisition, habitat improvements and long-term management of additional compensation lands or additional

funds required to compensate for any additional habitat disturbances. Additional funds shall be based on the adjusted market value of compensation lands at the time of construction to acquire and manage habitat. Water and mineral rights shall be included as part of the land acquisition. Agreements to delegate land acquisition to CDFG or an approved third party and to manage compensation lands shall be implemented within 18 months of the Energy Commission's License Decision.

2. Selection Criteria for Compensation Lands. The compensation lands selected for acquisition shall:

   a. be within the Western Mojave Desert, with potential to contribute to desert tortoise and Mohave ground squirrel habitat connectivity and build linkages between desert tortoise designated critical habitat, known populations of desert tortoise and Mohave ground squirrel, and/or other preserve lands;

   b. provide habitat for desert tortoise and Mohave ground squirrel with capacity to regenerate naturally when disturbances are removed;

   c. be near larger blocks of lands that are either already protected or planned for protection, or which could feasibly be protected long-term by a public resource agency or a non-governmental organization dedicated to habitat preservation;

   d. be connected to lands currently occupied by desert tortoise and Mohave ground squirrel, ideally with populations that are stable, recovering, or likely to recover;

   e. not have a history of intensive recreational use or other disturbance that might make habitat recovery and restoration infeasible;

   f. not be characterized by high densities of invasive species, either on or immediately adjacent to the parcels under consideration, that might jeopardize habitat recovery and restoration; and

   g. not contain hazardous wastes.

3. Review and Approval of Compensation Lands Prior to Acquisition. A minimum of three months prior to acquisition of the property, the Project owner shall submit a formal acquisition proposal to the CPM, CDFG, USFWS and BLM describing the parcel(s) intended for purchase. This acquisition proposal shall discuss the suitability of the proposed parcel(s) as compensation lands for desert tortoise and Mohave ground squirrel in relation to the criteria listed above. Approval from the CPM, in consultation with CDFG, BLM, and the USFWS, shall be required for acquisition of all parcels comprising the 10,010 acres.

4. Commission Mitigation Security: The Project owner shall provide financial assurances to the CPM with copies of the document(s) to CDFG, BLM, and the USFWS, to guarantee that an adequate level of funding is available to implement the Energy Commission Complementary Mitigation Measures described in this condition. These funds shall be used solely for implementation of the measures associated with the RSPP. Alternatively, financial assurance can be provided to the CPM and CDFG in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security") prior to initiating ground-disturbing Project activities. Prior to submittal to the CPM, the Security shall be approved by the CPM, in consultation with CDFG, BLM, and the USFWS, to ensure funding in the amount of (TBD) be provided. This Security amount was calculated as follows and may be revised upon completion of a Property Analysis Record (PAR) or PAR-like analysis of the proposed compensation lands:

   a. land acquisition costs for compensation lands, calculated at TBD /acre = TBD;

   b. costs of initial habitat improvements to compensation lands, calculated at TBD/acre = TBD; and

   c. costs of establishing an endowment for long-term management of compensation lands, calculated at TBD/acre = TBD.

5. Compensation Lands Acquisition Conditions: The Project owner shall comply with the following conditions relating to acquisition of the compensation lands after the CDFG and the CPM, in consultation with BLM and the USFWS, have approved the proposed compensation lands and received Security as applicable and as described above.

   a. Preliminary Report: The Project owner, or approved third party, shall provide a recent preliminary title report, initial hazardous materials survey report, biological analysis, and other necessary documents for the proposed 10,010 acres. All documents conveying or conserving compensation lands and all conditions of title/easement are subject to a field review and approval by the CPM, in consultation with CDFG, BLM, and the USFWS, California Department of General Services and, if applicable, the Fish and Game Commission and/or the Wildlife Conservation Board.

   b. Title/Conveyance: The Project owner shall transfer fee title or a conservation easement to the 10,010 acres of compensation lands to CDFG under terms approved by CDFG. Alternatively, a non-profit organization qualified to manage compensation lands (pursuant to California Government Code section 65965) and approved by CDFG and the CPM may hold fee title or a conservation easement over the habitat mitigation lands. If the approved non-profit organization holds title, a conservation easement shall be recorded in favor of CDFG in a form approved by CDFG. If the approved non-profit holds a conservation easement, CDFG shall be named a third party

beneficiary. If a Security is provided, the Project owner or an approved third party shall complete the proposed compensation lands acquisition within 18 months of the start of Project ground-disturbing activities.

c. Initial Habitat Improvement Fund. The Project owner shall fund the initial protection and habitat improvement of the 10,010 acres. Alternatively, a non-profit organization may hold the habitat improvement funds if they are qualified to manage the compensation lands (pursuant to California Government Code section 65965) and if they meet the approval of CDFG and the CPM. If CDFG takes fee title to the compensation lands, the habitat improvement fund must go to CDFG.

d. Long-term Management Endowment Fund. Prior to ground-disturbing Project activities, the Project owner shall provide to CDFG a non-wasting capital endowment in the amount determined through the Property Analysis Record (PAR) or PAR-like analysis that would be conducted for the 10,010 acres. Alternatively, a non-profit organization may hold the endowment fees if they are qualified to manage the compensation lands (pursuant to California Government Code section 65965) and if they meet the approval of CDFG and the CPM. If CDFG takes fee title to the compensation lands, the endowment must go to CDFG, where it would be held in the special deposit fund established pursuant to California Government Code section 16370. If the special deposit fund is not used to manage the endowment, the Desert Tortoise Preserve Committee or similarly approved entity identified by CDFG shall manage the endowment for CDFG and with CDFG supervision.

e. Interest, Principal, and Pooling of Funds. The Project owner, CDFG and the CPM shall ensure that an agreement is in place with the endowment holder/manager to ensure the following conditions:

   i. Interest. Interest generated from the initial capital endowment shall be available for reinvestment into the principal and for the long-term operation, management, and protection of the approved compensation lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action approved by CDFG designed to protect or improve the habitat values of the compensation lands.

   ii. Withdrawal of Principal. The endowment principal shall not be drawn upon unless such withdrawal is deemed necessary by the CDFG or the approved third-party endowment manager to ensure the continued viability of the species on the 10,010 acres. If CDFG takes fee title to the compensation lands, monies received by CDFG pursuant to this provision shall be deposited in a special deposit fund established pursuant to Government Code section 16370. If the special deposit fund is not used to manage the

endowment, the California Wildlife Foundation or similarly approved entity identified by CDFG would manage the endowment for CDFG with CDFG supervision.

iii. Pooling Endowment Funds. CDFG, or a CPM and CDFG approved non-profit organization qualified to hold endowments pursuant to California Government Code section 65965, may pool the endowment with other endowments for the operation, management, and protection of the 10,010 acres for local populations of desert tortoise and Mohave ground squirrel. However, for reporting purposes, the endowment fund must be tracked and reported individually to the CDFG and CPM.

iv. Reimbursement Fund. The Project owner shall provide reimbursement to CDFG or an approved third party for reasonable expenses incurred during title, easement, and documentation review; expenses incurred from other state or state approved federal agency reviews; and overhead related to providing compensation lands.

The Project owner is responsible for all compensation lands acquisition/easement costs, including but not limited to, title and document review costs, as well as expenses incurred from other state agency reviews and overhead related to providing compensation lands to the department or approved third party; escrow fees or costs; environmental contaminants clearance; and other site cleanup measures.

Verification: No less than 90 days prior to acquisition of the property, the Project owner shall submit a formal acquisition proposal to BLM's Authorized Officer, the CPM, CDFG, and USFWS describing the parcels intended for purchase.

No later than 18 months following the publication of the Energy Commission License Decision the Project owner shall provide written verification to BLM's Authorized Officer, the CPM, USFWS and CDFG that the compensation lands or conservation easements have been acquired and recorded in favor of the approved recipient(s). Alternatively, no later than 30 days prior to beginning Project ground-disturbing activities, the Project owner shall provide written verification of Security in accordance with this condition of certification. If Security is provided, the Project owner, or an approved third party, shall complete and provide written verification of the proposed compensation lands acquisition within 18 months of the start of Project ground-disturbing activities. Within 180 days of the land or easement purchase, as determined by the date on the title, the Project owner, or an approved third party, shall provide BLM's Authorized Officer, the CPM, CDFG and USFWS with a management plan for the compensation lands and associated funds. BLM's Authorized Officer and the CPM shall review and approve the management plan, in consultation with CDFG and the USFWS.

Within 90 days after completion of Project construction, the Project owner shall provide to the CPM and CDFG an analysis with the final accounting of the amount of habitat disturbed during Project construction.

RAVEN MONITORING, MANAGEMENT, AND CONTROL PLAN

BIO-13 The project owner shall implement a Raven Monitoring, Management, and Control Plan that is consistent with the most current USFWS-approved raven management guidelines, and which meets the approval of BLM's Authorized Officer and the CPM, in consultation with the USFWS and CDFG. The draft Raven Monitoring, Management, and Control Plan submitted by the Applicant (SM 2010a) shall provide the basis for the final plan, subject to review and revisions from BLM's Authorized Officer, the CPM, CDFG, and USFWS. The Raven Monitoring, Management, and Control Plan shall include a funding mechanism for support of the USFWS regional raven management program. The amount of that support is yet TBD.

Verification: No less than 10 days prior to start of any Project-related ground disturbance activities, the Project owner shall provide BLM's Authorized Officer, the CPM, USFWS, and CDFG with the final version of a Common Raven Management Plan. The CPM and BLM's Authorized Officer would determine the plan's acceptability within 15 days of receipt of the final plan. All modifications to the approved Raven Management Plan shall be made only with approval of BLM's Authorized Officer and CPM in consultation with USFWS and CDFG

Within 30 days after completion of Project construction, the Project owner shall provide to the CPM for review and approval, a written report identifying which items of the Raven Monitoring and Control Plan have been completed, a summary of all modifications to mitigation measures made during the Project's construction phase, and which items are still outstanding.

On January 31st of each year following construction the Designated Biologist shall provide a report to the CPM and BLM's Authorized Officer that includes: a summary of the results of raven management and control activities for the year; a discussion of whether raven control and management goals for the year were met; and recommendations for raven management activities for the upcoming year.

PRE-CONSTRUCTION NEST SURVEYS AND IMPACT AVOIDANCE MEASURES

BIO-14 Where practicable, ground-disturbing activities would be conducted outside the bird nesting season (February 1 through July 31). Pre-construction nest surveys shall be conducted if construction activities would occur from February 1 through July 31. The Designated Biologist or Biological Monitor conducting the surveys shall be experienced bird surveyors familiar with standard nest-locating techniques and shall perform surveys in accordance with the following guidelines:

1) Surveys shall cover all potential nesting habitat in the project site and within 500 feet of the boundaries of the designated disturbance area and linear facilities;

2) At least two pre-construction surveys shall be conducted, separated by a minimum 10-day interval. One of the surveys needs to be conducted within the 14-day period preceding initiation of construction activity.

Additional follow-up surveys may be required if periods of construction inactivity exceed three weeks, an interval during which birds may establish a nesting territory and initiate egg laying and incubation;

3) If active nests are detected during the survey, a no-disturbance buffer zone (protected area surrounding the nest, the size of which is to be determined by the Designated Biologist in consultation with CDFG and BLM) and monitoring plan shall be developed. Nest locations shall be mapped using a geographic positioning system (GPS) and submitted, along with a summary report describing the survey results, to BLM's Authorized Officer and the CPM; and

4) The Designated Biologist shall monitor the nest until he or she determines that nestlings have fledged and dispersed or the nest is otherwise no longer active (abandoned). Activities that might, in the opinion of the Designated Biologist, disturb nesting activities, shall be prohibited within the buffer zone until such a determination is made.

Verification: At least 10 days prior to the start of any project related ground disturbance activities, the project owner shall provide BLM's Authorized Officer and the CPM a letter-report describing the findings of the pre-construction nest surveys, including the time, date, and duration of the survey; identity and qualifications of the surveyor (s); and a list of species observed. If active nests are detected during the survey, the report shall include a map or aerial photo identifying the location of the nest and shall depict the boundaries of the no-disturbance buffer zone around the nest(s) that would be avoided during project construction.

A weekly monitoring report shall be prepared by the designated biologist for as long as active nests are present on the site and sent to the BLM Authorized Officer, the CPM, and CDFG. The weekly monitoring report shall include the current status of any active nests and describe any construction activities taking place adjacent to the nest buffers. A final monitoring report shall be prepared that summarizes nest monitoring activities for the nesting season and summarizes outcomes for monitored nests. The weekly and final reports shall include a graphic showing the locations of all monitored nests.

MONITORING IMPACTS OF SOLAR TECHNOLOGY ON BIRDS

BIO-15 The project owner shall monitor the death and injury of birds from collisions with facility features such as reflective mirror-like surfaces and from heat, and bright light from concentrating sunlight. The study design shall be approved by BLM's Authorized Officer and the CPM in consultation with CDFG and USFWS, and shall be incorporated into the project's BRMIMP and implemented. The monitoring should be conducted for a minimum of two years unless less monitoring can be justified. Following the first year of monitoring a decision will be made whether to continue monitoring for the second year. Following the second year of monitoring, and after considering the data and analysis, staff will determine whether more years are of monitoring are needed, or whether mitigation is needed. Carcass searches should be conducted weekly to determine whether birds are being killed or

injured by the facility. Carcass removal and searcher efficiency trials shall be conducted each year to determine if there is a carcass detection bias that would affect fatality numbers. The carcasses shall be photographed, collected, documented, and kept frozen until identified to species and checked to determine cause of death. The project owner will prepare a monitoring study plan to be approved by BLM's Authorized Officer and the CPM in consultation with CDFG and USFWS.

Verification: No less than 10 days following the publication of the Energy Commission License Decision or the Record of Decision/ROW Issuance, whichever comes first, the project owner shall submit to the CPM, BLM's Authorized Officer, USFWS and CDFG a final Bird Monitoring Study. Modifications to the Bird Monitoring Study shall be made only after approval from BLM's Authorized Officer and the CPM.

For one year following the beginning of power plant operation the Designated Biologist shall submit quarterly reports to BLM's Authorized Officer, CPM, CDFG, and USFWS describing the dates, durations, and results of monitoring. The quarterly reports shall provide a detailed description of any Project-related bird or wildlife deaths or injuries detected during the monitoring study or at any other time. Following the completion of the fourth quarter of monitoring the Designated Biologist shall prepare an Annual Report that summarizes the year's data, analyzes any Project-related bird fatalities or injuries detected, and provides recommendations for future monitoring and any adaptive management actions needed. The Annual Report shall be provided to the CPM, BLM's Authorized Officer, CDFG, and USFWS. Quarterly reporting shall continue until BLM's Authorized Officer and the CPM, in consultation with CDFG and USFWS determine whether more years of monitoring are needed, and whether mitigation and adaptive management measures are necessary. After the Bird Monitoring Study is determined by BLM's Authorized Office and the CPM to be complete, the project owner or contractor shall prepare a paper that describes the study design and monitoring results to be submitted to a peer-reviewed scientific journal. Proof of submittal shall be provided to BLM's Authorized Officer and the CPM within one year of concluding the monitoring study.

AMERICAN BADGER AND DESERT KIT FOX IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-16 To avoid direct impacts to American badgers and desert kit fox, pre-construction surveys shall be conducted for these species concurrent with the desert tortoise surveys. Surveys shall be conducted as described below:

Biological Monitors shall perform pre-construction surveys for badger and kit fox dens in the Project area, including areas within 250 feet of all Project facilities, utility corridors, and access roads. If dens are detected each den shall be classified as inactive, potentially active, or definitely active.

Inactive dens that would be directly impacted by construction activities shall be excavated by hand and backfilled to prevent reuse by badgers or kit fox. Potentially and definitely active dens that would be directly impacted by construction activities shall be monitored by the Biological Monitor for three consecutive nights using a tracking medium (such as diatomaceous earth or

fire clay) and/or infrared camera stations at the entrance. If no tracks are observed in the tracking medium or no photos of the target species are captured after three nights, the den shall be excavated and backfilled by hand. If tracks are observed, the den shall be progressively blocked with natural materials (rocks, dirt, sticks, and vegetation piled in front of the entrance) for the next three to five nights to discourage the badger or kit fox from continued use. After verification that the den is unoccupied it shall then be excavated and backfilled by hand to ensure that no badgers or kit fox are trapped in the den. BLM approval may be required prior to release of badgers on public lands.

Verification: The Project owner shall submit a report to the CPM and CDFG within 30 days of completion of badger and kit fox surveys. The report shall describe survey methods, results, impact avoidance and minimization measures implemented, and the results of those measures.

BURROWING OWL IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-17 The project owner shall implement the following measures to avoid, minimize and offset impacts to burrowing owls:

1) Pre-Construction Surveys. The Designated Biologist or Biological Monitor shall conduct pre-construction surveys for burrowing owls in accordance with CDFG guidelines (California Burrowing Owl Consortium 1993). The survey area shall include the Project Disturbance Area and surrounding 500 foot survey buffer.

2) Finalize and Implement the Burrowing Owl Relocation/Translocation Plan. If burrowing owls are detected within the Project Disturbance Area, the project owner shall implement measures described in an approved Burrowing Owl Translocation/Relocation Plan and shall meet the approval of BLM's Authorized Officer and the CPM, in consultation with USFWS and CDFG. Since California Fish and Game Codes do not permit the active translocation of burrowing owls without a research permit, any burrowing owls within the Project Disturbance Area shall be passively relocated. CDFG shall be consulted on the most current guidelines for passive relocation of burrowing owls prior to any disturbance occurring to a burrow that may be impacted from construction activities.

3) Timing of Site Grading and Offsite Land Preparation. In conjunction with the preconstruction surveys for burrowing owl described above, the project owner shall perform field surveys within a 1-mile buffer area surrounding the Project Disturbance Areas in order to record the number and location of existing, abandoned ground squirrel burrows for relocated owl use and the location of any offsite resident burrowing owls. Any existing small mammal burrows identified within the offsite areas shall be enhanced (enlarged or cleared of debris) or new burrows will be created (by installing artificial burrows) at a ratio of 2:1 on offsite lands. Therefore, the project owner shall provide at least two natural or artificial burrows per owl that will be relocated (CDFG 1995). If artificial burrows are deemed

necessary, they shall be installed during the non-breeding season and will be installed following Arizona Game and Fish Department burrowing owl management guidelines (Burrowing Owl Working Group 2007) which recommends that artificial burrows be placed within 100 meters of the original burrow.

The project owner shall allow for approximately two weeks for the passive relocation process to take place and to allow relocated owls to acclimate to new, off-site burrows. The timing of the Project Disturbance Area grading and owl passive relocation shall be timed to coincide concurrently to the extent possible to discourage owls from moving back to the impact site. Staff recommends that once owls that would be impacted by project construction have been determined to have vacated their burrows, site grading must begin within five working days. If construction of the facility or transmission line is delayed for more than 30 days, a follow-up clearance survey for burrowing owl shall be performed.

4) Implement Avoidance Measures. If an active burrowing owl burrow is detected within 500 feet from the Project Disturbance Area and Transmission Line and water pipeline Disturbance Area boundaries, the following avoidance and minimization measures shall be implemented:

   a. Establish Non-Disturbance Buffer. Fencing shall be installed at a 250-foot radius from the occupied burrow to create a non-disturbance buffer around the burrow. The non-disturbance buffer and fenceline may be reduced to 160 feet if all project-related activities that might disturb burrowing owls would be conducted during the non-breeding season (September 1st through January 31st). Following preconstruction surveys, owls and/or if active burrows are found in the Project Disturbance Areas (including transmission line), the appropriate non-disturbance buffer area described above shall be implemented. Signs shall be posted in English and Spanish at the fenceline indicating no entry or disturbance is permitted within the fenced buffer.

   b. Monitoring: If construction activities will occur within 500 feet of the occupied burrow during the nesting season (February 1 – August 31st) the Designated Biologist or Biological Monitor shall monitor to determine if these activities have potential to adversely affect nesting efforts, and shall make recommendations to minimize or avoid such disturbance.

Verification: Within 30 days of any ground disturbing activities, the project owner shall submit to BLM's Authorized Officer, the CPM, CDFG and USFWS an approved Burrowing Owl Relocation/Translocation Plan based on the applicant's plan submitted in January 2010 (SM 2010a).

Prior to the start of site mobilization activities, construction related ground disturbance, grading, boring, or trenching on the project site, the project owner shall submit to the

CPM and BLM's Authorized Officer, a final Burrowing Owl Relocation Area Management Plan that reflects review and approval by Energy Commission staff and BLM in consultation with CDFG and USFWS.

If preconstruction surveys detect burrowing owls within 500 feet of proposed construction activities, the Designated Biologist shall provide to the CPM and BLM's Authorized Officer documentation indicating that non-disturbance buffer fencing has been installed at least 10 days prior to the start of any project related site disturbance activities. The project owner shall report monthly to BLM's Authorized Officer, the CPM, CDFG, and USFWS for the duration of construction on the implementation of burrowing owl avoidance and minimization measures. Within 30 days after completion of construction, the project owner shall provide to the CDFG, BLM's Authorized Officer, and the CPM a written construction termination report identifying how mitigation measures described in the plan have been completed.

On January 31st of each year following construction, the Designated Biologist shall provide a report to the CPM, BLM's Authorized Officer, USFWS, and CDFG that describes the results of monitoring and management of the burrowing owl relocation area.

LAKE OR STREAMBED IMPACT MINIMIZATION AND COMPENSATION MEASURES

BIO-18 The project owner shall compensate for permanent impacts to waters of the state by implementing the following measures to avoid, minimize, and mitigate for impacts to ephemeral drainages and waters of the state:

1. Acquire Off-Site Desert Wash: The project owner shall acquire, in fee or in easement, a parcel or parcels of land that includes ephemeral washes with at least the number of acres of state jurisdictional waters determined in the verified delineation. The terms and conditions of this acquisition or easement shall be as described in Condition of Certification **BIO-12** with the additional criteria that the desert wash mitigation lands: 1) include at least the number of acres of state jurisdictional waters determined in the verified delineation that will be impacted by the proposed project; 2) be characterized by similar soil permeability, hydrological and biological functions as the impacted drainages; and 3) be within the same watershed as the impacted wash. The desert wash mitigation lands may be included with the DT mitigation and/or MGS mitigation lands ONLY if the above three criteria are met.

2. Review and Approval of Compensation Lands Prior to Acquisition: The project owner, or a third-party approved by the CPM, in consultation with CDFG,shall submit a formal acquisition proposal to the CPM and CDFGdescribing the parcel(s) intended for purchase. This acquisition proposalshall include a description and delineation of waters of the state within theparcel(s); shall describe the floodplain and immediate watershed in thevicinity of the drainage; and shall identify the area of lands surroundingthe drainage needed to adequately manage the waters of the state toprotect and enhance their biological functions and values. Approval

fromthe CPM, in consultation with CDFG, shall be required for acquisition ofall parcels comprising the compensation lands in advance of purchase.

3. Security for Implementation of Mitigation: A security in the form of an irrevocable letter of credit, pledged savings account, or certificate of deposit for the amount of all mitigation measures pursuant to this condition of certification shall be submitted to, and approved by, the CPM, in consultation with CDFG, prior to commencing project activities within areas of CDFG jurisdiction. The security shall be approved by the CPM, in consultation with CDFG's legal advisors, prior to its execution, and shall allow the CPM at their discretion to recover funds immediately if the CPM, in consultation with CDFG, determines there has been a default.

4. Preparation of Management Plan: The project owner shall submit to the CPM and CDFG a draft Management Plan that reflects site-specific enhancement measures for the drainages on the acquired compensation lands. The objective of the Management Plan shall be to enhance the wildlife value of the drainages, and may include enhancement actions such as weed control, or erosion control.

5. Right of Access and Review for Compliance Monitoring: The CPM reserves the right to enter the project site or allow CDFG to enter the project site at any time to ensure compliance with these conditions. The project owner herein grants to the CPM and to CDFG employees and/or their representatives the right to enter the project site at any time to ensure compliance with the terms and conditions and/or to determine the impacts of storm events, maintenance activities, or other actions that might affect the restoration and revegetation efforts. The CPM and CDFG may, at the CPM's discretion, review relevant documents maintained by the operator, interview the operator's employees and agents, inspect the work site, and take other actions to assess compliance with or effectiveness of mitigation measures.

6. Notification: The project owner shall notify the CPM and CDFG, in writing, at least five days prior to initiation of project activities in jurisdictional areas as noted and at least five days prior to completion of construction activities in jurisdictional areas. The project owner shall notify the CPM and CDFG of any change of conditions to the project, the jurisdictional impacts, or the mitigation efforts, if the conditions at the site of a proposed project change in a manner which changes risk to biological resources that may be substantially adversely affected by the proposed project. The notifying report shall be provided to the CPM and CDFG no later than seven days after the change of conditions is identified. As used here, change of condition refers to the process, procedures, and methods of operation of a project; the biological and physical characteristics of a project area; or the

laws or regulations pertinent to the project as defined below. A copy of the notifying change of conditions report shall be included in the annual reports.

a. Biological Conditions: a change in biological conditions includes, but is not limited to, the following: 1) the presence of biological resources within or adjacent to the project area, whether native or non-native, not previously known to occur in the area; or 2) the presence of biological resources within or adjacent to the project area whether native or non-native, the status of which has changed to endangered, rare, or threatened, as defined in section 15380 of Title 14 of the California Code of Regulations.

b. Physical Conditions: a change in physical conditions includes, but is not limited to, the following: 1) a change in the morphology of a river, stream, or lake, such as the lowering of a bed or scouring of a bank, or changes in stream form and configuration caused by storm events; 2) the movement of a river or stream channel to a different location; 3) a reduction of or other change in vegetation on the bed, channel, or bank of a drainage, or 4) changes to the hydrologic regime such as fluctuations in the timing or volume of water flows in a river or stream.

c. Legal Conditions: a change in legal conditions includes, but is not limited to, a change in Regulations, Statutory Law, a Judicial or Court decision, or the listing of a species, the status of which has changed to endangered, rare, or threatened, as defined in section 15380 of Title 14 of the California Code of Regulations.

7. Code of Regulations: The project owner shall provide a copy of the Streambed Impact Minimization and Compensation Measures from the Energy Commission Decision to all contractors, subcontractors, and the applicant's project supervisors. Copies shall be readily available at work sites at all times during periods of active work and must be presented to any CDFG personnel or Energy Commission personnel upon demand. The CPM reserves the right to issue a stop work order or allow CDFG to issue a stop work order after giving notice to the project owner if the CPM in consultation with CDFG, determines that the project owner has breached any of the terms or conditions or for other reasons, including but not limited to the following:

   a. The information provided by the applicant regarding streambed alteration is incomplete or inaccurate;

   b. New information becomes available that was not known to it in preparing the terms and conditions;

   c. The project or project activities as described in the Final Staff Assessment have changed; or

d. The conditions affecting biological resources changed or the CPM, in consultation with CDFG, determines that project activities will result in a substantial adverse effect on the environment.

8. Best Management Practices: The project owner shall also comply with the following conditions:

   a. The project owner shall minimize road building, construction activities and vegetation clearing within state waters to the extent feasible.

   b. The project owner shall not allow water containing mud, silt, or other pollutants from grading, aggregate washing, or other activities to enter state waters or be placed in locations that may be subjected to high storm flows.

   c. The project owner shall comply with all litter and pollution laws. All contractors, subcontractors, and employees shall also obey these laws, and it shall be the responsibility of the project owner to ensure compliance.

   d. Spoil sites shall not be located within drainages or locations that may be subjected to high storm flows, where spoil shall be washed back into a drainage.

   e. Raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances that could be hazardous to vegetation or wildlife resources, resulting from project-related activities, shall be prevented from contaminating the soil and/or entering waters of the state. These materials, placed within or where they may enter a jurisdictional drainage or El Paso Wash, by project owner or any party working under contract or with the permission of the project owner shall be removed immediately.

   f. No broken concrete, debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or washings thereof, oil or petroleum products or other organic or earthen material from any construction or associated activity of whatever nature shall be allowed to enter into, or placed where it may be washed by rainfall or runoff into, waters of the state.

   g. When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 200 feet of the high water mark of any drainage.

   h. No equipment maintenance shall occur within 200 feet of any ephemeral drainage where petroleum products or other pollutants from the equipment may enter these areas under any flow.

Verification: No fewer than 30 days prior to the start of work potentially affecting waters of the state, the project owner shall provide written verification (i.e., through

incorporation into the BRMIMP) to the CPM that the above best management practices will be implemented and provide a discussion of work in waters of the state in Compliance Reports for the duration of the project.

Draft agreements to delegate land acquisition to CDFG or an approved third party and agreements to manage compensation lands shall be submitted to Energy Commission staff for review and approval (in consultation with CDFG) prior to land acquisition. Such agreements shall be mutually approved and executed at least 60 days prior to start of any project-related ground disturbance activities. The project owner shall provide written verification to the CPM that the compensation lands have been acquired and recorded in favor of the approved recipient(s). Alternatively, before beginning project ground disturbance activities, the project owner shall provide Security in accordance with this condition.

No less than 90 days prior to acquisition of the parcel (s) containing the compensation acres of waters of the state determined in the verified delineation, the project owner, or a third-party approved by the CPM, in consultation with CDFG, shall submit a formal acquisition proposal to the CPM and CDFG describing the parcel(s) intended for purchase.

Within 90 days after the land purchase, as determined by the date on the title, the project owner shall provide the CPM with a draft management plan for review and approval, in consultation with CDFG for the compensation lands and associated funds. No later than 12 months after publication of the Energy Commission Decision the project owner shall submit a final Management Plan for review and approval to the CPM and CDFG.

WEED MANAGEMENT PLAN

BIO-19 The Project owner shall implement a Weed Management Plan that meets the approval of BLM's Authorized Officer and the CPM. The Weed Management Plan shall prescribe methods to monitor for weeds, prevent weed introduction, and control the spread of weeds during construction and operation of the Project. The draft Weed Management Plan submitted by the Applicant (SM 2010a) shall provide the basis for the final plan, subject to review and revisions from BLM's Authorized Officer and the CPM.

Verification: No less than 10 days prior to start of any Project-related ground disturbance activities, the Project owner shall provide BLM's Authorized Officer and the CPM with the final version of a Weed Management Plan that has been reviewed and approved by BLM, and Energy Commission staff, USFWS, and CDFG. Modifications to the approved Weed Control Plan shall be made only after consultation with the Energy Commission staff, BLM, USFWS, and CDFG.

Within 30 days after completion of Project construction, the Project owner shall provide to BLM's Authorized Officer and the CPM for review and approval, a written report identifying which items of the Weed Management Plan have been completed, a summary of all modifications to mitigation measures made during the Project's construction phase, and which items are still outstanding.

On January 31st of each year following construction the Designated Biologist shall provide a report to the CPM and BLM's Authorized Officer that includes: a summary of the results of noxious weeds surveys and management activities for the year; a discussion of whether weed management goals for the year were met; and recommendations for weed management activities for the upcoming year.

BIOLOGICAL OPINION

BIO-20 The USFWS will issue a Biological Opinion (BO) for project-related impacts to desert tortoise. All terms and conditions in the BO will be included in the BRMIMP for the project and be implemented.

Verification: No less than 30 days prior to the initiation of construction, the BO must be completed and all conditions of the BO must be included in the final BRMIMP and implemented during project construction and operation. In addition, a copy of the BO for the project shall be sent to the CPM, BLM Authorized Officer, and CDFG.

AVIAN AND BAT PROTECTION PLAN

BIO-21 The Project owner shall implement an Avian and Bat Protection Plan (ABPP) that meets the approval of the USFWS and the CPM. The ABPP shall describe actions that will be implemented by the project owner to minimize avian and bat impacts associated with the RSPP and would identify steps to further the conservation of bird and bat species. The ABPP should be developed in coordination with the USFWS and follow the USFWS Avian Protection Plan Guidelines (USFWS 2005) or more current guidance provided by the USFWS.

Verification: No less than 30 days prior to start of any Project-related ground disturbance activities, the Project owner shall provide USFWS and the CPM with the final version of an ABPP that has been reviewed and approved by BLM, and Energy Commission staff, USFWS, and CDFG. Modifications to the approved ABPP shall be made only after consultation with the Energy Commission staff, BLM, USFWS, and CDFG.

FEDERAL EAGLE ACT TAKE PERMIT

BIO-22 The Project owner shall obtain a Federal Eagle Act Take Permit from the USFWS or provide a written statement from the USFWS which states a Federal Eagle Act Take Permit is not needed.

Verification: No less than 30 days prior to start of any Project-related ground disturbance activities, the Project owner shall provide the CPM with the final version of a Federal Eagle Act Take Permit or written statement which states a Federal Eagle Act Take Permit is not needed.

C.2.15 CONCLUSIONS

Based on extensive analysis and review of the proposed Ridgecrest Solar Power Project (RSPP), Energy Commission Staff concludes that the RSPP would result in substantial direct, indirect, and cumulatively significant impacts to biological resources. Specifically the project would reduce MGS connectivity (genetic linkage and other meta-

population functions) and eliminate high value DT habitat that is important for recovery of the species. Since resources being impacted are tied to the physical location of the proposed RSPP site, and other sites or measures are not available to provide these habitat functions, these significant impacts cannot be reduced to levels of less than significant or fully mitigated. Because construction of the project would permanently destroy this critical biological resource, staff, believes it is far more appropriate and important, given the biological significance of the site for the survival of DT and MGS that it be preserved and protected instead of developed.

C.2.16 REFERENCES

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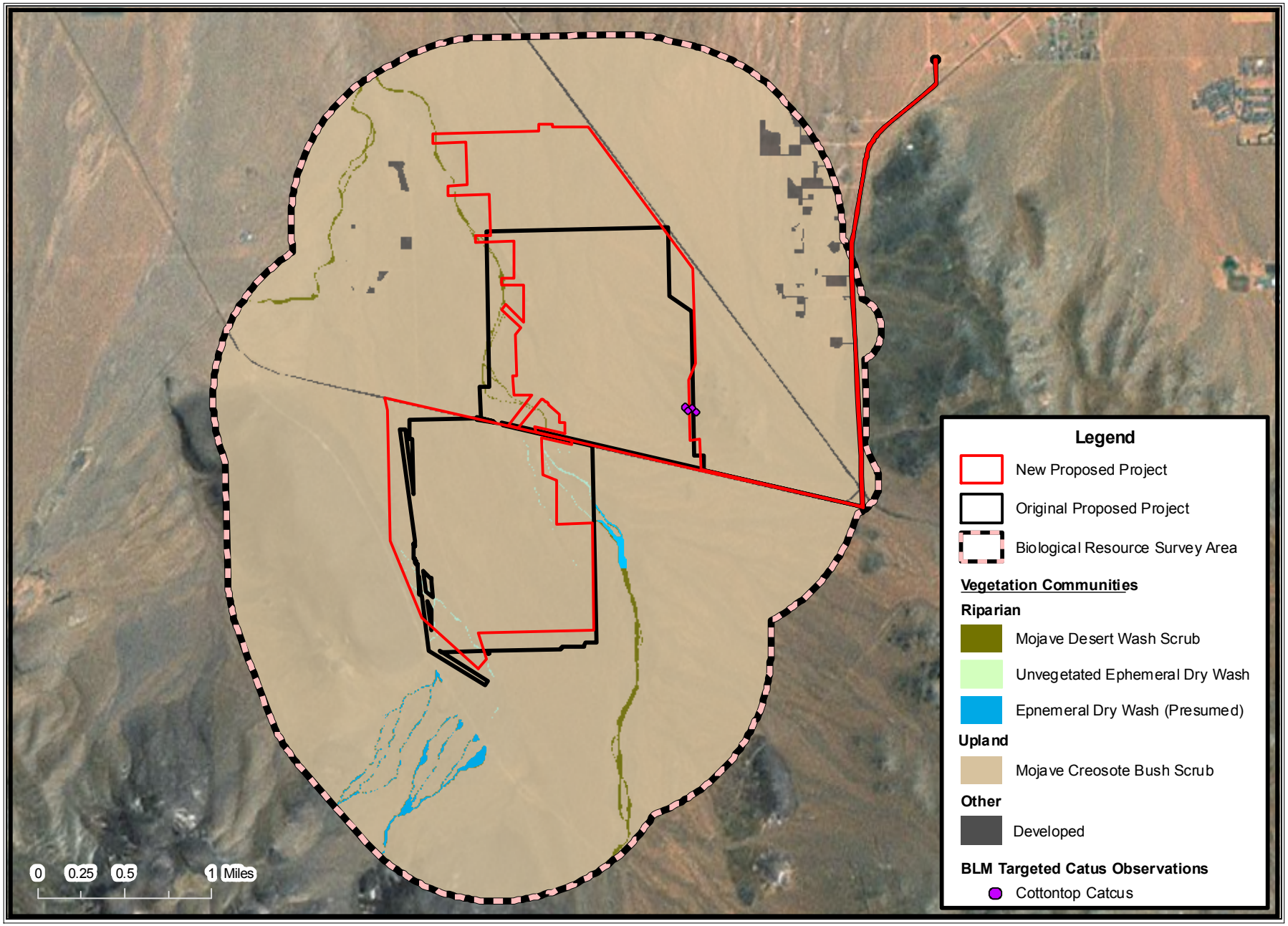
BIOLOGICAL RESOURCES - FIGURE 1

Ridgecrest Solar Power Project - Vegetation Communities

MARCH 2010



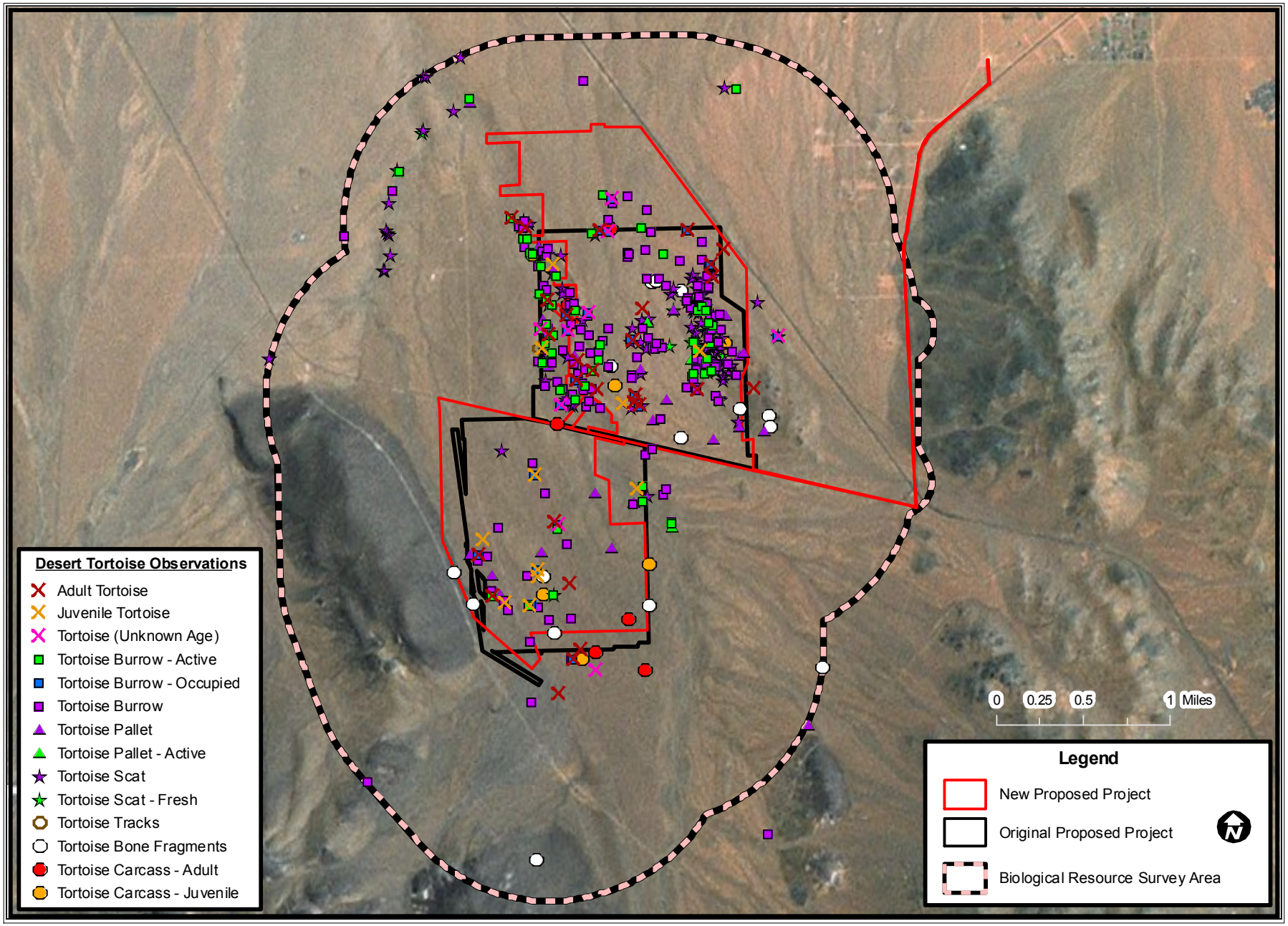
BIOLOGICAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: ESRI - Tele Atlas - Solar Millennium LLC

BIOLOGICAL RESOURCES - FIGURE 2

Ridgecrest Solar Power Project - Desert Tortoise Observations

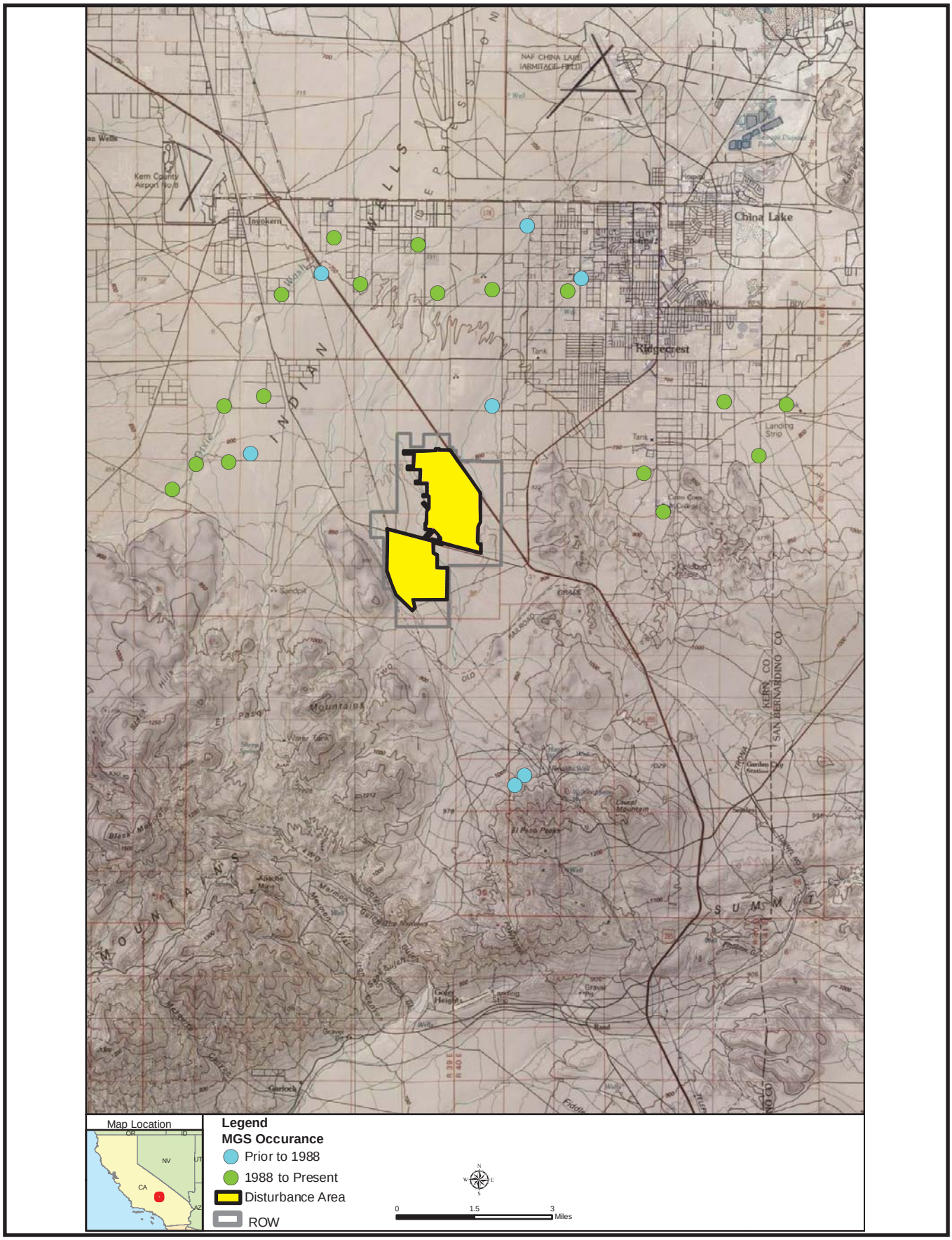


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: ESRI - Tele Atlas - Solar Millennium LLC

BIOLOGICAL RESOURCES - FIGURE 3

Ridgecrest Solar Power Project - Mohave Ground Squirrel occurrences within 5 miles

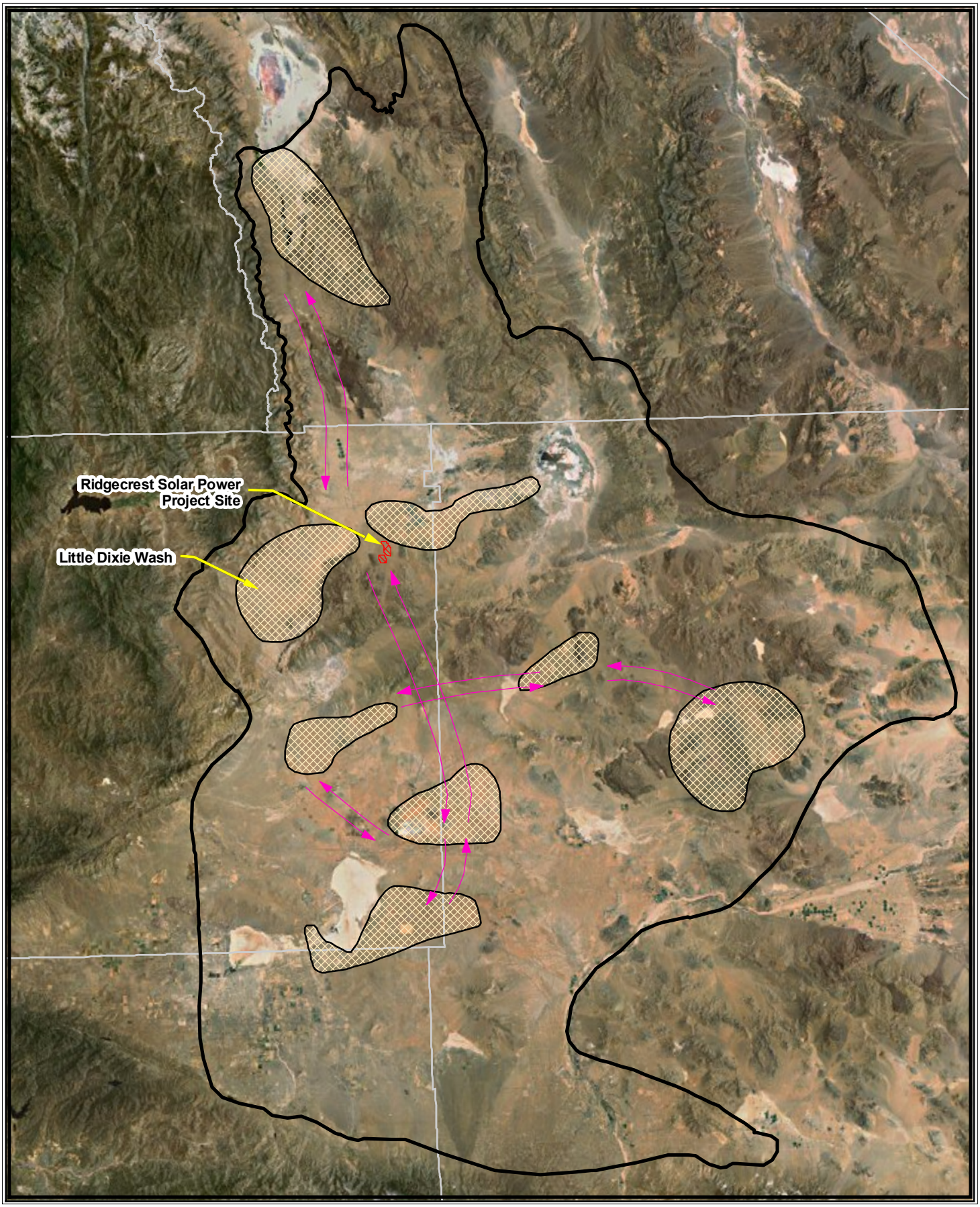


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH **2010**

SOURCE: DR-BIO Figure 58-1

BIOLOGICAL RESOURCES - FIGURE 4

Ridgecrest Solar Power Project - Mohave Ground Squirrel Range, Core Populations and Connectivity

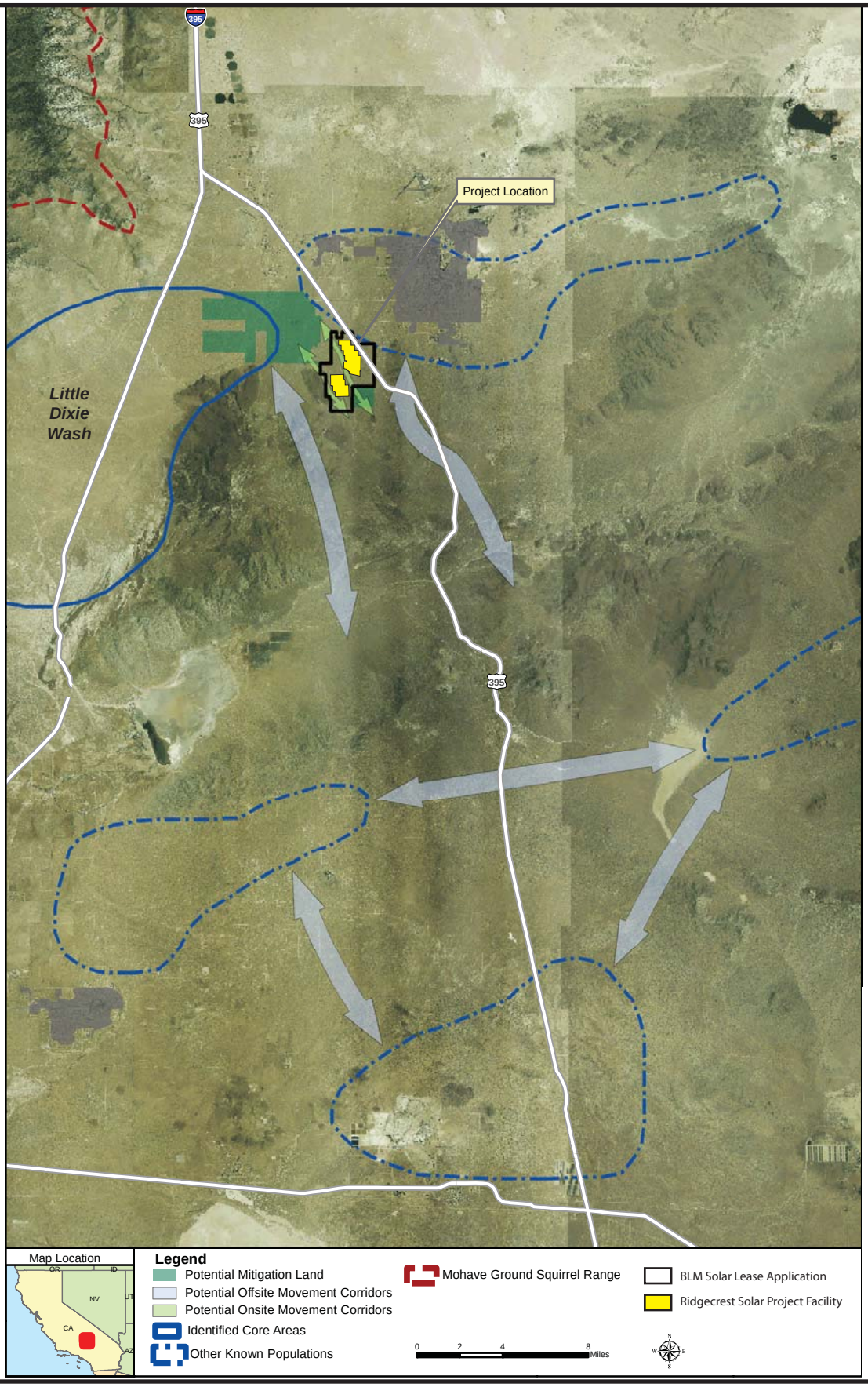


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: CA Dept of Fish & Game - ESRI - Tele Atlas

BIOLOGICAL RESOURCES - FIGURE 5

Ridgecrest Solar Power Project - Mohave Ground Squirrel Connectivity

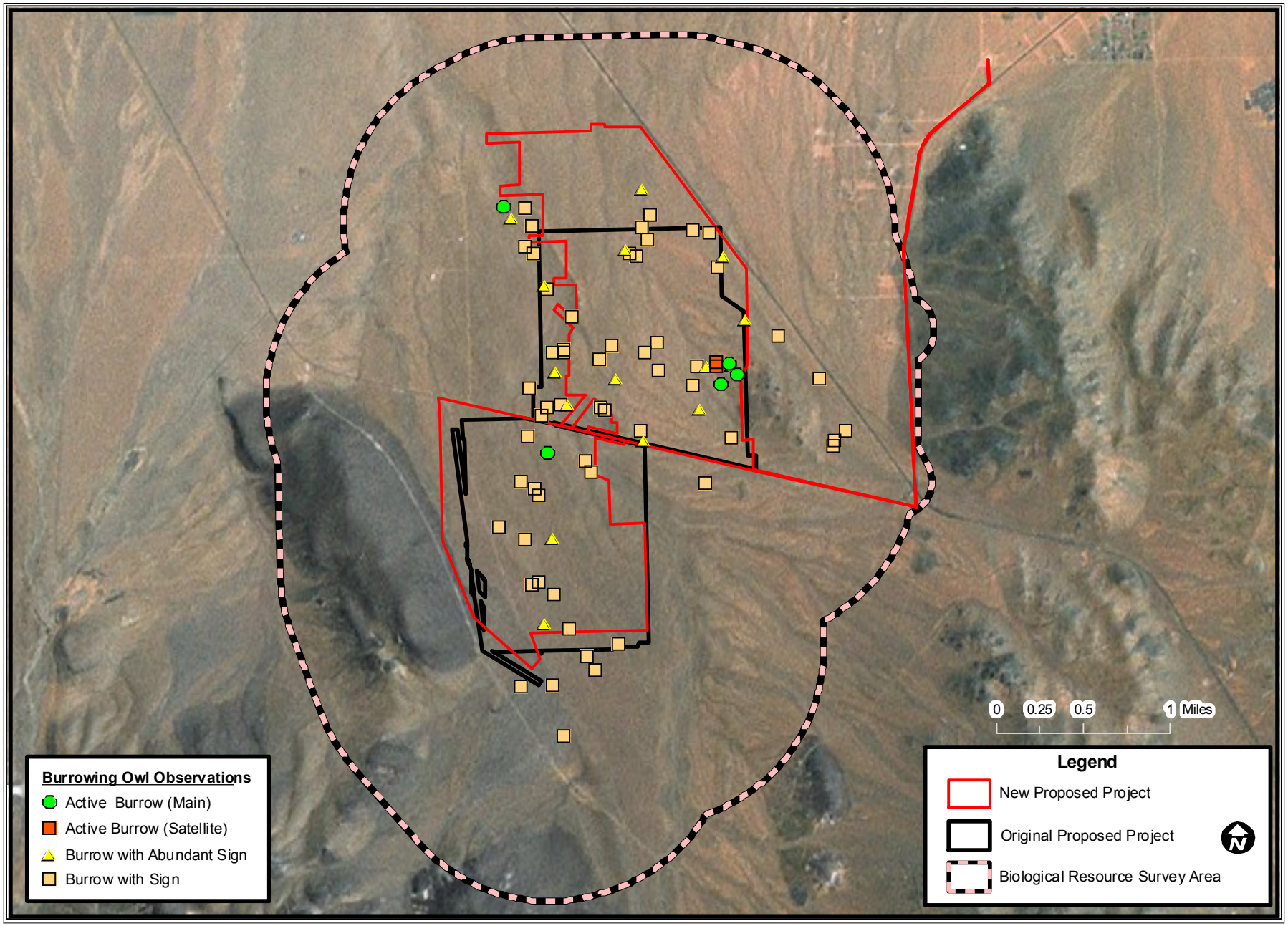


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Data Response Figure 58-4

BIOLOGICAL RESOURCES - FIGURE 6

Ridgecrest Solar Power Project - Burrowing Owl Observations

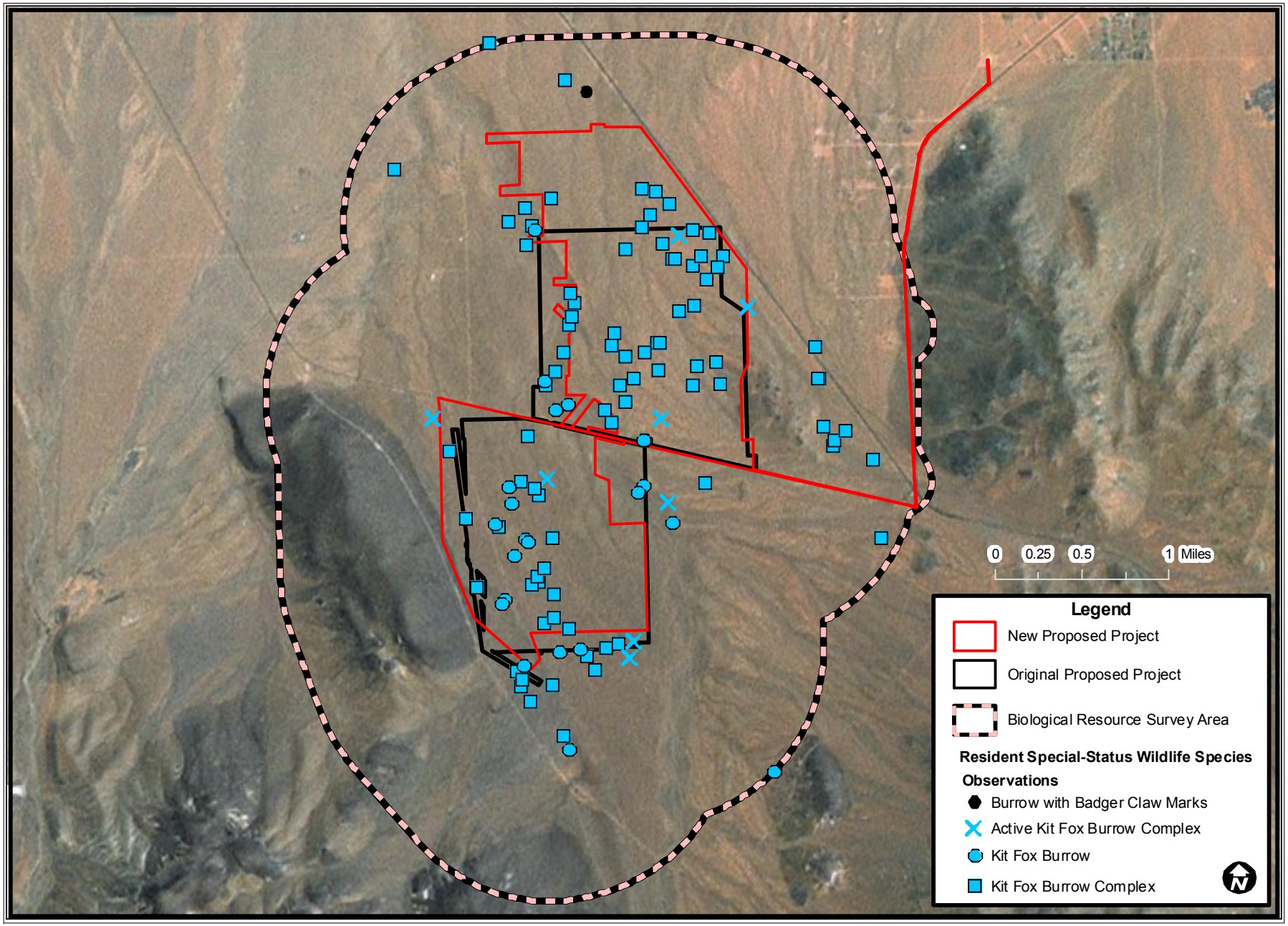


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: ESRI - Tele Atlas - Solar Millennium LLC

BIOLOGICAL RESOURCES - FIGURE 7

Ridgecrest Solar Power Project - Resident Special-Status Wildlife Species Observations

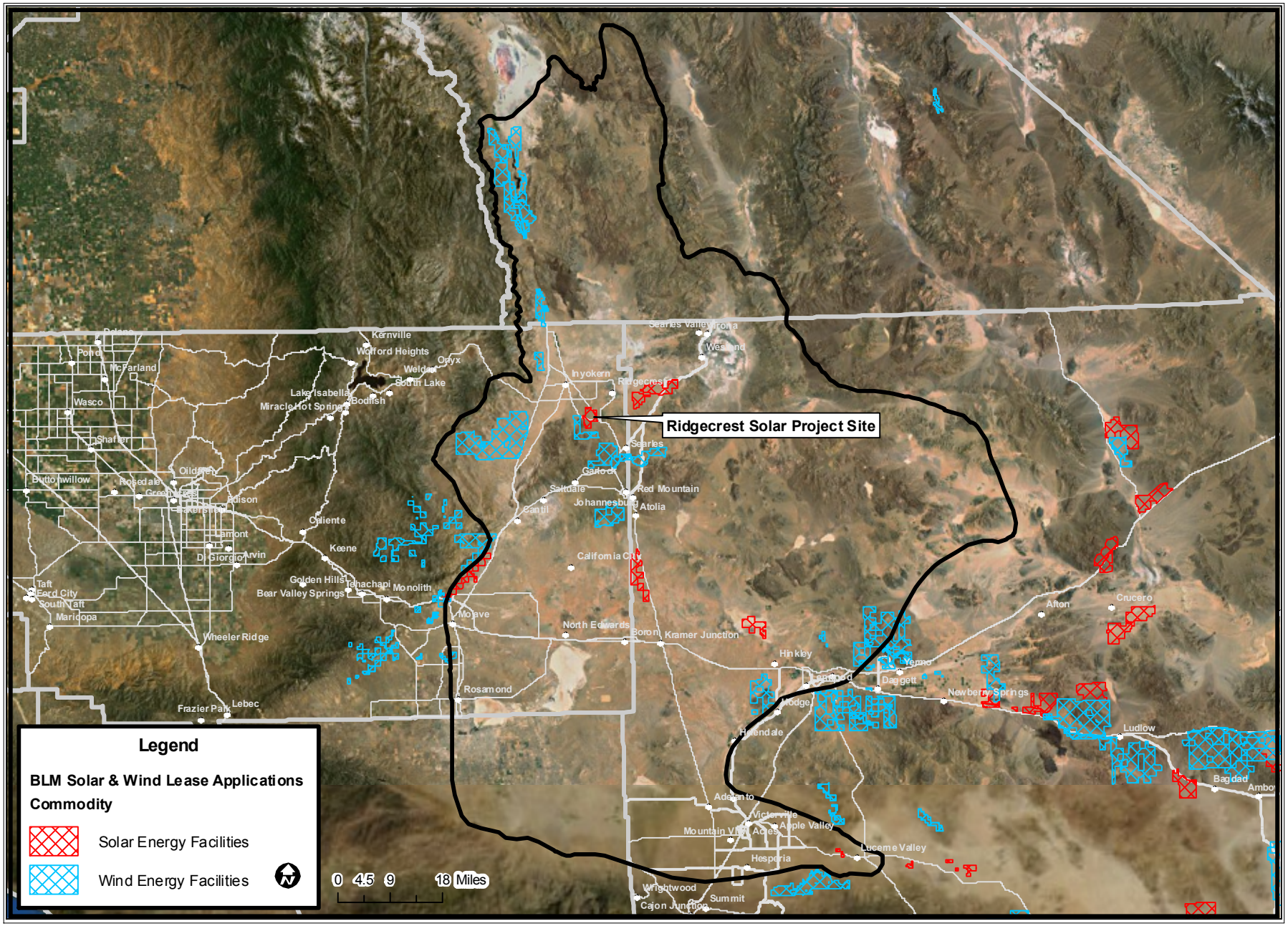


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: ESRI - Tele Atlas - Solar Millennium LLC

BIOLOGICAL RESOURCES - FIGURE 8

Ridgecrest Solar Power Project - Cumulative Impacts

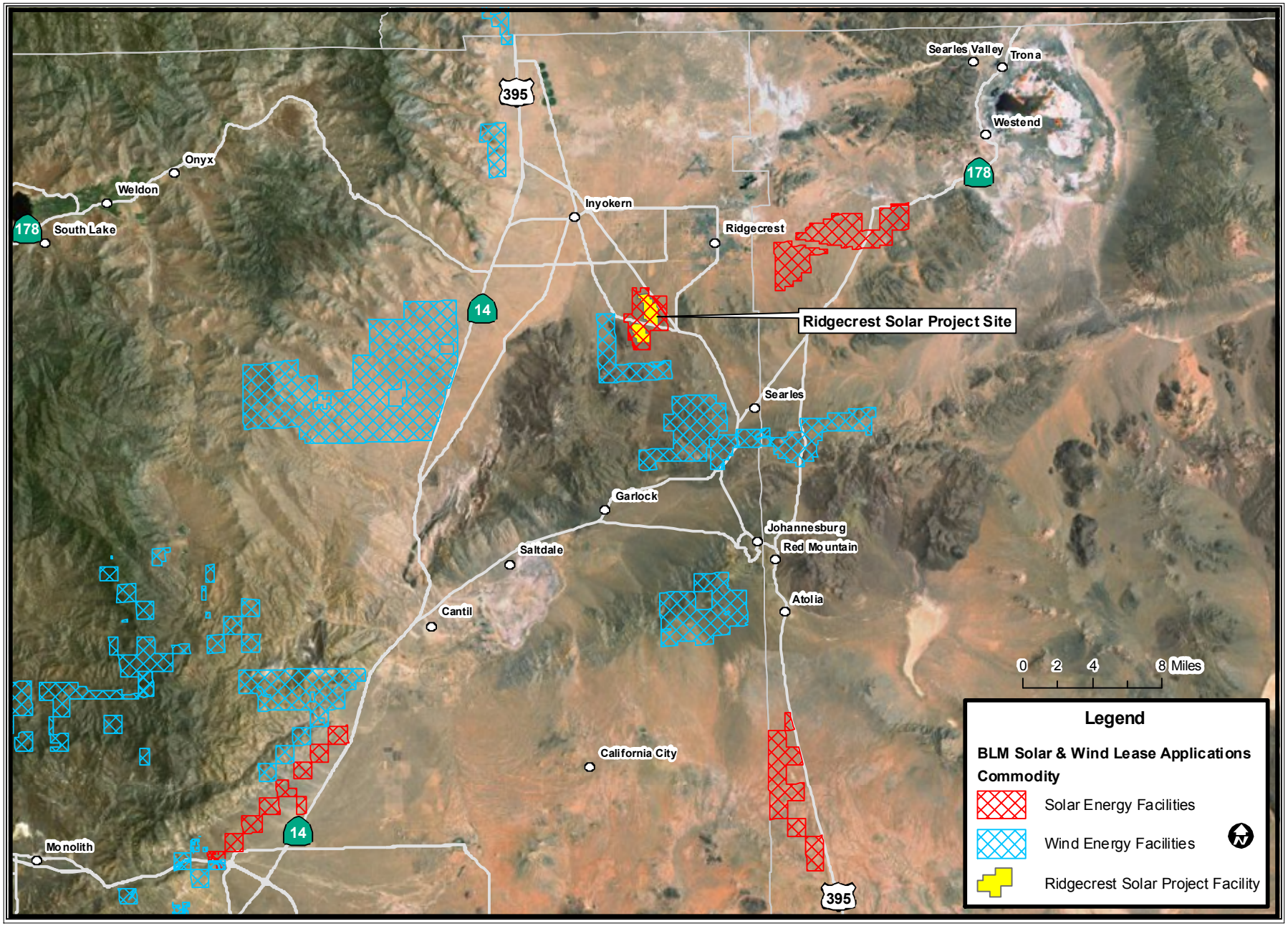


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: BLM - ESRI - Tele Atlas - Solar Millennium LLC

BIOLOGICAL RESOURCES - FIGURE 9

Ridgecrest Solar Power Project - Cumulative Impacts



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

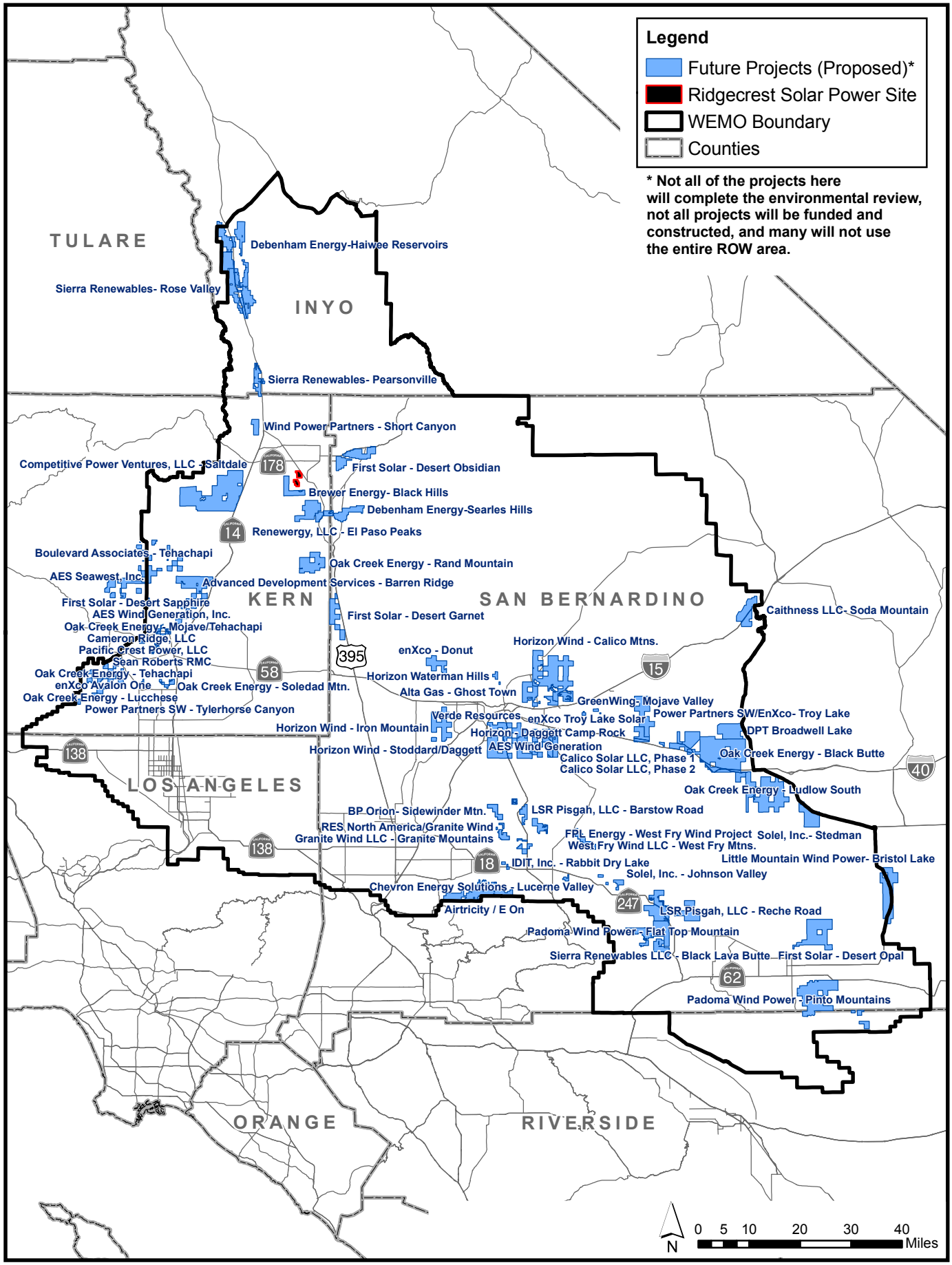
SOURCE: BLM - ESRI - Tele Atlas - Solar Millennium LLC

FORSEEABLE FUTURE PROJECTS [PROPOSED]

BIOLOGICAL RESOURCES FIGURE 10

RIDGECREST SOLAR POWER PROJECT

CUMULATIVE EFFECTS

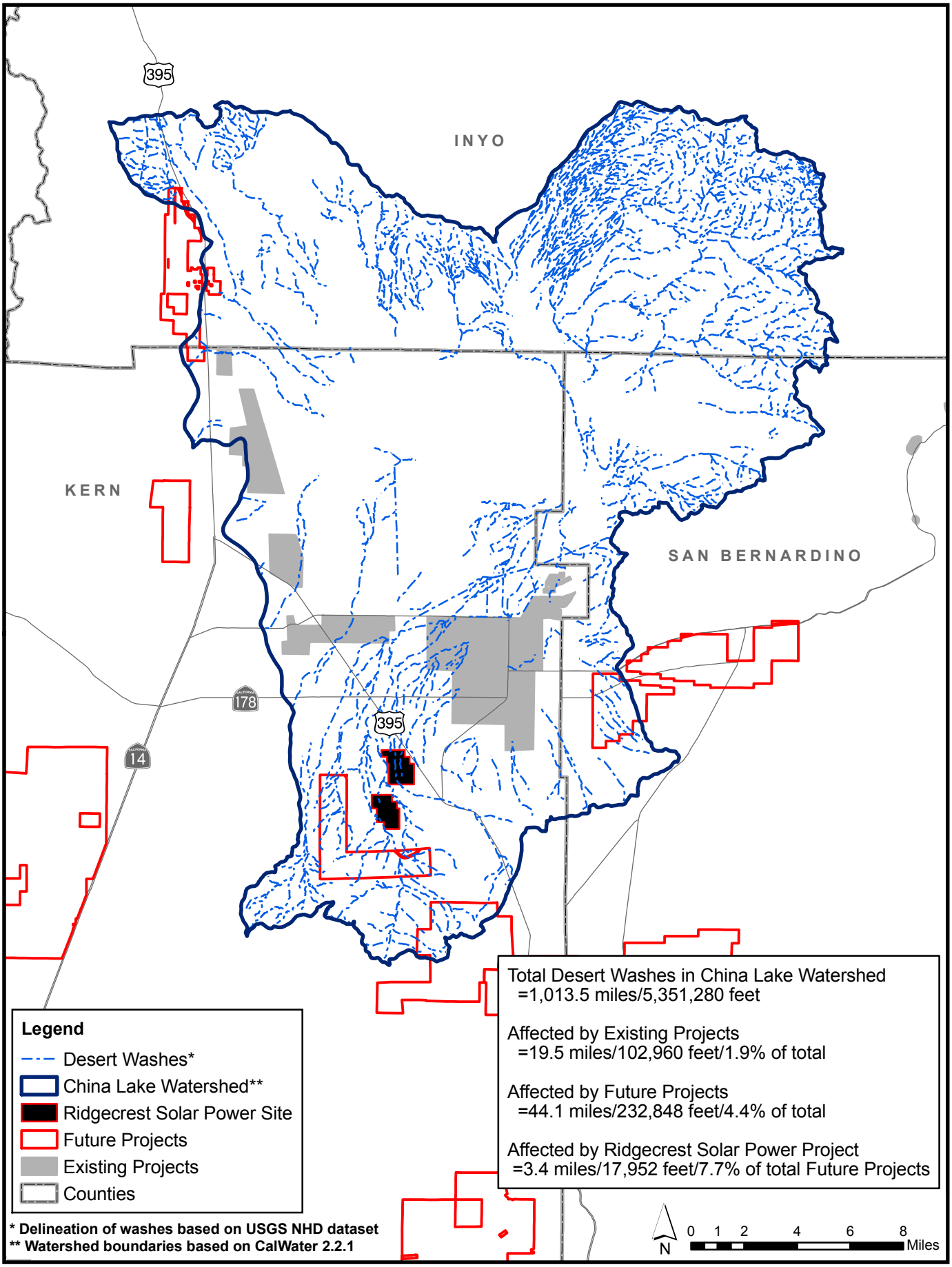


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, FEBRUARY 2010

DESERT WASHES - CHINA LAKE WATERSHED

BIOLOGICAL RESOURCES FIGURE 11

RIDGECREST SOLAR POWER PROJECT CUMULATIVE EFFECTS



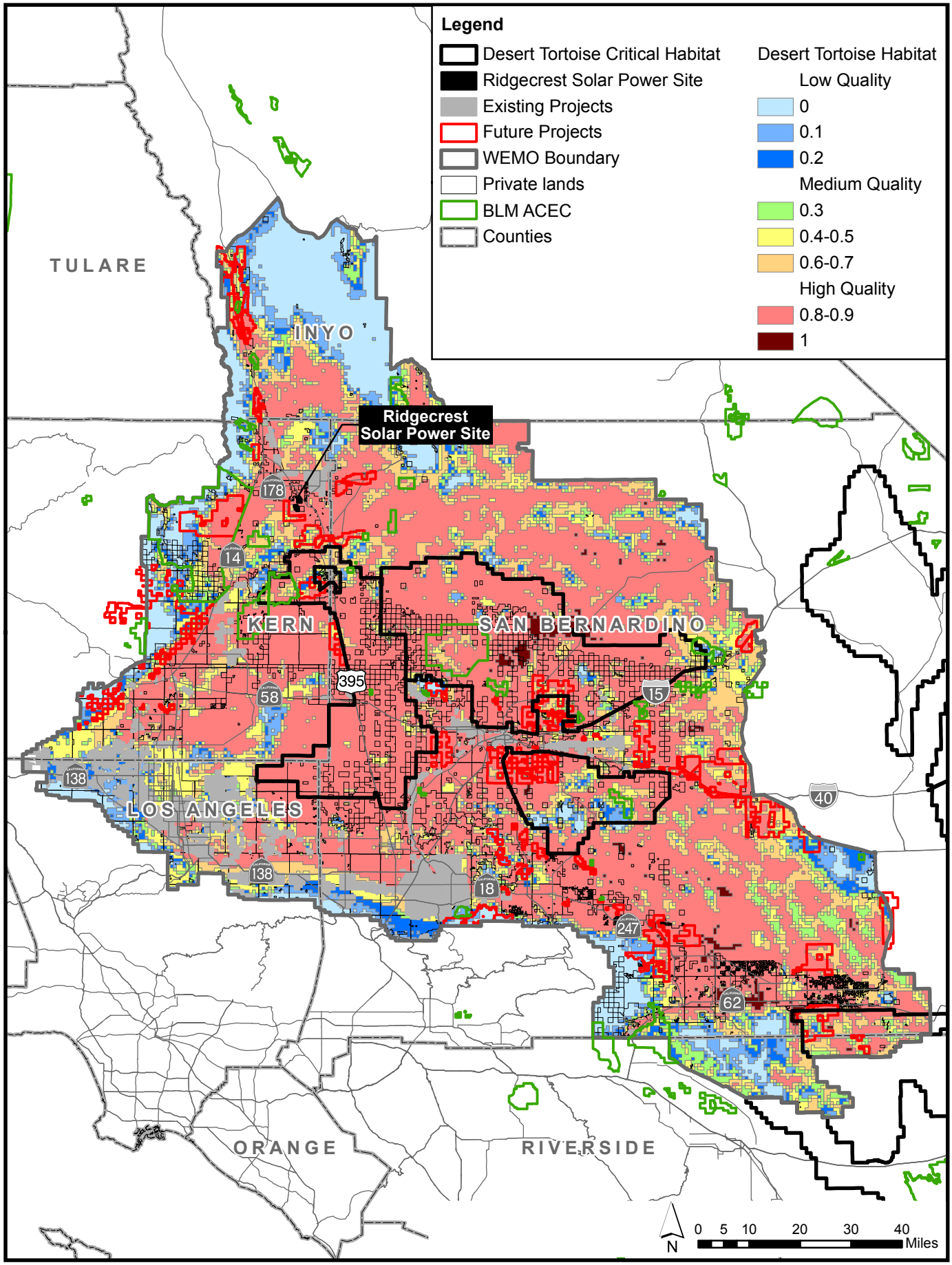
CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, FEBRUARY 2010

MARCH 2010 SOURCE: BLM, CEC BIOLOGICAL RESOURCES

DESERT TORTOISE - HABITAT QUALITY and CRITICAL HABITAT

BIOLOGICAL RESOURCES FIGURE 12

RIDGECREST SOLAR POWER PROJECT | CUMULATIVE EFFECTS



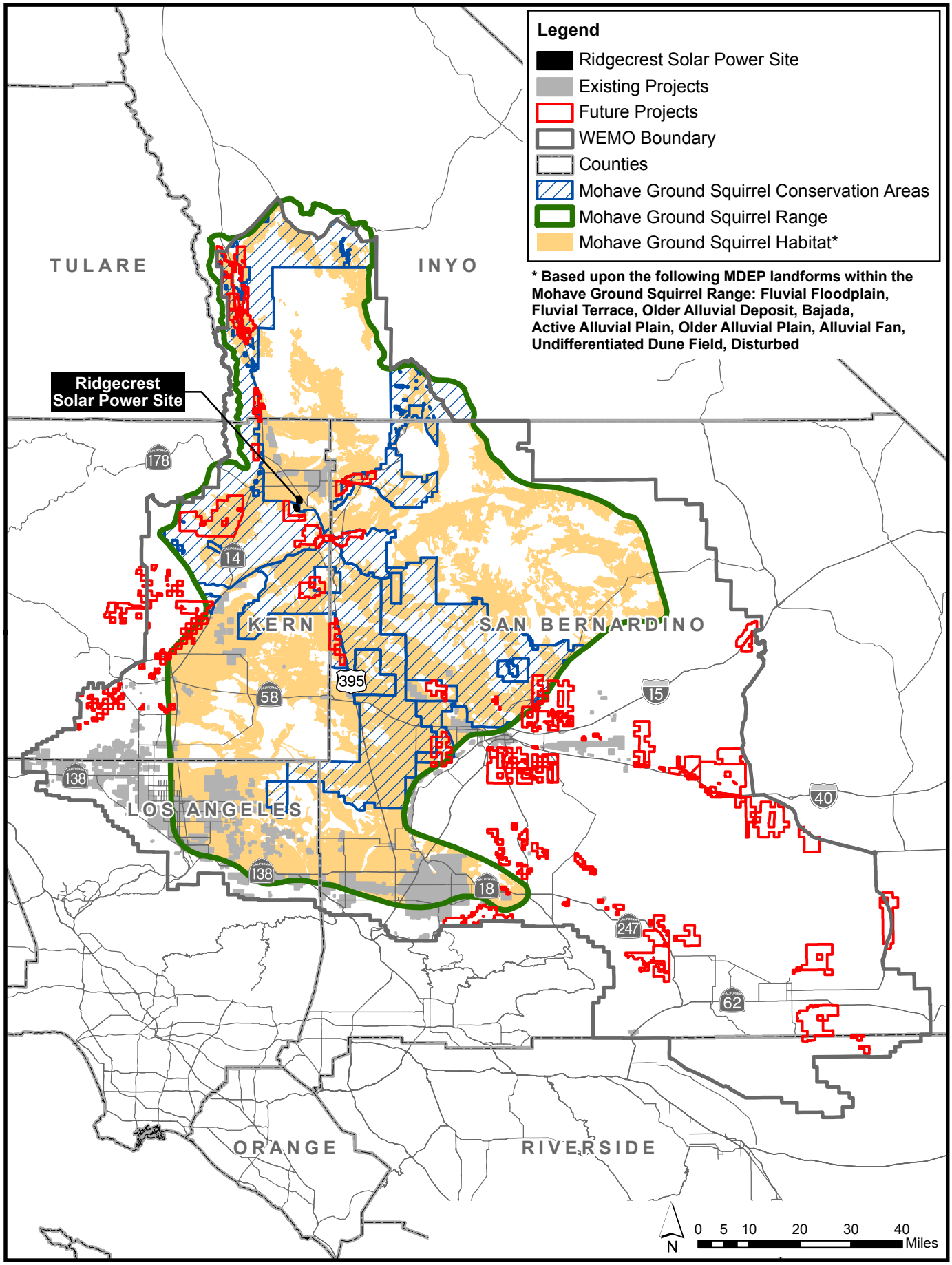
CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, FEBRUARY 2010

MARCH 2010 | SOURCE: BLM, CEC | BIOLOGICAL RESOURCES

MOHAVE GROUND SQUIRREL HABITAT

BIOLOGICAL RESOURCES FIGURE 13

RIDGECREST SOLAR POWER PROJECT | CUMULATIVE EFFECTS



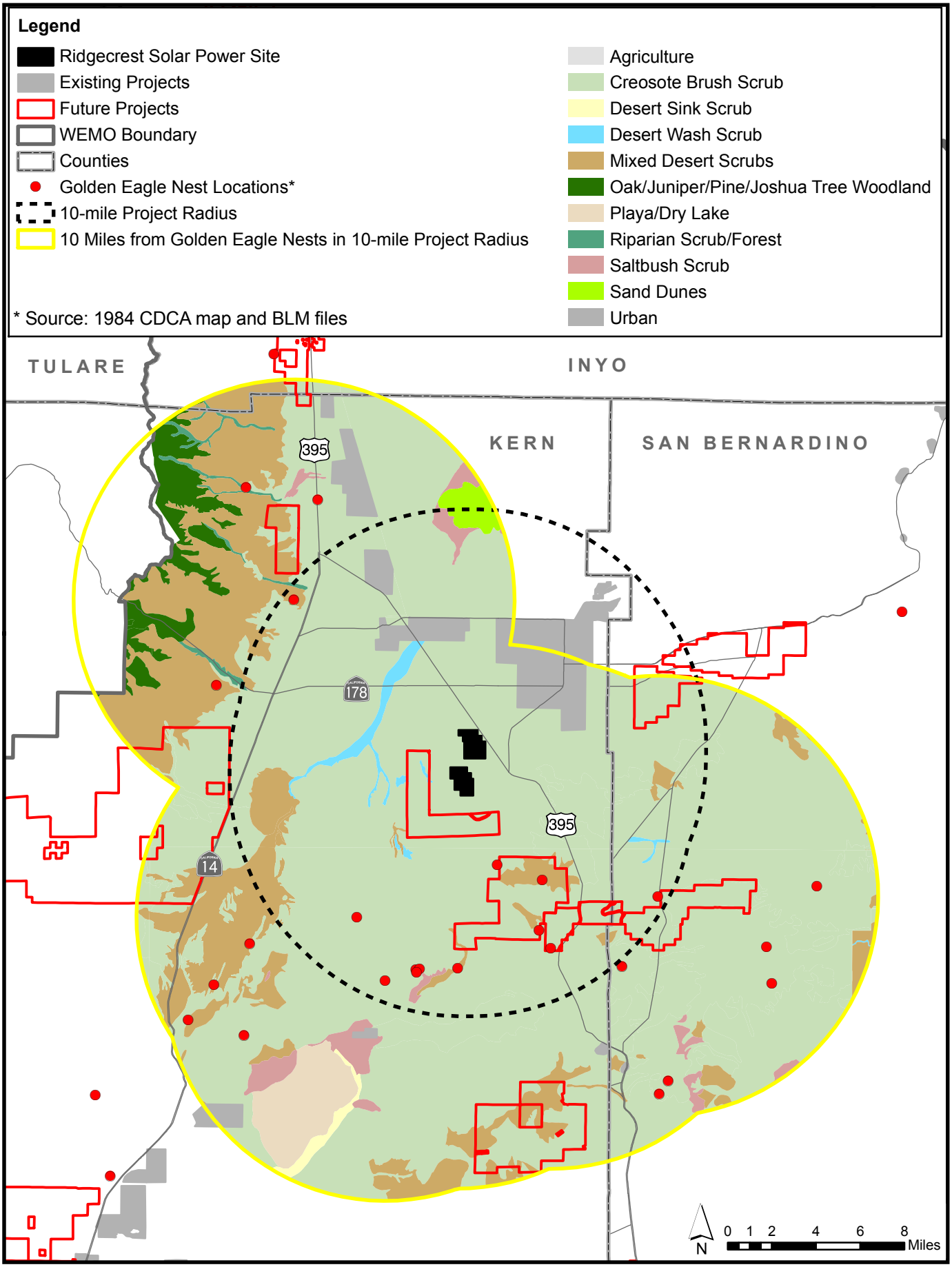
CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, FEBRUARY 2010

MARCH 2010 | SOURCE: BLM, CEC | BIOLOGICAL RESOURCES

GOLDEN EAGLE FORAGING HABITAT WITHIN 10 MILES OF NESTS

BIOLOGICAL RESOURCES FIGURE 14

RIDGECREST SOLAR POWER PROJECT | CUMULATIVE EFFECTS



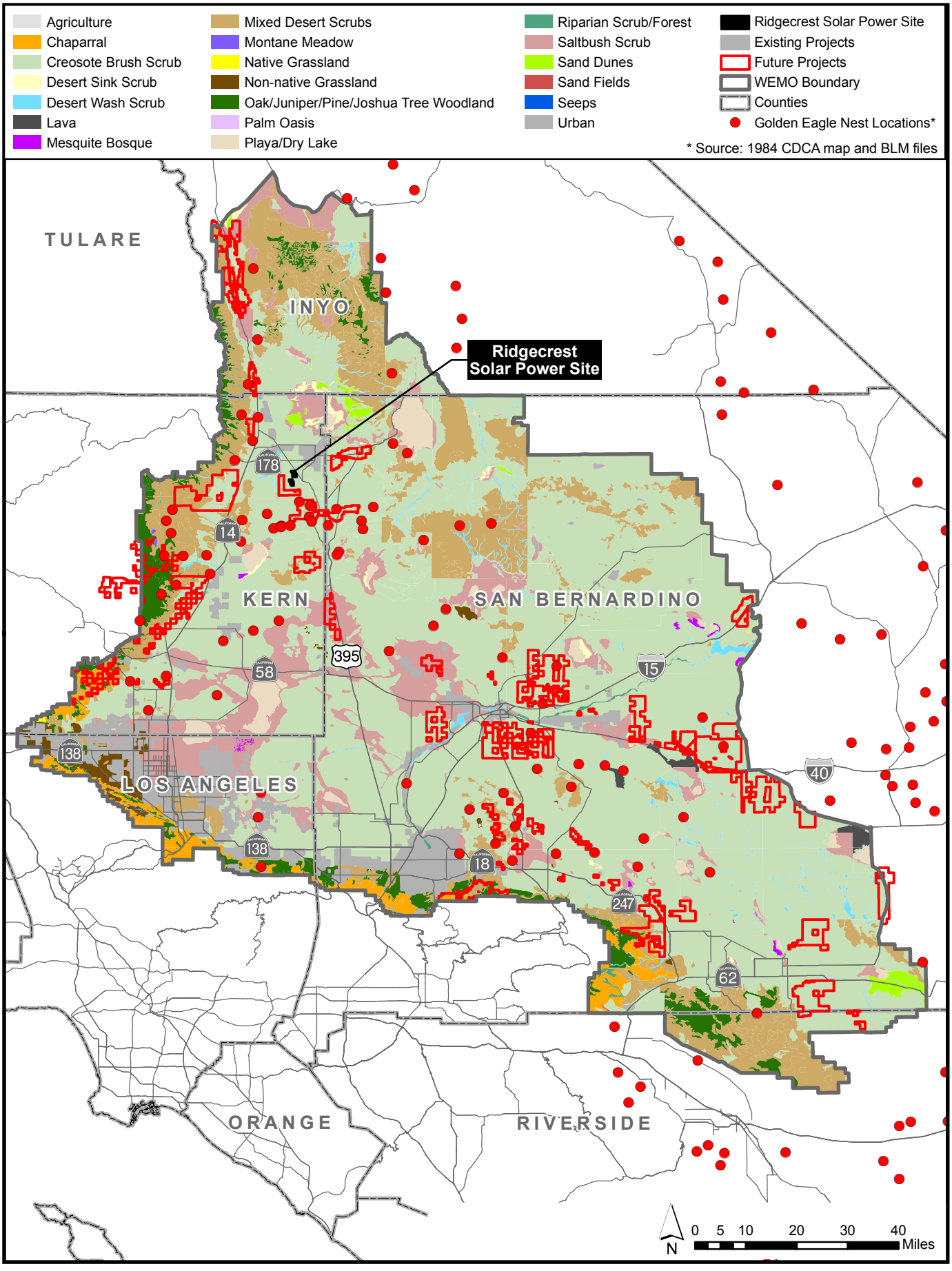
CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, FEBRUARY 2010

GOLDEN EAGLE NEST LOCATIONS

BIOLOGICAL RESOURCES FIGURE 15

RIDGECREST SOLAR POWER PROJECT

CUMULATIVE EFFECTS



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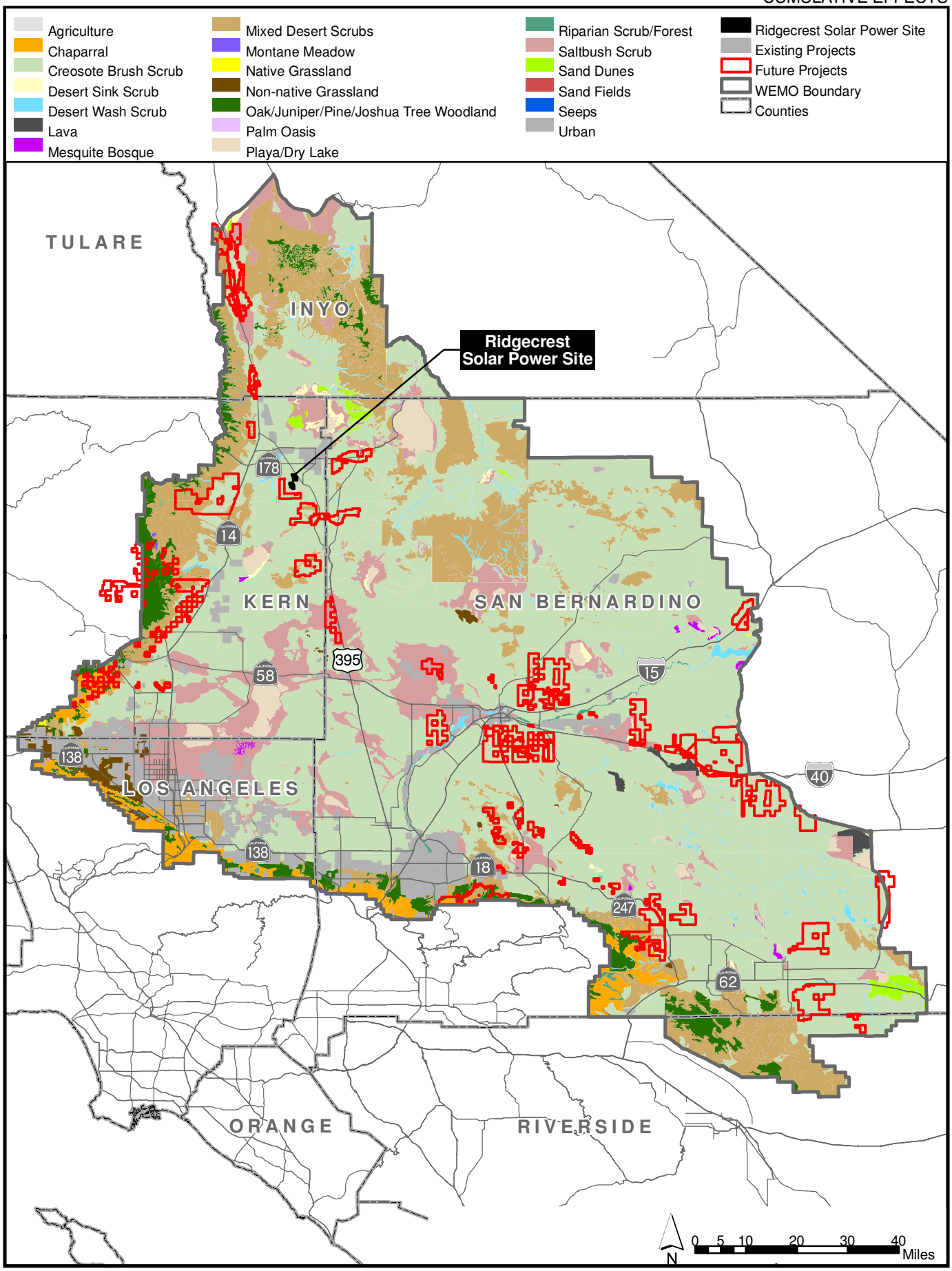
PLANT COMMUNITIES

BIOLOGICAL RESOURCES FIGURE 16

RIDGECREST SOLAR POWER PROJECT

CUMULATIVE EFFECTS



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C.3 CULTURAL RESOURCES AND NATIVE AMERICAN VALUES

Testimony of Glenn Farris and Michael McGuirt

C.3.1 SUMMARY OF CONCLUSIONS

In this analysis of four configurations of the proposed Ridgecrest Solar Power Plant (RSPP), plus one off-site alternative, staff concludes that the RSPP would encroach on the boundaries of a National Register District (Last Chance Canyon Archaeological District). The project area is also in close physical proximity and in the range of visual impact of a Native American sacred lands site (El Paso Mountains) registered with the California Native American Heritage Commission. The RSPP would also directly impact as many as 17 archaeological sites including 13 prehistoric sites and four historic sites, that are being treated as eligible for the National Register of Historic Places and the California Register of Historic Resources for purposes of evaluating the effects of the proposed project. In addition, a geo-archaeological assessment of the project APE has identified an archaeologically sensitive area for the likelihood of finding subsurface sites eligible properties. The effects to these sites will be resolved with the adoption and implementation of a Programmatic Agreement executed pursuant to section 106 of the National Register of Historic Places. The Programmatic Agreement is being developed in consultation with the BLM, the Energy Commission, the SHPO, the Advisory Council on Historic Preservation, Indian tribes and other consulting parties. The resolution of effects stipulated in the Programmatic Agreement will reduce the potential impacts of the proposed project on the subject resources to a less than significant level.

C.3.2 INTRODUCTION

This cultural resources analysis identifies the potential impacts of the Solar Millennium Ridgecrest Solar Power Project (RSPP) on cultural resources. Cultural resources are categorized under federal law (for the purposes of the National Environmental Protection Act (NEPA) and the National Historic Preservation Act (NHPA), § 106) and under California state law (for the purposes of the California Environmental Quality Act), as buildings, sites, structures, objects, and districts. Three kinds of cultural resources, classified by their origins, are considered in this analysis: prehistoric, ethnographic, and historic.

Prehistoric archaeological resources are associated with the Native American occupation and use of California prior to prolonged European contact. These resources may include sites and deposits, structures, artifacts, rock art, trails, and other traces of Native American human behavior. In the China Lake Basin, of which Indian Wells Valley forms a part, the prehistoric period began over 12,000 years ago.

Ethnographic resources represent the heritage of a particular ethnic or cultural group, such as Native Americans or African, European, Latino, or Asian immigrants. They may include traditional resource collecting areas, ceremonial sites, topographic features, cemeteries, shrines, or ethnic neighborhoods and structures.

Historic-period resources, both archaeological and architectural, are associated with Euro-American exploration and settlement of an area and the beginning of a written historical record. They may include archaeological deposits, sites, structures, traveled ways, artifacts, or other evidence of human activity. Groupings of historic-period resources are also recognized as historic districts and as historic vernacular landscapes. Under federal and state historic preservation law, cultural resources must be at least 50 years old to have sufficient historical importance to merit consideration of eligibility for listing in the National Register of Historic Places (NRHP) or in the California Register of Historical Resources (CRHR). A resource less than 50 years of age must be of exceptional historical importance to be considered for listing.

For the RSPP, staff provides an overview of the environmental setting and history of the project area, an inventory of the cultural resources identified in the project vicinity, and an analysis of the project's potential impacts to significant cultural resources. Recommendations of measures by which the project's adverse impacts to significant cultural resources may be resolved or mitigated will be addressed in a Programmatic Agreement that is currently being developed.

C.3.3 CULTURAL RESOURCES LAWS, ORDINANCES, REGULATIONS, STANDARDS, AND EXECUTIVE ORDERS

Projects licensed by the Energy Commission are reviewed to ensure compliance with all applicable laws. Although the Energy Commission has pre-emptive authority over local laws, it typically ensures compliance with local laws, ordinances, regulations, standards, plans, and policies. For this project, proposed for construction on federally managed public lands, the Energy Commission must assess the project's conformance with federal laws, ordinances, regulations, standards, and executive orders as well.

Cultural Resources Table 1
Cultural Resources Laws, Ordinances, Regulations, Standards, and Executive Orders

Applicable Law	Description
Federal	
Antiquities Act of 1906 16 United States Code (USC) 431–433	Establishes criminal penalties for unauthorized destruction or appropriation of "any historic or prehistoric ruin or monument, or any object of antiquity" on federal land; empowers the President to establish historical monuments and landmarks.
Historic Sites, Buildings, and Antiquities Act of 1935, as amended 16 USC. 461–467	Establishes national policy of acquisition, preservation, and management of historic and archaeological properties, including survey, recordation, research, and public education; establishes the National Park System Advisory Board and the National Park Service Advisory Council.
National Historic Preservation Act of 1966 (NHPA), as amended 16 USC 470 et seq.	The NHPA establishes national policy for historic preservation; creates the framework within which cultural resources are managed; requires federal agencies to consider significant cultural resources prior to undertakings; establishes the processes for consultation among interested parties, the lead agency, and the State Historic Preservation Officer, and for government-to-government consultation between federal agencies and Native American Tribal governments. Section 106 defines the process for identifying and evaluating cultural resources and determining whether a project will result in adverse effects on them and addresses the mitigation of adverse effects. Section 110 makes the heads of all federal agencies responsible for the preservation, through identification and appropriate use, of historically significant cultural resources owned or controlled by their agencies.
Executive Order 11593 of May 13, 1971 36 Federal Register (FR) 8921	Provides for the protection and enhancement of the cultural environment; Requires federal agencies to inventory their cultural resources and to record, to professional standards, any cultural resource that may be altered or destroyed.
Archaeological and Historic Preservation Act of 1974 (AHPA) 16 USC 469 et seq.	Addresses impacts on cultural resources resulting from federal activities that would significantly alter the landscape. The focus of the law is data recovery and salvage of scientific, prehistoric, historic, and archaeological resources.

Applicable Law	Description
Federal Land Policy Management Act of 1976 (FLPMA) 43 USC 1701 (a)(8)	Establishes the policy that public lands be managed to protect the quality of scientific, scenic, historical, and archaeological values.
Archaeological Resources Protection Act of 1979 (ARPA) 16 USC 470aa et seq.	Protects archaeological resources from vandalism and unauthorized collecting on public and Indian lands.
Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation [1983], as revised 48 FR 44716–42	Establishes qualifications standards for historic preservation professionals, evaluation standards for cultural resources, and guidelines for technical reports and the documentation of cultural resources.
Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) 25 USC 3001–3013	Provides for the protection of Native American graves, funerary objects, and "objects of cultural patrimony" on federal land; Establishes the procedures for determining ownership for Native American human remains, funerary objects, and other sacred objects under federal jurisdiction.
American Indian Religious Freedom Act 42 USC 1996 et seq.	Protects the right of Native Americans and other indigenous groups to exercise their traditional religions.
Executive Order 13006 of May 21, 1996 61 FR 26071	Encourages federal agencies to reuse historic downtown areas.
Executive Order 13007 of May 4, 1996 61 FR 26771	Requires that federal agencies allow Native Americans to worship at sacred sites located on federal property.
Executive Order 13175 of November 6, 2000 65 FR 67249	Requires federal agencies to coordinate and consult with Indian tribal governments whose interests might be directly and substantially affected by activities on federally administered lands.

Applicable Law	Description
Executive Order 13287 of March 3, 2003 68 FR 10635	Requires federal agencies to manage their historic properties and coordinate with local entities to promote and encourage tourism.
State	
State of California, Environmental Quality Act (CEQA) Public Resources Code (PRC) Sections 21083.2, 21084.1	21083.2 (a) requires a state lead agency to determine whether a project may have a significant effect on archaeological resources. 21083.2 (b) allows a lead agency to require a project to make reasonable efforts to leave significant archaeological resources undisturbed and preserved. 21083.2 (c) allows a lead agency to require the project proponent to fund mitigation measures. 21083.2 (d) limits archaeological excavation as mitigation to the parts of the resource that the project would damage. 21083.2 (i) allows a lead agency to evaluate archaeological resources unexpectedly encountered during construction and to require the project proponent to fund mitigation and delay construction in the area of the find. 21084.1 establishes that a project may have a significant effect on the environment if it causes a substantial adverse change in the significance of a historical resource. 21084.1 also defines which cultural resources must be considered under CEQA (those that are historically significant): a cultural resource listed or eligible for listing on the California Register of Historical Resources, a cultural resource listed in a local register, a cultural resource identified in a historical survey if the survey meets all required criteria, and a cultural resource determined by a lead agency to be historically significant, provided the lead agency's determination is supported by substantial evidence in light of the whole record. 21084.1 also allows a lead agency to determine that a cultural resource may be historically significant despite not being listed or eligible for any register or not being identified in any qualifying survey.

Applicable Law	Description
CEQA Guidelines California Code of Regulations (CCR) Title 14, Division 6, Chapter 3, Section 15064.5	15064.5 (a) specifies which cultural resources must be considered under CEQA: a cultural resource listed or eligible for listing on the California Register of Historical Resources, a cultural resource listed in a local register, a cultural resource identified in a historical survey if the survey meets all required criteria, and a cultural resource determined by a lead agency to be historically significant, provided the lead agency's determination is supported by substantial evidence in light of the whole record. 15064.5 (b) defines what constitutes a significant impact on a cultural resource; defines a significant impact on a historically significant cultural resource as a significant effect on the environment; specifies preservation, rehabilitation, restoration, or reconstruction of historic properties according to the Secretary of the Interior's Guidelines as mitigation of a project's impact on a historical resource to a less-than-significant level; and directs a lead agency to identify feasible and enforceable measures to mitigate a project's significant impacts to significant cultural resources. 15064.5 (c) requires a lead agency to determine if an archaeological site that a project will impact is historically significant, provides for the site's appropriate treatment if it is significant, and allows its destruction without mitigation if it is not significant. 15064.5 (d) allows the project proponent to develop an agreement with Native Americans on a plan for the disposition of remains from known Native American burials impacted by a project. 15064.5 (e) requires the landowner, or an authorized representative, to rebury Native American remains elsewhere on the property if other disposition cannot be negotiated. 15064.5 (f) directs the lead agency to make provisions for significant cultural resources that are accidentally discovered during construction, which may require the project proponent to fund mitigation and delay construction in the area of the find.

Applicable Law	Description
CEQA Appendix G, Section V	Provides the lead agency with a checklist that identifies potential project impacts to historical, cultural, or paleontological resources. Using the checklist, the agency can identify the kind of environmental document that will be needed to address the project's impacts on cultural resources. The checklist includes four questions to determine if a project would: 1) Cause a substantial adverse change in the significance of a historical resource; 2) Cause a substantial adverse change in the significance of an archaeological resource; 3) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature; and/or 4) Disturb any human remains, including those interred outside of formal cemeteries. Each answer identifies a potential project impact that is then evaluated as potentially significant, less than significant with mitigation, less than significant, or nil.
PRC, Section 5020.1	Provides a series of definitions of terms used in legislation dealing with cultural resources.
PRC, Section 5024.1	Establishes the California Register of Historical Resources (CRHR) and the eligibility criteria for cultural resources to be listed in the CRHR; identifies the historical resources which are eligible for listing in the CRHR in one of three ways: 1. automatically; 2. following procedures and criteria adopted by the State Historical Resources Commission; or 3. nominated and processed by means of a public hearing.
CCR, Title 14, Division 3, Chapter 11.5, Section 4851	Amplifies and clarifies the provisions of PRC Section 5024.1
CCR, Title 14, Division 3, Chapter 11.5, Section 4852	Defines the types of historical resources eligible for listing in the CRHR: buildings, sites, structures, objects, and historic districts; Establishes four criteria for significance and defines the integrity required for CRHR-eligible historical resources; Lists special considerations for moved resources, resources less than 50 years old, and reconstructed resources; and Amplifies and clarifies the provisions of PRC Section 5024.1.
CCR, Title 14, Division 3, Chapter 11.5, Appendix A	Provides a glossary of the terms used in the code guiding all aspects of the California Register of Historical Resources.

Applicable Law	Description
PRC 5097.98(b) and (e)	Requires a landowner on whose property Native American human remains are found to limit further development activity in the vicinity until he/she confers with the Native American Heritage Commission-identified Most Likely Descendents (MLDs) to consider treatment options. In the absence of MLDs or of a treatment acceptable to all parties, the landowner is required to re-inter the remains elsewhere on the property in a location not subject to further disturbance.
PRC, Sections 5097.99 and 5097.991	5097.99 establishes as a felony the acquisition, possession, sale, or dissection with malice or wantonness of Native American remains or funerary artifacts. 5097.991 establishes as state policy the repatriation of Native American remains and funerary artifacts.
Health and Safety Code (HSC), Section 7050.5	Makes it a misdemeanor to mutilate, disinter, wantonly disturb, or willfully remove human remains found outside a cemetery; Requires a project owner to halt construction if human remains are discovered and to contact the county coroner.
HSC, Sections 8010-8011 (California Native American Graves Protection and Repatriation Act of 2001)	Provides state policy consistent with the federal Native American Graves Protection and Repatriation Act (see above), facilitates that act's implementation at publicly funded agencies and museums, and ensures the timely response of those agencies and museums to Native American repatriation claims filed under this act; Encourages voluntary disclosure and return of remains and cultural items; Extends repatriation rights to non-federally-recognized tribes.
SB 18, an act to amend Section 815.3 of the Civil Code, to amend Sections 65040.2, 65092, 65351, 65352, and 65560 of, and to add Sections 65352.3, 65352.4, and 65562.5 to the Government Code; Chapter 905 of the Statutes of 2004	Requires California cities and counties, when preparing or revising their General Plans (and, by extension, specific plans, as well), to provide their proposals to those Native American Tribes who have traditional lands located within those local jurisdictions and who are on the contact list established by the Native American Heritage Commission; Requires cities and counties to initiate a consultation process with these tribes before adopting or amending their General and specific plans; Gives Native American tribes the right to acquire and hold conservation easements as a means of protecting their cultural places.

Applicable Law	Description
SB 18 Tribal Consultation Guidelines, April 15, 2005 (Supplement to General Plan Guidelines, Governor's Office of Planning and Research, 2004)	Advises local governments in four areas of the tribal consultation process required under SB 18.
Executive Order W-26-92, Section 1 (3)	Requires state agencies to ensure that significant heritage resources are fully considered in all land use and capital outlay decisions.
Local	
Kern County General Plan, Section 1.10.3 (SM 2009a, Vol. 1 Sections 5.4.1, 5.4.3, and 5.4.4).	Policy 25: Provides that the County will promote the preservation of cultural and historic resources.
Kern County Code of Building Regulations, Section 17.48.060 (SM 2009a, Vol. 1, Sections 5.4.1, 5.4.3, and 5.4.4).	Item 45 provides a definition of an historic structure as any structure that is on the National Register of Historica Places or on a State Inventory.
Kern County Code of Building Regulations, Section 17.48.370 (SM 2009, vol. 2, Append. G, p. 14)	Subsection (B) provides direction on issuance of variances by the County floodplain administrator for the repair or rehabilitation of Historic Structures upon determination that the proposed repair or rehabilitation will not preclude the structure's continued designation as a historic structure and that the variance is the minimum necessary to preserve the historic character of the structure.

C.3.4 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

The purpose of the present cultural resources analysis is to provide evidence of the ongoing public process by which the Energy Commission and the Bureau of Land Management (BLM) are jointly complying with local, State, and Federal regulations to which each agency is variously subject. The Energy Commission, pursuant to section 25519, subsection (c) of the Warren-Alquist Act of 1974 (Act), is the lead agency for the purpose of complying with CEQA in relation to the certification of the proposed facility and the site on which the facility would operate, and is further responsible, pursuant to section 25525 of the Act, for ensuring that the facility would conform with applicable

State, local, or regional standards, ordinances, or laws. The BLM is the lead agency for the purpose of complying with NEPA, as the Federal government considers the environmental implications of the proposed action, and has further obligations to comply with Section 106 of the National Historic Preservation Act of 1966, as amended (16 USC 470(f)) (NHPA), and other Federal historic preservation programs.

The structure of the cultural resources analysis for the proposed action accommodates both the primary need of the Energy Commission to demonstrate under CEQA a consideration of the potential for the proposed project to affect cultural resources and the primary needs of the BLM to conduct similar analyses under NEPA and Section 106. (Each of these three regulatory programs uses slightly different terminology to refer to the proposed action. Clarifications on the use of "proposed action," "proposed project," and "undertaking" may be found in the "Cultural Resources Glossary" subsection, below.)

The present analysis strives to fulfill the similar goals of CEQA, NEPA, and Section 106 through the implementation of one variant of the basic process that the Energy Commission and the BLM would, under normal circumstances, have chosen to coordinate State and Federal cultural resources regulatory compliance. The variant of the basic regulatory process that the Energy Commission and the BLM use for the present analysis is referred to herein as "Approach 3" (see "Alternate Approaches to Coordinated State and Federal Regulatory Compliance" subsection, below). The basic regulatory process is set out in detail below to provide a context for the derivation and use of Approach 3. The basic coordinated regulatory process for cultural resources would normally proceed through five basic analytic phases. These five phases include

1. The determination of the appropriate geographic extent of the analysis for the proposed action and for each alternative action under consideration,

2. The production of a cultural resources inventory for each such geographic area,

3. The development of determinations on the historical significance of the cultural resources in the inventory for each geographic area, unless the construction, operation and maintenance, and decommissioning and closure of the proposed or alternative actions will avoid particular resources,

4. The assessment of the character and the severity of the effects of the proposed or alternative actions on the historically significant cultural resources in each respective inventory that cannot be avoided, and

5. The development of measures that would resolve those effects that are found to be significant.

Further details of each of these phases follow below and help provide the parameters of the present analysis.

C.3.4.1 THE PROJECT AREA OF ANALYSIS AND THE AREA OF POTENTIAL EFFECTS

A useful precursor to a cultural resources analysis under CEQA and NEPA and a requisite part of the Section 106 process (36 CFR Part 800) is to define the appropriate geographic limits for an analysis. The area that Energy Commission staff typically considers when identifying and assessing impacts to cultural resources under CEQA is referred to here as the "project area of analysis." Energy Commission staff defines the project area of analysis as the area of and surrounding a project site and ancillary linear facility corridors. The area reflects, although does not necessarily equate with, the minimum standards set out in the Energy Commission Power Plant Site Certification Regulations (Cal. Code Regs., tit. 20, § 1701 et seq., appen. B, subd. (g)(2)) and is sufficiently large and comprehensive in geographic area to facilitate and encompass considerations of archaeological, ethnographic, and built-environment resources. The project area of analysis is a composite, though not necessarily contiguous, geographic area that accommodates the analysis of each of these resource types:

- For archaeological resources, the project area of analysis is minimally defined as the project site footprint, plus a buffer of 200 feet, and the project linear facilities routes, plus a buffer of 50 feet to either side of the rights-of way for these routes.
- For ethnographic resources, the project area of analysis is expanded to take into account traditional use areas and traditional cultural properties which may be far-ranging, including views that contribute to the significance of the property. These resources are often identified in consultation with Native Americans and other ethnic groups, and issues that are raised by these groups may define the area of analysis.
- For built-environment resources, the project area of analysis is confined to one parcel deep from the project site footprint in urban areas, but in rural areas is expanded to include a half-mile buffer from the project site and above-ground linear facilities to encompass resources whose setting could be adversely affected by industrial development.
- For a historic district or a cultural landscape, staff defines the project area of analysis based on the particulars of each siting case (i.e. specific to that project).

The project area of analysis concept provides an appropriate areal scope for the consideration of cultural resources under NEPA and is generally consistent with the definition of the area of potential effects (APE) in the Section 106 process (36 CFR § 800.16(d)). The project area of analysis will, therefore, be equivalent to the APE for the purpose of the present discussion and the present analysis.

C.3.4.2 INVENTORY OF CULTURAL RESOURCES IN THE PROJECT AREA OF ANALYSIS

A cultural resources inventory specific to each proposed or alternative action under consideration is a necessary step in any staff effort to determine whether each such action may cause, under CEQA, a substantial adverse change in the significance of any cultural resources that are on or would qualify for the California Register of Historical Resources (CRHR), may, under NEPA, significantly affect important historic and cultural

aspects of our national heritage, or may, under Section 106, adversely affect any cultural resources that are on or would qualify for the National Register of Historic Places (NRHP).

The development of a cultural resources inventory entails working through a sequence of investigatory phases to establish the universe of cultural resources that will be the focus of the analyses of each proposed or alternative action. Generally the research process proceeds from the known to the unknown. These phases typically involve doing background research to identify known cultural resources, conducting fieldwork to collect requisite primary data on not-yet-identified cultural resources in the vicinity of an action, and assessing the results of any geotechnical studies or environmental assessments completed for a project site. The results of this research then support, in part, the development of determinations of historical significance for the cultural resources that are found.

C.3.4.3 DETERMINING THE HISTORICAL SIGNIFICANCE OF CULTURAL RESOURCES

A key part of any cultural resources analysis under CEQA, NEPA, or Section 106 is to determine which of the cultural resources that a proposed or alternative action may affect, are important or historically significant (each of these three regulatory programs uses slightly different terminology to refer to historically significant cultural resources; clarifications on the use of the terms “historical resource,” “important historic and cultural aspects of our national heritage,” and “historic property” may be found in the “Cultural Resources Glossary” subsection, of this report). Subsequent effects assessments are only made for those cultural resources that are determined to be historically significant. Cultural resources that can be avoided by construction may remain unevaluated. Unevaluated cultural resources that cannot be avoided are treated as eligible when determining effects. The criteria for evaluation and the requisite thresholds of resource integrity that are, taken together, the measures of historical significance, vary among the three regulatory programs.

C.3.4.3.1 Evaluation of Historical Significance under CEQA

CEQA requires the Energy Commission, as a lead agency, to evaluate the historical significance of cultural resources by determining whether they meet certain criteria. Under CEQA, the definition of a historically significant cultural resource is that it is eligible for listing in the CRHR, and such a cultural resource is referred to as a “historical resource,” which is a “resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the CRHR”, or “a resource listed in a local register of historical resources or identified as significant in a historical resource survey meeting the requirements of section 5024.1(g) of the Public Resources Code,” or “any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the agency’s determination is supported by substantial evidence in light of the whole record” (Cal. Code Regs., tit. 14, § 15064.5(a)). The term, “historical resource,” therefore, indicates a cultural resource that is historically significant and eligible for listing in the CRHR.

Consequently, under the CEQA Guidelines, to be historically significant, a cultural resource must meet the criteria for listing in the CRHR. These criteria are essentially the same as the eligibility criteria for the NRHP. In addition to being at least 50 years old, a resource must meet at least one (and may meet more than one) of the following four criteria (Pub. Resources Code, § 5024.1):

- Criterion 1, is associated with events that have made a significant contribution to the broad patterns of our history;
- Criterion 2, is associated with the lives of persons significant in our past;
- Criterion 3, embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values; or
- Criterion 4, has yielded, or may be likely to yield, information important to history or prehistory.

In addition, historical resources must also possess integrity of location, design, setting, materials, workmanship, feeling, and association (Cal. Code Regs., tit. 14, § 4852(c)).

Additionally, cultural resources listed in or formally determined eligible for the National Register of Historical Places (NRHP) and California Registered Historical Landmarks numbered No. 770 and up are automatically listed in the CRHR and are therefore also historical resources (Pub. Resources Code, § 5024.1(d)). Even if a cultural resource is not listed or determined to be eligible for listing in the CRHR, CEQA allows a lead agency to make a determination as to whether it is a historical resource (Pub. Resources Code, § 21084.1).

C.3.4.3.2 Evaluation of Historical Significance under NEPA

NEPA establishes national policy for the protection and enhancement of the environment. Part of the function of the Federal government in protecting the environment is to "preserve important historic, cultural, and natural aspects of our national heritage." Cultural resources need not be determined eligible for the NRHP, as in the Section 106 process, to receive consideration under NEPA. NEPA is implemented by the regulations of the Council on Environmental Quality, 40 CFR 1500-1508. NEPA provides for public participation in the consideration of cultural resources issues, among other issues, during agency decision making.

C.3.4.3.3 Evaluation of Historical Significance under Section 106

The Federal government has developed laws and regulations designed to protect cultural resources that may be affected by actions undertaken, regulated, or funded by federal agencies. Cultural resources are considered during federal undertakings chiefly under Section 106 of the NHPA through its implementing regulations, 36 CFR Part 800). Properties of traditional, religious, and cultural importance to Native Americans are considered under Section 101(d)(6)(A) of the NHPA.

The Section 106 process requires Federal agencies to consider the effects of their undertakings on any district, site, building, structure, or object that is included in or eligible for inclusion in the NRHP and to afford the Advisory Council on Historic

Preservation (ACHP) a reasonable opportunity to comment on such undertakings (36 CFR § 800.1). Under Section 106, the significance of any adversely affected cultural resource is assessed and mitigation measures are proposed to resolve effects. The resolution of effects is usually executed in a Memorandum of Agreement or Programmatic Agreement between the Federal agency, the SHPO, the ACHP and other consulting parties. Significant cultural resources (historic properties) are those resources, districts, sites, buildings, structures, or objects, that are listed in or are eligible for listing on the NRHP per the criteria listed at 36 CFR § 60.4 and presented below.

Per National Park Service (NPS) regulations, 36 CFR § 60.4, and guidance published by the NPS, National Register Bulletin, Number 15, How to Apply the National Register Criteria for Evaluation, different types of values embodied in districts, sites, buildings, structures, and objects are recognized. These values fall into the following categories:

- Associative Value (Criteria A and B): Properties significant for their association with or linkage to events (Criterion A) or persons (Criterion B) important in our past.
- Design or Construction Value (Criterion C): Properties significant as representatives of the man-made expression of culture or technology.
- Information Value (Criterion D): Properties significant for their ability to yield important information about prehistory or history.

The quality of significance in American history, architecture, archaeology, engineering and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling and association. Cultural resources that are determined eligible for listing in the NRHP, along with SHPO concurrence, are termed “historic properties” under Section 106, and are afforded the same protection as sites listed in the NRHP.

C.3.4.4 ASSESSING ACTION EFFECTS

The core of a cultural resources analysis under CEQA, NEPA, or Section 106 is the assessment of the character of the effects that a proposed or alternative action may have on historically significant cultural resources. The analysis takes into account three primary types of potential effects which each of the three above regulatory programs defines and handles in slightly different ways. The three types of potential effects include direct, indirect, and cumulative effects. Once the character of each potential effect of a proposed or alternative action has been assessed, a further assessment is made as to whether each such effect is significant, relative to specific regulatory criteria under CEQA, NEPA, and Section 106.

C.3.4.4.1 Direct and Indirect Effects

Direct and indirect effects are those that are more clearly and immediately attributable to the implementation of proposed or alternative actions. Direct and indirect effects are conceptually similar under CEQA and NEPA. The uses of the concepts vary under Section 106 relative to their uses under CEQA and NEPA.

C.3.4.4.1.1 Direct and Indirect Impacts under CEQA

In the abstract, direct impacts to cultural resources are those associated with project development, construction, and co-existence. Construction usually entails surface and subsurface disturbance of the ground, and direct impacts to archaeological resources may result from the immediate disturbance of the deposits, whether from vegetation removal, vehicle travel over the surface, earth-moving activities, excavation, or demolition of overlying structures. Construction can have direct impacts on historic built-environment resources when those structures must be removed to make way for new structures or when the vibrations of construction impair the stability of historic structures nearby. New structures can have direct impacts on historic structures when the new structures are stylistically incompatible with their neighbors and the setting, and when the new structures produce something harmful to the materials or structural integrity of the historic structures, such as emissions or vibrations.

Generally speaking, indirect impacts to archaeological resources are those which may result from increased erosion due to site clearance and preparation, or from inadvertent damage or outright vandalism to exposed resource components due to improved accessibility. Similarly, historic structures can suffer indirect impacts when project construction creates improved accessibility and vandalism or greater weather exposure becomes possible.

Ground disturbance accompanying construction at a proposed plant site, along proposed linear facilities, and at a proposed laydown area has the potential to directly impact archaeological resources, unidentified at this time. The potential direct, physical impacts of the proposed construction on unknown archaeological resources are commensurate with the extent of ground disturbance entailed in the particular mode of construction. This varies with each component of the proposed project. Placing the proposed plant into this particular setting could have a direct impact on the integrity of association, setting, and feeling of nearby standing historic structures.

C.3.4.4.1.2 Direct and Indirect Effects under NEPA

The concepts of direct and indirect effects under NEPA are almost equivalent to those under CEQA. Direct effects under NEPA are those “which are caused by the [proposed or alternative] action and [which] occur at the same time and place” (40 CFR § 1508.8(a)). Indirect effects are those “which are caused by the [proposed or alternative] action and are later in time or farther removed in distance, but are still reasonably foreseeable” (40 CFR § 1508.8(b)).

C.3.4.4.1.3 Direct and Indirect Effects under Section 106

The Section 106 regulation narrows the range of direct effects and broadens the range of indirect effects relative to the definitions of the same terms under CEQA and NEPA. The regulatory definition of “effect,” pursuant to 36 CFR § 800.16(i), is that the term “means alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register.” In practice, a “direct effect” under Section 106 is limited to the direct physical disturbance of a historic property. Effects that are immediate but not physical in character, such as visual intrusion, and reasonably

foreseeable effects that may occur at some point subsequent to the implementation of the proposed undertaking are referred to in the Section 106 process as “indirect effects.”

C.3.4.4.2 Cumulative Impacts

Cumulative Impacts are slightly different concepts under CEQA and NEPA, and are, under Section 106, undifferentiated as an aspect of the potential effects of an undertaking, of a proposed or alternative action. The consideration of cumulative impacts reaches beyond the project area of analysis or the area of potential effects. It is a consideration of how the effects of a proposed or alternative action in those areas contributes or does not contribute to the degradation of a resource group or groups that is or are common to the project area of analysis and the surrounding area or vicinity.

C.3.4.4.2.1 Cumulative Impacts under CEQA

A cumulative impact under CEQA refers to a proposed project's incremental effects considered over time and taken together with those of other, nearby, past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project (Pub. Resources Code sec. 21083; Cal. Code Regs., tit. 14, secs. 15064(h), 15065(a)(3), 15130, and 15355). Cumulative impacts to cultural resources in a project vicinity could occur if any other existing or proposed projects, in conjunction with the proposed project, had or would have impacts on cultural resources that, considered together, would be significant. The previous ground disturbance from prior projects and the ground disturbance related to the future construction of a proposed project and other proposed projects in the vicinity could have a cumulatively considerable effect on archaeological deposits, both prehistoric and historic. The alteration of the natural or cultural setting which could be caused by the construction and operation of a proposed project and other proposed projects in the vicinity could be cumulatively considerable, but may or may not be a significant impact to cultural resources.

C.3.4.4.2.2 Cumulative Impacts under NEPA

Under NEPA, a cumulative impact is the “impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR § 1508.7). Cumulatively significant impacts are taken into consideration as an aspect of the intensity of a significant effect (40 CFR § 1508.27(b)(7).

C.3.4.4.2.3 Cumulative Effects under Section 106

The Section 106 regulation makes explicit reference to cumulative effects only in the context of a discussion of the criteria of adverse effect (36 CFR § 800.5(a)(1)). Cumulative effects are largely undifferentiated as an aspect of the potential effects of an undertaking. Such effects are enumerated and resolved in conjunction with the consideration of direct and indirect effects.

C.3.4.5 ASSESSING THE SIGNIFICANCE OF ACTION EFFECTS

Once the character of the effects that proposed or alternative actions may have on historically significant cultural resources has been determined, the severity of those effects needs to be assessed. CEQA, NEPA, and Section 106 each have different definitions and tests that factor into decisions about how severe, how significant the effects of particular actions may be.

C.3.4.5.1 Significant Impacts under CEQA

Under CEQA, "a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment" (Pub. Resourced Code, § 21084.1). Thus, staff analyzes whether a proposed project would cause a substantial adverse change in the significance, that is, the CRHR eligibility, of the subset of the historical resources in the cultural resources inventory for a project area that the proposed project demonstrably has the potential to effect. The degree of significance of an impact depends on:

- The cultural resource impacted;
- The nature of the resource's historical significance;
- How the resource's historical significance is manifested physically and perceptually;
- Appraisals of those aspects of the resource's integrity that figure importantly in the manifestation of the resource's historical significance; and how much the impact will change those integrity appraisals.

C.3.4.5.2 Significant Effects under NEPA

Significant effects under NEPA require considerations of both context and intensity (40 CFR § 1508.27). These considerations are:

(a) Context. This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

(b) Intensity. This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:

(1) Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.

(2) Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

(3) The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.

(4) Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.

(5) The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.

(6) Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

C.3.4.5.3 Adverse Effects under Section 106

In accordance with 36 CFR § 800.5 of the ACHP's implementing regulations, which describes criteria for adverse effects, impacts on cultural resources are considered significant if one or more of the following conditions would result from implementation of the proposed action:

- An undertaking has an effect on a historic property when the undertaking may alter characteristics of the property that may qualify the property for inclusion in the NRHP. For the purpose of determining the type of effect, alteration to features of a property's location, setting, or use may be relevant, depending on the property's significant characteristics, and should be considered.
- An undertaking is considered to have an adverse effect when the effect on a historic property may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects on historic properties include, but are not limited to:

  (1) Physical destruction, damage, or alteration of all or part of the property

  (2) Isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's qualification for the NRHP

  (3) Introduction of visual, audible, or atmospheric elements that are out of character with the property or that alter its setting

  (4) Neglect of the property, resulting in its deterioration or destruction

  (5) Transfer, lease, or sale of the property

Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative. A formal effect finding under Section 106 relates to the proposed or alternative action as a whole rather than relating to individual resources.

C.3.4.6 RESOLVING SIGNIFICANT EFFECTS

The concluding phase in a cultural resources analysis, whether under CEQA, NEPA, or Section 106, is to resolve those effects of a proposed or alternative action that have been found to be significant or adverse. The terminology used to describe the process of effects resolution differs among the three regulatory programs. The resolution of significant effects under CEQA involves the development of mitigation measures the implementation of which would minimize any such effects (14 CCR § 15126.4). Mitigation under NEPA includes proposals that avoid or minimize any potential significant effects of a proposed or alternative action on the quality of the human environment (40 CFR § 1502.4). The definition of mitigation in the NEPA regulation includes the development of measures that would avoid, minimize, or rectify significant effects, progressively reduce or eliminate such effects over time, or provide compensation for such effects (40 CFR § 1508.20). The Section 106 process directs the resolution of adverse effects through a consultative process with consulting parties which results in the development of proposals to avoid, minimize, or otherwise mitigate such effects (36 CFR § 800.6(a)).

The present analysis seeks to resolve the potentially significant effects of proposed and alternative actions on significant cultural resources (i.e. historical resources/historic properties) through the development of measures that satisfy the common conceptual threads of effects resolution in CEQA, NEPA, and Section 106. Energy Commission staff here proposes that the applicant comply with the terms of the BLM's programmatic agreement (PA) under Section 106 a condition of certification (**CUL-1**). The BLM here proposes to use the present cultural resources analysis and its consultation efforts under Section 106, which includes the negotiation and drafting of the PA, to evidence its compliance with NEPA. The applicant's implementation of the terms of the PA would ensure compliance with applicable laws, ordinances, regulations, and standards (LORS), in addition to compliance with CEQA, NEPA, and Section 106.

C.3.4.7 ALTERNATE APPROACHES TO COORDINATED STATE AND FEDERAL REGULATORY COMPLIANCE

State and Federal agencies have the latitude to develop any number of alternate approaches to the above basic coordinated regulatory process for cultural resources compliance. Energy Commission staff, in consultation with BLM staff, proposed three alternate approaches to cultural resources regulatory compliance for the proposed and alternative actions (Approaches 1–3), and asked the applicant to choose which of the three approaches the applicant would like to implement. The applicant chose Approach 3. Each of the three approaches is described below. The use of both Approaches 2 and 3 require a further consultation process to develop and execute a Section 106 agreement document. That process is described subsequent to the descriptions of the three approaches.

C.3.4.7.1 Approach 1

Approach 1 would typically cover solar thermal projects that encompass a modest number ($\leq$ 75) of cultural resources. Under this approach, the Energy Commission and the BLM would normally try to conclude all investigations necessary to identify, evaluate the historical significance of, and assess the reasonably foreseeable and particular

effects to the cultural resources in a project area of analysis prior to the Energy Commission's or the BLM's respective decisions on such projects. Where historically significant cultural resources are affected, the conclusion of these investigations prior to agency decisions facilitates the development of more refined measures to reduce significant project effects, which, in turn, reduces post-decision delays to construction start-up, reduces redirection or stoppage of work during construction, and can substantially reduce the overall cost of cultural resources compliance. Federal agency responsibility under Section 106 of the NHPA to reduce any significant project effects is typically accomplished through the execution of a memorandum of agreement (MOA) that is the result of consultation among the California State Historic Preservation Officer (SHPO), the ACHP, and other consulting parties.

C.3.4.7.2 Approach 2

Approach 2 accommodates solar thermal power projects that encompass a large number (> 75) of cultural resources. Energy Commission and BLM staff, under this approach, draft the joint NEPA and CEQA analysis for cultural resources on the basis of a relatively large (≥ 25%) and reliable sample of the cultural resources inventory in a project area of analysis, and ensure the thorough consideration and treatment of all of the resources in that inventory through the negotiation and execution of a programmatic agreement (PA) pursuant to the Section 106 regulatory process. Staff subsequently incorporates the PA into the joint analysis by reference. The implementation of a PA under the Section 106 process facilitates cultural resources compliance under both NEPA and CEQA for large and complex projects by helping to reduce the effort, time, and cost to gather information prior to a decision. The use of a PA allows for modifications in the scheduling of efforts to identify and evaluate the historical significance of the total complement of cultural resources in a project area of analysis. Such modifications in schedule can substantially reduce the scope of the effort and the time necessary to gather cultural resources information prior to a decision and, consequently, the pre-decision cost of cultural resources compliance. The major drawback to the second approach is that it may result in significant post-decision delays in construction start-up as most of the cultural resources investigations that, under the first approach, would have been done prior to the decision would, instead, be done after the decision. The overall cost of cultural resources compliance under either the first or second approach, on the basis of cost per cultural resource, is approximately the same, and the applicant may also enjoy comparable reductions in construction monitoring obligations.

C.3.4.7.3 Approach 3

Approach 3 handles cultural resources that are known prior to construction differently from those that are discovered during construction. Prior to construction, the Approach 3 would streamline the time necessary to produce the joint cultural resources analyses under NEPA and CEQA by foregoing potentially lengthy investigations to evaluate the historical significance of the cultural resources found on the surface of a project area of analysis, and, instead, addressing those cultural resources that are demonstrably subject to project effects, as though they were historically significant. Energy Commission and BLM staff would, prior to any decision, study the results of the cultural resources pedestrian survey, identify those cultural resources on the surface of the project area of analysis that would be subject to project effects, assume that all surface

cultural resources are historically significant, and then develop measures to reduce project effects to those surface resources to less than significant through the use of a phased treatment plan. Staff would ensure the thorough consideration and treatment of all of the surface resources through the negotiation and execution of a PA pursuant to the section 106 regulatory process, which staff would subsequently incorporate, by reference, into the joint analysis. The primary benefit of the proposed approach is that, depending on the nature of the cultural resources and the potential character of resulting project effects, it has the potential to substantively reduce both the amount of time necessary to gather information for the cultural resources analysis and the amount of time necessary to draft the actual analysis. This approach, however, has the real potential to result in post-decision delays in construction start-up, increases in requisite construction monitoring, and cost. Contrary to the regulatory review process under either Approaches 1 or 2, every cultural resource in a project area of analysis known prior to the onset of construction, many of which may have otherwise been found not to be historically significant, would, under Approach 3, be subject to potentially costly post-decision and pre-construction data recovery investigation. The only exceptions would be those cultural resources that staff could demonstrate that the proposed project would not affect or those resources which staff could determine were not historically significant on the basis of extant information.

Due to the absence of the finer resolution data that Approaches 1 and 2 provide, Energy Commission and BLM staff would be unable, under Approach 3, to tailor a unique construction monitoring protocol for the proposed or alternative actions. As a consequence, construction monitoring could become requisite across the entirety of the ultimate project area, and each discovery of a new archaeological deposit, during construction, would have to be dealt with on an individual basis. Each new construction discovery would be subject to an evaluation of historical significance and resources thought to be historically significant would then be subject to data recovery investigation as construction progressed. Potential increases in the overall number of requisite data recovery investigations, both for surface cultural resources known prior to construction and for new resources found during construction, in the extent and duration of construction monitoring, and in construction discovery events may cause greater construction delays and result in higher overall costs for cultural resources compliance.

C.3.4.7.4 Programmatic Agreement (PA)

The use of Approaches 2 and 3 require the development and execution of a PA under Section 106. In accordance with 36 CFR § 800.14(b), PAs are used for the resolution of adverse effects for complex project situations and when effects on historic properties, resources eligible for or listed in the NRHP, cannot be fully determined prior to approval of an undertaking. The BLM will prepare a PA in consultation with the ACHP, the SHPO, the Energy Commission, interested Native American groups, and the public at large (including tribal governments as part of government to government consultation). The PA will govern the conclusion of the identification and evaluation of historic properties (eligible for the NRHP) and historical resources (eligible for the CRHR), as well as the resolution of any significant effects that may result from the proposed or alternative actions. Historic properties and historical resources are significant prehistoric and historic cultural resources as determined by Energy Commission and BLM staff.

As a result of the anticipated significant effects of the proposed action on cultural resources and the large geographic area in the APE, a PA with the BLM, other Federal agencies, the Energy Commission, the SHPO, interested Native American tribes (government to government consultation), and the public at large is necessary. Treatment plans regarding historic properties and historical resources that cannot be avoided by project construction will be developed in consultation with stakeholders, as stipulated in the PA. When the PA is executed and fully implemented, the project will have fulfilled the requirements of CEQA, NEPA, and Section 106 of the NHPA.

The BLM is presently in the process of initiating formal consultation with the ACHP, the SHPO, Energy Commission staff, Native American groups, and the public at large on the development of a PA for the proposed action. BLM and Energy Commission staff anticipates that the draft PA would be available for public comment concurrent with the publication of the supplemental staff assessment and final environmental impact statement, presently anticipated to occur in July 2010. Comments on the draft PA would be incorporated into the final version of the document which would be executed no later than the BLM's signature of the record of decision for the right-of-way grant for the action.

C.3.5 PROPOSED PROJECT

C.3.5.1 SETTING AND EXISTING CONDITIONS

C.3.5.1.1 Regional Setting

The proposed project area is located in the southern portion of the Indian Wells Valley, bordered on the west by the southern Sierra Nevada Mountains, on the south by the El Paso Mountains, on the east by the Argus Range and Searles Valley, and on the north by the Coso Range. Indian Wells Valley is an extensive closed basin that also includes perennial China Lake, the main current hydrologic feature of the valley. However, it is apparent that a portion of the Indian Wells Valley was part of the Indian Wells-Searles Basin which formed, at maximum expansion, a large lake with an area of about 386 square miles, as recently as 10,000 years ago (Hubbs and Miller 1948, p. 81; Gale 1914; SM 2009a, vol. 1, pp. 5.4-8–5.4-9). Located just northeast of the El Paso Mountains, the project area gently slopes from south to north and is roughly bisected by a dry wash.

The vicinity of the proposed RSPP site is relatively flat and is dominated by creosote bush. This undeveloped desert land is managed by the Bureau of Land Management and lies at the southeast portion of the Indian Wells Valley, about 5 miles southwest of the town of Ridgecrest in northeastern Kern County. Highway 395 passes the proposed RSPP site to the north, and a former rail line skirts the area just to the west, while a power transmission line passes through the southwest corner of the APE. Although no natural perennial streams drain the project vicinity, a dry creek bed (El Paso Wash) traverses the area diagonally southeast-northwest.

C.3.5.1.1.1 Macro-geographic and basic geo-political location

The project location is in the western Mojave Desert in the northeastern corner of Kern County, approximately 5 miles southwest of the city of Ridgecrest. The land is owned by the federal government and administered by the Bureau of Land Management.

C.3.5.1.1.2 Present regional climate

Currently the regional climate is dry with very little rainfall, typically ranging from 3 to 10 inches. The area is also subject to frequent very strong winds. On occasion the area is subject to a brief but heavy rainfall which causes the dry washes to flood. Summer temperatures are often very high (into the 110s), whereas in winter the temperature can drop to the low 30s (SM 2009a, vol. 2, Append. G, pp. 14-15).

C.3.5.1.1.3 Regional or macro-biotic community

The main biotic community of the area is characterized as Mojave creosote bush scrub, with the dominant species being creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*). Where the soil becomes more alkaline, saltbush (*Atriplex* spp.) is often found as well as cholla (*Opuntia* spp.) and various native grasses (SM 2009a, vol. 2, Append. G., p. 15).

C.3.5.1.1.4 Present ecology

The ecology of the area is of a creosote bush dominated, treeless area of alluvial soil with spotty ground cover. The habitat is noted especially for Desert Tortoise, Mojave Ground Squirrel, numerous rodent species, jackrabbits, cottontails, coyotes, Desert Kit fox, and more than 300 species of birds, including burrowing owls (SM 2009a, vol. 2, Append. G, p.15).

C.3 5.1.1.5 Land use

The area is located entirely within BLM's West Mojave Plan area (WEMO) and is classified as Multiple Use Class Limited (BLM 2005). Historic and current uses of the site include grazing, off-road vehicle use, target practice, and trash dumping (SM 2009a vol. 2, append. G, p. 1).

C.3.5.1.1.6 Historic

Historic use of the land has focused on mining of various types of minerals. Several mining "prospects" have been dug in areas within the project ROW (in section 25). BLM has also permitted stock grazing on the land. Currently, the land is used for recreational purposes (hiking, off-road vehicle use).

C.3.5.1.2 Project, Site, and Vicinity Description

The current project has been revised from the original plan submitted. To address resource management agencies' comments regarding habitat values, the RSPP site plan has been reconfigured to avoid the impacts to natural storm water flows across the El Paso Wash. South of Brown Road, this avoidance will be accomplished by shifting the south solar field slightly to the north and west, placing it entirely out of and to the west of the Wash. This adjustment results in an approximate 4% reduction in the area of disturbance of the southern solar field. The reconfiguration also includes relocation of

the power block to the north of Brown Road. The main site access road and main office are also moved to north of Brown Road. The reduced footprint of the south solar field requires the number of solar collector array loops, which individually have dimensions of approximately 1,300 feet long by 140 feet wide, to be decreased from 133 to 119.

The design of the 230 kV switchyard has been optimized, resulting in a reduction of the footprint to 3.2 acres (425 ft x 325 ft) from 5.5 acres (600 ft x 400 ft). The new location of the switchyard is such that its western boundary limit will be contiguous with the eastern boundary line of the proposed Southern California Edison (SCE) permanent easement. Modifications to the planned reroute of the existing SCE lines west of the south solar field are consistent with the original intent to closely follow the western limits of the field. The length of the existing lines that will need to be relocated (through a shift to the west) is now 8,600 feet (compared to 8,000 ft in the original site configuration. The length of the proposed realigned segments of the existing SCE 115 kV and 230 kV transmission lines will run 9,060 ft around the southwest corner of the south solar field.

North of Brown Road, the north solar field is shifted north and east to move the field entirely out of the El Paso Wash. The area of disturbance associated with the north solar field has increased by approximately 25% to offset the reduction of the south solar field. The number of solar collector array loops in the north solar field has increased from 145 to 167. In order to contain the entire field between the east side of the El Paso Wash and US Highway 395, the east-west dimensions of the two original segments of the north solar field are reduced and the field is reconfigured into a total of six segments, with some segments of the field shifted east. The reconfiguration of the RSPP results in a slight increase in the ROW to 3,995 acres. Engineered drainages along the perimeters of both the north and south solar fields are being redesigned to accommodate the new solar field configuration. Total disturbed acreage for the project will be increased from approximately 1,760 acres to 1,944 acres (a 10% increase). The difference between this acreage and the original 3995 acre ROW will be addressed in the Programmatic Agreement.

Several factors contributed to the increase in disturbance area of the north field. The greatest factor is more unused space within the fence lines of the solar fields due to segmentation of the field to avoid the wash and fit into the remaining available area. The new design is not as efficient as the previous design, in both use of land area and conversion of solar radiation into electricity. Process efficiency is reduced, requiring approximately 3% more solar loops due to the heat transfer requirements associated with the solar collection and pumping inefficiencies that occur with the staggered field configuration.

To mitigate the overall losses in process efficiency resulting from the new configuration, the process performance of the steam cycle was improved by adding cells to the air-cooled condenser (ACC). This change approximately doubled the area occupied by this piece of equipment, from about 1.66 acres to 3.27 acres; ACC height remains at 120 feet. The increase in ACC size will reduce the steam system backpressure. To accommodate the larger ACC, the layout within the power block was rearranged somewhat, although the overall impact to the power block footprint is negligible.

In addition, regarding the less efficient use of land area, the staggered field configuration results in triangular spaces at the “offsets” in the field design that may be disturbed in the process of grading the site. These areas are currently being evaluated to minimize any impact. The segmentation in the north field has also increased the number of subfields of solar arrays from 4 to 6, resulting in additional terraces, access roads, and on-site drainage channels being required between the subfields. Also, the new SCE lines have been pushed further to the west, which also has resulted in some space inefficiencies and corresponding increase in total disturbance area. The areas of disturbance associated with the relocated SCE transmission lines are included within the total disturbance area cited above. The disturbed areas west of the south field may be able to be further reduced at such time as SCE has finalized their design for the re-alignment.

The movement of the power block to the north of Brown Road will result in a longer gen-tie line alignment and a greater number of monopoles between the power block and the switchyard. The length of the t-line alignment will increase from approximately 1,250 ft to 3,900 ft, and the number of poles will increase from 3 to 4. The reconfiguration will also result in the need for the gen-tie line to cross over Brown Road. The longer north-south dimensions of the north solar field will result in an overall longer run of in-field HTF piping, and the new relative positioning of the two solar fields will result in a longer run of out-of-field HTF piping. The major length of out-of-field piping is a 2,200-foot run from the power block, spanning over El Paso Wash via a new pipe bridge, under Brown Road via a pair of culverts, and onward into the south solar field.
Because the offsite portion of the water pipeline is shortened in the new design, total disturbed acreage for the offsite water line will be reduced from approximately 18 acres to approximately 16.3 acres. The diameter for the water pipeline has increased from 12” to 16” to accommodate a request from the Indian Wells Valley Water District.

C.3.5.1.2.1 Descriptions of Alternative Project Configurations Within the Original Ridgecrest ROW

C.3.5.1.2.1.1 Northern Unit Alternative

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because (1) it eliminates about 42% of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources (desert tortoise and Mohave ground squirrel), cultural resources, and recreational uses, and (2) avoids constructing a solar facility in the Mohave Ground Squirrel Conservation Area (MGSCA).

The Northern Unit Alternative would consist of 167 solar collector array loops with a net generating capacity of approximately 146 MW. The total disturbance area would be approximately 1134 acres of land. This alternative would retain 58% of the proposed solar array loops and would affect 58% of the land of the proposed 250 MW project. The boundaries of the Northern Unit Alternative are shown in **Alternatives Figure 1.**

Similar to the proposed project, the Northern Unit Alternative would transmit power to the grid through the planned SCE 230-kV substation to be located near the proposed project site. The power block covering approximately 18 acres, would remain north of

Brown Road, as proposed by the project and would include all operational power facilities, structures, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system). The proposed transmission line alignment is 3,900 ft and would connect to the proposed switchyard (3.2 acres) adjacent to the existing SCE 230kV transmission line, west of the proposed project. In addition, the site would require access roads, a parking lot, bio-remediation unit and main office building (3 acres) all of which are proposed north of Brown Road within the proposed project footprint (AECOM 2009). The proposed 16.3 acre water line would remain at the location as proposed by the project. The Northern Unit Alternative would not require the relocation of the two existing SCE transmission lines.

As stated above, the Northern Unit Alternative is evaluated in this SA/DPA/DEIS because it would reduce some impacts of the project. Additionally, the Northern Unit Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals, while minimizing impacts to the desert environment. A limited acreage alternative was suggested in scoping comments.

C.3.5.1.2.1.2 Southern Unit Alternative

The Southern Unit Alternative would be a 104 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because it eliminates about 58% of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources, and cultural resources.

The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of approximately 104 MW. The total disturbance area would be approximately 908 acres of land. This alternative would retain 42% of the proposed solar array loops and would affect 42% of the land of the proposed 250 MW project.

The boundaries of the Southern Unit Alternative are shown in Alternatives Figure 2. This area was would avoid a large portion of the El Paso Wash and sensitive biological resources, including areas that were mapped as occupied tortoise and Mohave ground squirrel habitat (live tortoise and/or active burrows and sign).

Similar to the proposed project, the Southern Unit Alternative would transmit power to the grid through the planned SCE 230-kV substation to be located near the proposed project site. The power block, spanning approximately 18 acres, would remain north of Brown Road, as proposed by the project and would include all operational power facilities, structures, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system). The proposed transmission line alignment is 3,900 ft and would connect to the proposed switchyard (3.2 acres) adjacent to the existing SCE 230kV transmission line, west of the proposed project. In addition, the site would require access roads, a parking lot, bio-remediation unit and main office building (3 acres) all of which are proposed north of Brown Road (AECOM 2009). The proposed 16.3 acre water line would remain at the location as proposed by the project.

Similar to the proposed project, the Southern Unit Alternative would require the relocation of the two existing SCE transmission lines; this realignment would require approximately 58.2 acres.

As stated above, the Southern Unit Alternative is evaluated in this SA/DPA/DEIS because it would reduce some impacts of the project. Additionally, the Southern Unit Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals, while minimizing impacts to the desert environment. A limited acreage alternative was suggested in scoping comments.

C.3.5.1.2.1.3 Original Proposed Project Alternative

The Original Proposed Project Alternative would be a 250 MW solar facility as originally proposed by Solar Millennium. This alternative is analyzed because it would reduce the amount of land developed within the Mojave Ground Squirrel Conservation Area and it could transmit the full 250 MW of power that Solar Millennium has requested.

The Original Proposed Project Alternative would consist of 278 solar array loops with a net generating capacity of approximately 250 MW. The total disturbance area would be approximately 1,794 acres of land A shorter transmission interconnection – 1,250 feet as compared to the proposed project interconnection of 3,900 feet – would be needed. The boundaries of the Original Proposed Project Alternative are shown in Alternatives Figure 3. This project footprint contains two desert ephemeral washes that would require redirection and smaller dry desert washes also traverse the site. In addition this site is the location of prime desert tortoise and Mojave ground squirrel habitat.

Similar to the proposed project, the Original Proposed Project Alternative would transmit power to the grid through the planned SCE 230-kV substation located near the proposed project site and would require infrastructure including main office building (3 acres), power block, water line, transmission line, switch yard, access roads, parking area, bio-remediation unit and maintenance building (AECOM 2009). The 18-acre off-site water line route would follow the same route as the proposed project. The bioremediation unit would be located north of Brown Road, within the proposed project footprint; the power block and ancillary facilities would be located south of Brown Road on approximately 18 acres in addition to the transmission line and switch-yard (5.5 acres). The Original Proposed Project Alternative would require the relocation of the two existing SCE transmission lines.

As stated above, the Original Proposed Alternative is evaluated in this SA/DPA/DEIS because it reduces land developed with the MGSCA. Additionally, the Original Proposed Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals.

C.3.5.1.2.1.4 No Project/No Action Alternatives

C.3.5.1.2.1.4.1 No Project/No Action Alternative #1: No Action on Ridgecrest Solar Power Project application and on CDCA land use plan amendment

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA

Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site and no new ground disturbance. As a result, no loss or degradations to cultural resources from construction or operation of the proposed project would occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations

C.3.5.1.2.1.4.2 No Project/No Action Alternative #2: No Action on Ridgecrest Solar Power Project and amend the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with a different solar technology. As a result, ground disturbance would result from the construction and operation of the solar technology and would likely result in a loss or degradation to cultural resources. Different solar technologies require different amounts of grading and maintenance; however, it is expected that all solar technologies require some grading and ground disturbance. As such, this No Project/No Action Alternative could result in impacts to cultural resources similar to the impacts under the proposed project.

C.3.5.1.2.1.4.3 No Project/No Action Alternative #3: No Action on Ridgecrest Solar Power Project application and amend the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended. Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site and no corresponding land disturbance. As a result, the cultural resources of the site are not expected to change noticeably from existing conditions and, as such, this No Project/No Action Alternative would not result in

impacts to cultural resources. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

Within the 3,920-acre RSPP right-of-way (ROW) parcel, the proposed facility footprint would cover 1,440 acres. The total surface area potentially disturbed by the project, including off-site drainage modifications and linear facilities, is approximately 1,944 acres (SM 2010a). A proposed water pipeline running within the Kern County ROW, along the west side of South China Lake Boulevard, is also included in the plan.

The project will have major impacts on the site area ranging from grading and compacting the 1448 acres under the solar fields to the excavation of deep pits for reprocessing the water used for cleaning the mirrors in the solar troughs. There will also be the construction of various buildings for offices and maintenance. If the North Solar Field only alternative is chosen, there will be the need for a Connector to the main transmission line interconnection to the Inyokern Substation. A visual impact to areas outside of the project disturbance area may affect the adjacent El Paso Mountains Sacred site.

C.3.5.1.3 Environmental Setting

The environmental setting of the project APE is composed primarily of Cenozoic age sedimentary formations composed of older alluvium, younger fan deposits and younger alluvium. This alluvium is seen in the form of sand, silt, clay, gravels and angular cobbles which were mostly deposited in Pleistocene times. The elevation of the APE is fairly flat, ranging from 2630 to 2770 feet). The vegetation is dominated by creosote bush scrub (*Larrea tridentata*) with white bursage (*Ambrosia dumosa*), saltbush (*Atriplex spp*) and some cholla cactus (*Opuntia* spp.). The area is bisected by the usually dry El Paso Wash, which has been known to be subject to major flooding, most recently in 1984. A variety of desert animal species live in the area, in particular the Desert tortoise (*Gopherus agassizii*) and the Mohave Ground Squirrel (*Spermophilus mohavensis*). Rainfall in the area is generally from 3 to 10 inches per year (SM 2009a, vol. 2, Append. G, pp. 13-15).

C.3.5.1.3.1 Paleoclimate

Toward the end of the Pleistocene Epoch (ca. 10,000–12,000 years ago), the northern portion of Indian Wells Valley was a lake, known to geologists as Searles Lake, that was part of a large pluvial lake system extending from Lake Lahontan south to Searles Lake. The area then dried out for many thousands of years, but experienced a wet period about 2,000–3,000 years ago (AAUW 2002, p. 186). Geologic studies of the extent of these pluvial lakes indicate that the high water mark did not intrude into or beyond the RSPP project area (Jayko 2010). Therefore, it is not expected that ancient lakeshore sites would be found in the project APE. However, there is the possibility that streams flowing into the lake may have passed through the project area on its way to the pluvial lake (Jayko 2010). Such a fresh-water stream would have been attractive for camping or habitation. The dry wash known as El Paso Wash that passes through the project area might have been an active stream in past times of greater rainfall.

C.3.5.1.3.2 Geology

The geological makeup of the surface in the APE consists mainly of alluvial sediments made up of sand, silt, clay, gravels, and angular cobbles, most of which were deposited during Pleistocene times, but with some areas, in the southwest corner of the APE and along washes, containing more recent Holocene deposits. Situated within the lower Indian Wells Valley, these sediments likely derived mostly from the adjacent El Paso Mountains with lesser contribution from the Sierra Nevada. The Sierra Nevada Mountains to the west consist, principally, of Mesozoic age granitic rocks. Mesozoic age granitic rocks are also present in the Coso and Argus ranges to the north and east, but these ranges also contain older Paleozoic marine formations as well as Cenozoic age, extrusive volcanic rocks. These latter rocks are mostly Quaternary in age and are especially prevalent in the Coso Range, with extensive flows of basalt, rhyolite, and andesite along with pyroclastic deposits present. The rhyolite flows in the Coso Range are also are noted to contain extensive quantities of obsidian (Streitz and Stinson 1974; Duffield and Bacon 1981). The El Paso Mountains, immediately to the south and west, contain bedrock of pre-Tertiary, Tertiary, and Quaternary age. The older pre-Tertiary bedrock consists of a basement complex of metasedimentary rocks of the Garlock Series, of Paleozoic age, and granitic rocks of Mesozoic age. The Garlock Series contains tactite, marble, phyllite, schist, hornfels, chert, limestone andshale. These rocks outcrop along the southern and eastern edges of the APE. The Tertiary Age outcrops consist of sedimentary rocks of the Goler Formation, containing arkosic sandstone, clay, shale, and conglomerate. The Quaternary rocks are the Pleistocene Black Mountain basalt consisting of extrusive flows of vesicular to dense olivine basalt. This latter formation is present within the APE along the southwestern project boundary (Jennings et al. 1962; SM 2009d, p. 12).

C.3.5.1.4 Prehistoric Background

The northwestern Mojave Desert lies at the eastern edge of the southern Sierra Nevada mountains. Archaeological studies of this area, particularly the adjacent China Lake and El Paso Mountains, resulted in the discovery of human occupation ranging back at least 11,000 years (Moratto 1984, pp. 66–70; Sutton 1996; Kaldenberg 2005; Sutton et al. 2007). Extensive archaeological studies in the region since the 1930s have developed an understanding of the pattern of this human use of the area (Davis 1978; Davis and Panlaqui 1978a, 1978b, and 1978c).

C.3.5.1.4.1 Basic introduction on the depth of the region's prehistory

California prehistorians (cf. Sutton 1996, pp. 227-238; Warren 1984, pp. 409-430) have divided the prehistory of the Mojave Desert into six periods. The earliest period is called the "Paleo-Indian" period (10,000 to 8000 BC), followed by the "Lake Mojave Complex" (8,000–5000 BC). The next period is titled the Pinto Complex (5000–2000 BC). This was followed by the Gypsum Complex (2000 BC–AD 500), and then by the Rose Spring Complex (AD 500–1000). Finally, we have the "Late Prehistoric Complex" (AD 1000 to European Contact, ca. 1776). Variations on this scheme have been put forward (Bettinger and Taylor 1974; Warren and Crabtree 1986, pp. 184-192) in which the dates in several periods have been somewhat refined and sometimes renamed. Thus Rose Spring has been also called Haiwee or Saratoga Springs (Warren 1984, p. 410) and the

dating has been revised to AD 200 – 1100 (Sutton et al. 2007, p. 241) and the Late Prehistoric from AD 1100 to European Contact (Sutton et al. 2007, p.242).

C.3.5.1.4.1.1 Paleo-Indian Period (10,000 – 8000 BC)

The Paleo-Indian complex that has been identified so far in the Mojave Desert is Clovis, which is characterized by the classic fluted projectile point (Sutton et al. 2007, pp 233-234). These points have been mainly found in the north and western parts of the Mojave Desert including China Lake (Sutton et al. 2007, p. 234).

C.3.5.1.4.1.2. Lake Mojave Complex (8,000–5000 years BC)
The Lake Mojave complex (Warren and Crabtree 1986, p. 184), dating to the early Holocene, is represented by sites with a wider toolkit than the Paleo-Indian period. Lake Mojave period sites are often limited to surface assemblages, although some substantial subsurface deposits have been reported in the central Mojave Desert (Jenkins 1985). Assemblages of the Lake Mojave complex are characterized by projectile points, including leaf-shaped points, long-stemmed points with narrow shoulders (Lake Mojave and Parman points), short-bladed stemmed points with distinct shoulders (Silver Lake points), and rare fluted points. Crescents, domed scrapers, heavy core tools, and other items are also found. Milling stones had been thought rare in the assemblage (Warren and Crabtree 1986), but this notion has been brought into question by more recent discoveries (Basgall 1994, Basgall and Hall 1994, and Grayson 1993).

Because sites of the Lake Mojave period are often found in association with lake stands and outwash drainages, some researchers have argued that lacustrine (lake-adapted) resources were a subsistence focus. Others suggest that grasslands suitable for the grazing of large game would have surrounded the lakes, and that these animals were the primary subsistence focus of Lake Mojave cultures. Materials dating to the Lake Mojave period in the western Mojave Desert are few and confined to areas such as Lake Mojave, Fort Irwin, Twentynine Palms, Rosamond Lake, and China Lake, which is located 12 miles northeast of the proposed project site (Sutton et al. 2007). Surveys around China Lake in the 1960s and 1970s identified surface prehistoric artifact concentrations dating typologically to more than 10,000 years old (Davis 1978, Davis and Palanqui 1978). While further analyses identified post-depositional erosion processes, including wind and wave forces, at work in forming these artifact concentrations, the findings illustrate the cultural adaptation to pluvial conditions (e.g., lakes, marshes, and grasslands) that flourished for several millennia after 8,500 B.P. (Moratto 1984: p. 77).

C.3.5.1.4.1.3 Pinto Complex (5000–2000 BC)

Beginning about 5000 BC the middle Holocene environment changed from a wet to arid, with the main sources of water (rivers and lakes) drying up. This resulted also in a change in the biota, causing the human population to adjust their cultural adaptation to the new desert environment (Warren 1984, pp. 410–414). The sites associated with this period are mostly small, indicating a period of major depopulation.

Pinto period assemblages are notable in the increase in the abundance of groundstone implements (Sutton et al. 2007, p. 238), indicative of a greater reliance on hard seeds. A

collector-like strategy is indicated (Sutton et al. 2007, p. 238), undertaken by small, ephemeral groups practicing subsistence diversification. A distinctive projectile point that gives its name to this complex is the Pinto style point. Although the majority of Pinto sites are found in the eastern Mojave Desert, Pinto points have also appeared in parts of the Western Mojave (Sutton 1988; Sutton et al. 2007, p. 238). Warren (1984, p. 411) points out that this arid period was interrupted by a wet period known as the "Little Pluvial," from about 3000 B.C. to 1500 B.C., and suggests that this could have resulted in differing adaptations both before and after this wetter period. Sites during this period shift from being found along the lake edge to being strung out along stream beds or washes.

C.3.5.1.4.1.4 Gypsum Complex (2000 BC – AD 500)

An increase in the number of archaeological components and a wider diversity in the assemblage and site setting are characteristic of the Gypsum Complex. In some areas large village sites appeared, although there were also various smaller special-use sites (rock rings, lithic scatters, and milling stations) (Warren and Crabtree 1986, pp. 187–189). A distinctive projectile point type known as the Humboldt Basal notch has been attributed to this period (Garfinkel and Yohe 2004).

C.3.5.1.4.1.5 Rose Spring Complex (AD 500–1000) [or AD 200 – 1100, see above].

A major population increase is indicated during the Rose Spring period with more changes in artifact assemblages and the introduction of the distinctive, smaller Rose Spring projectile point that is believed to indicate a shift to the use of bow and arrow (Sutton 1988; Sutton 1996; Sutton et al. 2007, pp. 241-242). Exploitation of small-to-medium-size game is indicated during this period, including large numbers of lagomorphs (hares and rabbits) and rodents. Milling of plant foods was also very important during this period with some sites featuring bedrock milling stations, including mortars and slicks (Sutton 1988).

C.3.5.1.4.1.6 Late Prehistoric Complex (AD 1000 to European contact)

Ethnic and linguistic complexity apparently increased in this period, with major population displacements, particularly the movement of Numic peoples (Shoshonean and Paiute) into the Great Basin in large numbers, before the arrival of Europeans (with the passage through the area of Fr. Francisco Garcés and his expedition) around 1776. New projectile points including Desert Side-notch and Cottonwood triangular points are characteristic of this period. Another important arrival is brownware pottery, although it was not found so much in the northern Mojave Desert. Tradewares, particularly Lower Colorado buffwares, unshaped hand stones and milling stones, incised stones, mortars, pestles, and shell beads coming from the coast were typical of this period (Warren and Crabtree 1986, pp. 191–192).

C.3.5.1.5 Ethnographic Background

The project area is located within the extensive traditional territory claimed by the California Native American group known as Kawaiisu. This name is actually one applied to them by their Yokuts neighbors. Like most California tribes, the Kawaiisu preferred to simply called themselves "people", which in their language would have been *niwiwi* (Zigmond 1986, p. 410). In common parlance, however, the tribe is usually called

Kawaiisu. The Kawaiisu occupied the area extending from the southern Sierra Nevada mountains out to the south and east into the Mojave Desert (Zigmond 1986, p. 399), including the Indian Wells Valley.

Ethnographic information indicates that the Kawaiisu traveled as far east as the Panamint Mountains, and Steward (1937, 1938) assigns the southern portion of Panamint Valley to this group (Cleland 2003; Earle 2005, pp. 5-6). The desert to the east of their core area was used mainly for seasonal trips to exploit desert resources such as salt (at Saltdale), and to an obsidian source near Randsburg (Pilot Knob) (Cleland 2003).

Neighboring groups were the Tubatulabals and Paiutes to the north, the Southern Yokuts to the west, and the Kitanemuk and Serrano groups to the south. In the period following European contact, the Kawaiisu claimed a major portion of the Mojave Desert as their territory, including the Fremont Valley (Sutton 1991).

The Kawaiisu language belongs to the Southern Numic branch of the Northern Uto-Aztecan family. Seasonally mobile, with a subsistence system based on hunting and gathering, the Kawaiisu relied on acorns and pine nuts (*Pinus sabiniana* and *P. monophylla*), supplemented with large and small game, rodents, birds, and insects (Zigmond 1986, pp. 399-400). Acorns were also used as a commodity in exchange for obsidian and salt.

Family groups formed the basis of the Kawaiisu social organization, with little tribal identity, and with a leader or leaders being recognized through tacit acceptance by the community (Zigmond 1986, p. 405). Families cooperated in the procurement of subsistence resources, including acorns, tubers, and roots. Material culture included the bow and arrow, made of available local woods, lithic tools, elaborate baskets, buckskin clothing, beading worn through pierced ears, and tubular nose plugs (Zigmond 1986, pp. 400-403). Game included antelope, big horn sheep and chuckwallas (Cleland 2003). Pottery, however, is rarely found and may have been obtained in only limited amounts through trade with neighboring Great Basin groups rather than through manufacture (Zigmond 1986, p. 401).

C.3.5.1.5.1 Common Linguistic Group

The Kawaiisu are linguistically part of the Southern Numic language group which is related to the Southern Paiutes and Shoshone. The name was not one that the people use for themselves. Rather, they called themselves “people” or *niwiwi* in their language. Kawaiisu is believed to have been a name used by neighboring people for them.

C.3.5.1.5.2 Traditional Territory of Group

As identified by Zigmond (1986, p. 399) the territory associated with the Kawaiisu extends from the area of Tehachapi on the west up to the Panamint Valley and Amargosa River on the north and down to the Mojave River on the south. These boundaries were probably fluid over time and should allow for periodic shifts and overlaps with their neighbors. It appears the Kawaiisu people were a friendly, peaceful people who shared resources with their neighbors (Zigmond 1986, p. 399). Desert

environments like the project area, were probably more used to collect seasonal food products, but not as major base sites which would have been in the vicinity of perennial water sources.

The adjacent El Paso Mountains have been registered with the Native American Heritage Commission as a Traditional Cultural Property (Faull et al. n.d.) of importance to the current day Native Americans. Its boundary comes to within a half mile of the project APE (Singleton 2009). This area appears to be important to not only the Kawaiisu, but also the Panamint (Southern Paiute) and Tubatulabal peoples as a place to visit for spiritual renewal and inspiration. Ron Wermuth confirmed his own continued use of the El Paso Mountains area for religious activities (CEC 2010x).

C.3.5.1.6 Historical Background

C.3.5.1.6.1 Spanish Period (1769 to 1821)

Starting in 1769 at what would become San Diego, Spain sought to reinforce its claims to California, as a territory of New Spain, by establishing a series of missions to pacify and Christianize the Indians, with the object of making them stable citizens of the Spanish Empire. The closest missions to the project area had been established on the lower Colorado River, near present-day Yuma, by Fr. Francisco Garcés. Local Indians attacked the Colorado River missions in 1781 destroying the missions and killing Fr. Garcés. Before that dire event, however, in 1771, Fr. Garcés, intent on locating groups of Indians to proselytize, led an expedition that explored the Colorado Desert of Southern California. He followed up in 1776 with another expedition that passed through the Mojave Desert (Coues 1900; Galvin 1967).

C.3.5.1.6.2. Mexican Period (1821 to 1848)
Mexico wrested her independence from Spain in 1821, following a ten-year revolution. and Alta California became one of the provinces of, first, the new Empire of Mexico, under Emperor Agustin Iturbide, and then, in 1823, the Republic of Mexico.

During the Mexican period, companies of fur trappers (Jedediah Smith, Ewing Young, Joseph Walker) passed over the desert on the way to the Central Valley of California. Walker Pass in the Southern Sierra Nevada bears testament to a passage made by Joseph Walker's company about 1834, that would have passed through part of the Indian Wells Valley. Walker subsequently led a party of immigrants westward through the pass in 1843, and again in 1845 (AAUW 2002, pp. 6–7).

After the government secularized the missions, starting in 1834 under California Governor José Figueroa, citizens of the province, particularly retired soldiers, began petitioning the government for land grants, usually coming from the former mission lands. At first, there was some attempt by the government to arrange for the lands to be turned over to the former mission Indians, albeit with a Mexican mayordomo in charge. In 1839–1840, English merchant William E.P. Hartnell was deputized as the Visitador General to the California missions and attempted to investigate the concerns of the Indians over mismanagement of their lands by the mayordomos. In 1840, however, Governor Alvarado decided, against the advice of the Visitador General, to grant large quantities of the mission lands to the petitioners, including members of prominent families who had financed various government initiatives and generally supported

Alvarado (Gurcke and Farris 2004, p. 13). Due to the distance from the coast and the generally undesirable nature of the lands in the Mojave Desert for purposes of agriculture or pasturage, no land grants were requested in the project area.

C.3.5.1.6.3 American Period (1848 to the present)

Prior to the conclusion of the Mexican War, the United States military effectively took control of California in 1846. However, the transfer of the territory did not become official until 1848 with the signing of the Treaty of Guadalupe Hidalgo. During the sporadic battles with the Californians in 1846 and early 1847, American troops came to California by sea, but also overland by the southern route. From the Utah territory came a battalion of Mormons who set up bases in San Bernardino County and San Diego. The Gold Rush of 1849 brought other travelers passing through or near the project area, and parties of gold seekers taking the southern route to California undoubtedly passed through Indian Wells Valley seeking an easier crossing of the Sierra Nevada (AAUW 2002, pp. 7–8).

C.3.5.1.6.3.1 Mining in the RSPP Area

On July 8 and 9, 1855, as part of the General Land Office (GLO) survey of California, land surveyor Joseph A. Tivy surveyed T27S, R39E (the township in which the bulk of the land in the RSPP is located). Tivy placed various survey markers, usually charred wood posts with a mound, trench, and pits at section corners and/or quarter section points (GLO notes 1855). His survey noted various dry stream beds crossing the land (sections 26 to 25 and 35 to 34), as well as commenting on the quality of the land being generally either second- or third-rate undulating prairie. Due to the extreme aridity of the Mojave Desert, Tivy judged the area was not suitable for agriculture (GLO notes 1855). Tivy also compiled the first map of the area (GLO survey notes, 1855; GLO map 1856).

Following the initial focus of the Gold Rush of 1849 in the mid-Sierra Nevada foothills, however, the general search for precious metals brought gold and silver seekers into the vicinity of the project area. Miners in the 1850s and 1860s came down into the Mojave Desert, especially the hilly terrain such as the El Paso Mountains. The discovery of gold there as early as 1853 by a man named Herman Johnson resulted in the arrival of a number of miners, although it was another 40 years before mining towns were established, among which were Randsburg, Johannesburg, and Garlock in the 1890s (Starry 1974, p. 2). Mining districts in the area included the Goler, Randsburg, and Rademacher Districts.

Attempts to establish mines in the area of Indian Wells Valley were undertaken in 1860 by Dr. Darwin French, and the next year Coso Village was established on China Lake. With the increasing numbers of whites in the area, altercations with the local Indians increased. Eventually a fort was established near Independence in 1862 (Beck and Haase 1974, p. 54). In the 1870s, following the completion of the Transcontinental Railroad, a number of other miners, including Chinese workers, came to the area.

The presence of gold inevitably drew bandits including the famous Tiburcio Vasquez who roamed all over California. On February 25, 1874, Vasquez and his gang robbed

Raymond's Station in Indian Wells Valley, making off with $1,300 as well as money from a number of stagecoach passengers who had stopped at the station (Powers 2002, pp. 86–87; Jones 1996, pp. 134–137).

Although gold and silver were the primary elements mined in the western Mojave Desert, particularly in the El Paso Mountains, other commercial mining took place as well. Various companies were established to mine borates, which were processed to make the important cleansing material, borax. A major borate mining operation located on the edge of Searles Lake, where the San Bernardino Mining Company was established in 1873 by John Searles in the town of Trona (AAUW 2002, p. 33).

Although the land on which the proposed project is situated was mapped by a GLO surveyor in the summer of 1855, it has remained in public ownership until the present time. It was not until at least the 1890s that the section of land immediately east of the proposed project site (section 36) passed into private hands. The owners, as shown on an 1898 map of Kern County, were "Henry and Carlton." The latter individual may have been George E. Carlton, who is shown in the 1910 Federal Census as living in Township 1 of Kern County. His birthplace and birth date are given as Maine, in 1868. In 1904, a mining map of Kern County issued by the California State Mineralogist, Lewis E. Aubury, showed three mines located in section 35, T27S, R39E (Fig. C.3-1). At least two of these mines were noted as being owned by F. A. Huntington, of 21 Fremont Street, San Francisco (Aubury 1904, pp.11–12). It is interesting to note that Huntington was also born in Maine, but 32 years earlier than Carlton, in 1836. At this point, there is no known connection between the two men.

In the eastern half of section 25, T27S, R39E, is an area with several rock shelters (sites CA-KER-249 and CA-KER-1596). The 1973 Ridgecrest South USGS map also indicates several mining "prospects" in this area. These sites are outside the project impact area, but within the overall ROW.

Another mine (or prospect, as it is sometimes called) was located on the east side of South China Lake Boulevard, within the Architectural APE (AAPE for the Water line). It was called the White Star mine and was worked by a man named Gus Erdman beginning in 1903 who eventually took between $5000 and $25,000 worth of gold out of the mine. Erdman continued working the mine until 1941 when the federal government enacted a mining moratorium (Powers 2002, pp. 116-117). This mine was listed as the White Star prospect and identified as being at the east corners of sections 18 and 19, T27S, R40E. It was said to have had a 60 foot inclined shaft (Troxel and Morton 1962, p. 194). Two unnamed "prospects" are shown in the vicinity on the 1973 USGS Ridgecrest South 7.5' quad. The one slightly NE of hilltop 2831 appears to be the most likely candidate for this mine, being only about 250 feet from the section corner recorded by Troxel and Morton.

C.3.5.1.6.3.2 Railroads

With the construction of the Los Angeles Aqueduct, starting in 1907, the California and Nevada Railroad line was built to bring up the heavy equipment and materials needed for the water project. A few years later, the line was acquired by Southern Pacific Railroad and was called the Owenyo Branch or the Mojave-Owenyo Branch, and

sometimes the Jawbone Branch (Mikesell and Riggs 1992, p. 6). It passed through the western edge of the proposed RSPP site and included features 234 (ballast deck culvert), Q-1 (gravel road bed with wooden bridge and concrete culvert) and Q-2 (loading dock/platform) of linear site CA-Ker-3366H within the project area. The latter feature is a still-extant loading dock-platform (Mikesell and Riggs 1992, p. 45). Although termed "the Terese siding" in the AFC (SM 2009a, vol. 2, Append. G, p. 40) based on the Searles Lake (1915) 60 minute USGS quad and the Inyokern (1943) 15 minute USGS map, this appears to be in error. The particular feature was actually called the Code Siding (Locus Q) in the study by Mikesell and Riggs (1992, p. 45). The Terese Siding on this line was located approximately a mile to the NW of the proposed project site in sections 16/21 (Hall 1992, p. 45).

C.3.5.1.6.3.3 Homesteading and the Military

The availability of this rail line facilitated more people moving into the area. Although a few farmers came, the inadequate water supply limited the number that could make a go of farming in the Indian Wells Valley. There was a dairy in the area that later became Ridgecrest. A small town developed there originally called Crumville (Powers 2002, pp. 116-119). More intensive settlement in the area occurred in the 1950s and 1960s and is mostly found to the north and northeast of the proposed project site, in sections 6, 7, 18 and 19 of T27S, R40E (SM 2009a vol. 2, app. G, p. 22). During WW II (1943), the Naval Air Weapons Station at China Lake was created, and it has become a major employer for the area, spurring the development and growth of the town of Ridgecrest.

Another feature identified in the APE is the historic (but now reused as a local road) road alignment of Highway 395 (CA-KER-6837H) which has subsequently been bypassed in favor of a new alignment of the highway that places it to the north of the project APE.

C3.5.1.7 Cultural Resources Inventory

A project-specific cultural resources inventory is a necessary step in staff's effort to determine whether the proposed project may cause significant impacts to historically significant cultural resources and would therefore have an adverse effect on the environment.

The development of a cultural resources inventory entails working through a sequence of investigatory phases. Generally the research process proceeds from the known to the unknown. These phases typically involve doing background research to identify known cultural resources, conducting fieldwork to collect requisite primary data on not-yet-identified cultural resources within and near the proposed project, assessing the results of any geoarchaeological studies or environmental assessments completed for the proposed project site, and compiling recommendations or determinations of historical significance for any cultural resources that are identified.

This subsection describes the research methods used by the applicant and Energy Commission staff for each phase and provides the results of the research, including literature and records searches (California Historical Resources Information System (CHRIS) and local records), archival research, Native American consultation, and field investigations.

This subsection also provides a brief description of each cultural resource identified by the applicant. For this project, staff has used the analytic process (defined above under "Methodology and Thresholds for Determining Environmental Consequences"), so the inventory consists of the body of resources the applicant identified in the AFC, and the descriptions are limited to what the applicant provided, either with the AFC or in response to staff's data requests (SM 2010a).

Staff's assessments of the project's impacts on known cultural resources, potential impacts on previously unidentified, buried archaeological resources, and proposed mitigation measures for the project's impacts are presented in subsection C.3.5.2 below.

C.3.5.1.7.1 Prehistoric Site Types

Consideration of possible site types prior to field investigations was important, first, because it informed surveyors of the types of cultural resources that were likely to be encountered, and second, because the potential value of identified resources would depend on their relevance to the investigation of regional research issues. The applicant's identified pre-survey site types expected in the Mojave Desert and the RSPP follow (SM 2009a, vol. 2, Append. G, p. 34).

C.3.5.1.7.1.1 Trails

Trails are generally tamped into stable surfaces, sometimes with larger gravel and pebbles pushed to the sides to form slight berms along the edges of the trail. In the desert, trails are typically found on shoulders and along tops of ridge systems, relatively stable alluvial fans, and other upland areas, often disappearing into a wash. Prehistoric trails can follow washes for considerable distances. Along these trails can be found associated features, particularly cairns (human-made rock piles). These cairns were used for marking the way, or sometimes as shrines to which passersby would sometimes add their own contribution (SM 2009a, vol. 1, Append. G, p. 34; Rogers 1966, pp. 47-51). Although prehistoric trails have not been noted in the site area, it is clear that ancient peoples did periodically have to cross the APE in the past, but perhaps not enough to result in clear paths evident today.

C.3.5.1.7.1.2 Lithic Scatters and Flaking Stations

The debitage (stone flakes resulting from tool making) in lithic scatters is typically a result of core (nodule of rock from which flakes are taken) reduction activities. Debitage size is usually associated with the size of the parent material and is variable. This resource category can range from single flaking stations to large scatters that often contain numerous flaking stations with a diffuse, light scatter of debitage. The flaking stations often include cores, but rarely finished tools. The tools that are found are usually blanks created early in the manufacturing process, or expedient tools (Moratto 1984, pp. 85-88, 92-96).

In a lithic study in nearby McCoy Wash, Spencer et al (2001) attempted to look at reduction techniques and core size to provide a means of relative dating. Although lithic scatters are generally interpreted by archaeologists as places where toolstone

acquisition and tool manufacture occurred, Native Americans have pointed out that certain ritual activities also result in the production of scatters of flaked stone materials (e.g. Cachora 1994).

C.3.5.1.7.1.3 Rock Rings

Prehistoric rock rings are commonly found throughout the Great Basin and adjacent areas. Rock rings are found as isolate features or in clusters and are situated in areas of desert pavement or other stable surfaces. Rings larger than 1 m in diameter are generally regarded as habitation places, with the rocks possibly used to support brush "walls" (Pigniolo et al. 1997; von Werlhof 1977). Smaller rock rings may indicate hearths or may have a ceremonial function (Cleland 2005; Pigniolo et al. 1997). Although generally circular in shape, these features also occur as ovoids or rectangles (Rogers 1966, p. 44) and are composed of one (usually) or more courses of rocks ranging from cobble-sized to small boulders (Rogers 1966, pp. 45-47).

C.3.5.1.7.1.4 Cairns

Within the Mojave Desert, prehistoric cairns are typically situated on stable surfaces. The cairns, which may be partially collapsed, are generally composed of multiple courses of rocks consisting of pebbles to small boulders. Prehistoric cairns are frequently found associated with trails or other features (Rogers 1966, p. 53).

C.3.5.1.7.1.5 Habitation Sites

Habitation sites typically show evidence of a variety of kinds of occupation debris, including multiple artifact classes, subsistence wastes, fire-affected rock, and/or domestic architecture. Habitation sites can include living areas (see also rock rings above), cooking hearths, subsistence remains (fish or mammal bone), middens, artifact scatters, and often discrete activity areas, such as lithic reduction, milling, or other subsistence-related locales (McGuire et al. 1982, p. 77-78).

C.3.5.1.7.1.6 Petroglyphs

Petroglyphs are formed by removing the desert varnish or weathered surface from boulders or bedrock outcrops by various means. They are considered ceremonial in nature. Petroglyphs in the Mojave Desert include anthropomorphic, zoomorphic, abstract, and geometric forms. Although found singly, petroglyphs usually occur clustered on rock faces, forming "panels" (Garfinkel 2007, p. 95-102).

C.3.5.1.7.1.7 Ground Figures—Geoglyphs and Rock Alignments

The applicant recognized two types of ground figures: geoglyphs and rock alignments. Geoglyphs, sometimes referred to as intaglios, are typically figures incised or scraped into the desert pavement (Harner 1953; Johnson 1984; Rogers 1945). In this kind of geoglyph, the rocks and gravel forming the desert pavement are removed, exposing the lighter-colored soil to form a shape. The removed gravel is often pushed to the edge to form a low gravel berm around the geoglyph. Depending on the construction method and the degree of erosion, these berms can range from well-defined to ill-defined or nonexistent (von Werlhof 1987). Geoglyphs may alternatively be tamped into the desert pavement rather than incised. For example, in tamped rings the pavement surface is compressed but not actually removed; these are thought to have been used in ritual

circle dances (Johnson 1985; Solari and Johnson 1982; von Werlhof 2004). Ground figures can also be formed by an additive process wherein cobbles and/or small boulders are placed on the ground surface in various types of alignments (Johnson 1985; von Werlhof 1987). Such types are referred to herein as “rock alignments.”

C.3.5.1.7.2 Area of Potential Effects (APE) and Project Area of Analysis

The concept and general definition of the APE (and the approximately equivalent CEQA project area of analysis) are discussed above under “Methodology and Thresholds for Determining Environmental Consequences.” For this project, staff has defined APEs for the following cultural resources types:

For archaeological resources, staff has defined the APE as the project site footprint, the 100-foot-wide project linear facilities route corridors, and the maximum depth that would be reached by all foundation excavations and by all pipeline installation trenches.

For ethnographic resources, staff has defined the project’s APE as the project site footprint as well as the area within a mile of this footprint. In this case, the APE will take in the El Paso Mountains Sacred Lands area (for visual impacts) and the Last Chance Canyon Archaeological District that overlaps the project area.

For this project, the APE for built-environment resources comprises those structures located within .5 miles of the ROW boundaries for the project. In this particular case, these structures are found in the area flanking the water pipeline following South China Lake Boulevard where such structures are found.

C.3.5.1.7.3 Background Inventory Research

Various repositories in California hold compilations of information on the locations and descriptions of cultural resources older than 45 years that have been identified and recorded in past cultural resources surveys. Applicants acquire information specific to the vicinity of their project from certain repositories and provide it to staff as part of the AFC submitted to the Energy Commission. Additionally, to acquire further information on potential cultural resources in the vicinity of a proposed project, the applicant is required to make inquiries of knowledgeable individuals in local agencies and organizations and to consult Native Americans who have expressed an interest in being informed about development projects in areas to which they have traditional ties.

C.3.5.1.7.3.1 CHRIS Records Search

C.3.5.1.7.3.1.1 Methods

The California Historical Resources Information System, or CHRIS, is a federation of 11 independent cultural resources data repositories overseen by the California Office of Historic Preservation. These centers are located around the state, and each holds information about the cultural resources of several surrounding counties. Qualified cultural resources specialists obtain data on known resources from these centers and in turn submit new data from their ongoing research to the centers.

On February 13, 2009, the applicant requested from the appropriate CHRIS center, the Southern San Joaquin Valley Information Center (SSJVIC) in Bakersfield, a records

search for any sites and studies within a 1.0-mile area around the original RSPP ROW and within 0.5 mile of the water line route. The applicant received the records search results on April 20, 2009 (SM 2009b, Appendix G, p. 25).

IA supplemental records search was conducted by AECOM on January 15, 2010 to cover additional areas of the one-mile radius around the interconnection route of a transmission line interconnection to the Inyokern substation to determine if any previous surveys had been conducted within the limits of or near the interconnection route. The results of two record searches were used in this analysis. .

Additionally, resources recorded as part of the Class III Survey report for the RSPP are included in this analysis (Jordan 2009).

C.3.5.1.7.3.1.2 Results

The results of this search indicated 32 previous cultural resources investigations within the records search area (Table 2). Of these 32 previous surveys, eleven (Young 1978, Lawson and Lawson 1986, Norwood 1990, Love and Tang 1997, Berg 1993, Laylander 1995c, Taylor 1989, Hall 1992, Burke 1988, Wickstrom and Donahue 2003, Darcangelo et al 2004, and Wickstrom and Brangham 2006) took place within portions of the RSPP APE. Berg (1993) consists of a linear study for a proposed gas line corridor; no resources were identified in the RSPP APE. The report, Laylander 1995c, consists of a negative archaeological survey report on the linear survey for the proposed rehabilitation of Highway 395; one isolate obsidian flake (P-15-10822) was recorded within the northeastern portion of the RSPP APE (SM 2009a, Append. G, p. 28; Wickstrom and Brangham 2006, p.18). A report by Taylor (1989) consists of a Class III inventory conducted by Southern California Edison for the proposed conductoring of the now-existing Inyokern-Kramer 115-kV and 220-kV transmission line running through the far southwestern corner of the RSPP APE. This study identified one lithic scatter (six flakes) within the APE, recorded as isolate feature IF-KER-435 (p.11). Hall 1992 and Burke 1988 consist of an original survey and a resurvey of sections of the Lone Pine Branch of the Mojave-Owenyo rail alignment, a portion of which runs through the western edge of the RSPP APE. Wickstrom and Donahue 2003 and Wickstrom and Brangham 2006 consist of the archaeological survey report and a historic properties survey report related to the expansion of Highway 395; no sites were recorded within the RSPP APE as part of these two studies (SM 2009a, vol. 2, Append. G, p. 25-26).

Cultural Resources Table 2
Summary of Previous Surveys within Records Search Limits
(SM 2009a, vol. 2, Append. G, pp. 26-27)

Report Number KE-	Date	Author	Title
02736	1999	Abeyta, Daniel	Demolition of 18 Miles of Abandoned Railroad track, Naval Air Weapons Station, China Lake, Kern County
00289	1993	Berg, John E.	A Technical Report of a Cultural Resources Survey and Inventory for the Mojave Pipeline/Coso Lateral.
00306	1987	Brock, James, and John F. Elliott	A Cultural Resources Assessment of the Indian Wells Valley Water District Southwest Well Field and Transmission System
02553	1998	Burke, Thomas D.	Re-Examination of Previously Documented Cultural Resources on the Union Pacific Railroad Lone Pine Branch, M.P. 4300.00 Series to M.P. 519.34 Near Lone Pine, on Public Lands Administered by the Bureau of Land Management, Ridgecrest Field Office.
00309	1990	Burton, Jeffrey F.	An Archaeological Survey of the Contel Bishop to Inyokern Fiber Optics Line, Inyo and Kern Counties, California
02900	2004	Darcangelo, Michael, William R. Hildebrandt and Jerome King	Archeological Survey of the southern and Western Portions of the Security Perimeter Fence Line, Naval Air Weapons Station, China Lake
00424	1983	Garfinkle, Alan P.	Archaeological Survey Report for a Proposed Sale of an Excess Parcel on 09-KER-395, Kern County, California
02188	1992	Hall, M.C.	Cultural Resources Survey of a Portion of the Former Southern Pacific Mojave-Owenyo Branch Railroad, Inyo and Kern Counties, California
00532	1978	Jelinek, James and Daniel L. Young	Historical Properties Survey Report
00538	1992	Jensen, Peter	Archaeological Inventory Survey Buffer Zone Study Area at the Ridgecrest Solid Waste Landfill, Indian Wells Valley, Eastern Kern County, California
00541	1992	Jensen, Peter	Archaeological Inventory Survey Buffer Zone Study Area at the Ridgecrest Solid Waste Landfill, Indian Wells Valley, Eastern Kern County, California
00567	1986	Lawson, Jan B., and Clifton E. Lawson	Report of Archaeological Survey for James H. Pappe
00568	1987	Lawson, Jan B. and Clifton E. Lawson	Report of Archaeological survey for Ethel M. Burge
00040	1995	Laylander, Don	Archaeological Survey Report for the West Bowman Road Excess Parcels near Inyokern, Kern County, California
00047	1995	Laylander, Don	Negative Archaeological Survey Report

Report Number KE-	Date	Author	Title
00572	1995	Laylander, Don	Negative Archaeological Survey Report, U.S. 395, P.M. 15.0/29.3
00576	1985	Lerch, Michael K.	Archaeological Survey Report for a Proposed Sale of an Excess Parcel on 09-KER-395, Kern County, California
02054	1997	Love, Bruce, and Bai Tom Tang	Water Systems General Plan Indian Wells Valley Water District, Kern and San Bernardino Counties, California
02403	2000	LSA Associates, Inc.	Cultural Resource Assessment for Pacific Bell Mobile Services Facility LA-973-04, in the County of Kern, California.
00634	1985	Macko, Michael E., and Jill Wiesbrod	Sylmar Expansion Project Cultural Resources Inventory and Significance Evaluation, Final Report, Volume 1.
00795	1979	No Author	Environmental Impact Statement for Archaeological Values Prepared for Various Projected Facilities of the IWVCWD.
00733	1990	Norwood, Richard H.	Cultural Resources survey for Tentative Parcel Map No. 9457, 20 Acres in Inyokern, Kern County, California
01868	1989	Oxendine, Joan	Cultural Resources Report for the Contel Fiber Optic Cable Ridgecrest Resource Area.
01094	1989	Pruett, Catherine L.	Environmental Impact Evaluation: Archaeological Evaluation for 80 Acres South of Inyokern, Kern County.
00948	1990	Pruett, Catherine L.	Archaeological evaluation for a Road Right-of-Way across BLM and South of Inyokern, Kern County.
01543	1989	Smith, Barbara	Report of Archaeological Survey for Ed Lecky
03574	2006	Switalski, Hubert	Archaeological Investigations for Southern California Edison's Proposed Overhead Line Removal and the Installation of an Underground Conduit, Inyokern, Kern County, California
02016	1989	Taylor, Thomas T.	Archaeological Survey Report Inyokern-Kramer 220 kV Transmission Line Conductoring Project Tower Sites, Pulling Areas, Sleeve Areas, and Wire Setups, Kern and San Bernardino Counties, California.
03497	2006	Wickstrom, Brian and Lance H. Brangham	Historic Properties Survey Report for the Inyokern Four Lane Project, Kern County, California
02862	2003	Wickstrom, Brian and Mike Donahue	Archaeological Survey Report for the Inyokern Four Lane Project, Kern County, California
01762	1977	Young, Daniel L.	Archaeological Survey Report for a Shoulder Paving and Resurfacing Project North of Johannesburg on 9-Ker-395-0.0/14.5 E.A. 069001.
01828	1978	Young, Daniel	Archaeological Survey Report for Highway Improvement Projects between China Lake Boulevard (Ridgecrest) and Highway 395.

The records search at the SSJVIC identified 16 resources within the records search area. Three of these previously documented cultural resources are located within the RSPP APE. These consist of an isolate obsidian flake (P-15-10822) a segment of the Southern Pacific Railroad (SP) alignment (P-15-3366), and the Last Chance Canyon Archaeological District (P-15-008676). Known cultural resources located within 1.0 mile of the RSPP APE include lithic and groundstone scatters, milling features, rock shelters and rock alignments, historic debris, and a portion of Old Highway 395 (SM 2009a, vol. 2, Append. G, p. 27-29.

The eastern boundary of the NRHP-listed Last Chance Canyon Archaeological District was arbitrarily set at the eastern edge of the Inyokern 15' USGS topographic quadrangle at 117° 45'. This means that it crosses over into the RSPP ROW by anywhere from 0.4 mile (in T27S, R39E, section 35) to 1.4 miles (in the upper half of section 27). Although data available to BLM and the applicant at the time of application indicated that all the sites in this District were well to the south and west of the RSPP APE, on a reconnaissance tour, local Native Americans pointed out to CEC and BLM archaeologists the location of at least two unrecorded village sites about one mile from the RSPP APE (Storm 2010, p. 1).

C.3.5.1.7.3.2 Archival and Library Research

Detailed, resource-specific information needed by staff may entail primary and secondary research in various archives and libraries, holding such sources as historic aerial photography, historic maps, city directories, and assessors' records. The applicant may include archival information as part of the information provided to staff in the AFC or may undertake such research to respond to staff's data requests. Staff may also undertake such research to supplement information provided by the applicant.

C.3.5.1.7.3.2.1 Methods

Staff consulted various archival resources for the RSPP APE in order to learn more about the regional and local history of the area. This included research on historical land use and occupation of the APE, utilizing historical texts and maps. Historic maps on file at the University of Alabama were referenced on-line. In addition, staff examined maps and documents at the University of California, Davis, (UCD) in the Map Room and in Special Collections, which oversees the Harrison Collection of Western Americana.

The Applicant and Staff also visited the Bureau of Land Management, Ridgecrest Field Office. The BLM field staff provided information and records related to historic activities in the area and commented on cultural resources that have been identified in the APE. Archived material included the 1856 GLO plat maps of the APE and mining claim information. Staff visited BLM's State Office in Sacramento and obtained both a copy of the 1856 survey map and copies of the survey notes for this map.

C.3.5.1.7.3.2.2 Results

Historic topographic maps are often useful in identifying the locations of historic roads, structures, and other features, as well as natural features (stream beds, etc.) that may be of importance. **Cultural Resources Table 3** lists the historic maps staff consulted.

Cultural Resources Table 3
Historic Maps Consulted by Applicant and Staff

Map Name/Date	Scale	Notes	Source
U.S. Geological Survey (USGS) Searles Lake 1915	1:250,000	Overview of RSPP APE	University of Alabama
USGS Inyokern1943	1:62,500	Western portion of RSPP APE	University of Alabama
USGS Ridgecrest 1943	1:62,500	Eastern portion of RSPP APE	University of Alabama
General Land Office (GLO) Plat T27S/R39E 1856	1:32,500	Overview of RSPP APE	BLM Sacramento
Map of Kern County 1875	1:190,080	Overview of RSPP APE	UCD Map Library
Map of Kern County 1898	1:126,720	Ownership comments on RSPP APE	UCD Map Library
Mining Map of Kern County 1904	1:300,000	Mines identified in RSPP APE	UCD Map Library
Map of Kern County 1912	1:140,000	Ownership in project vicinity	UCD Map Library
Map of Kern County 1918	1:126,720	Ownership in project vicinity	UCD Map Library

Although none of the historic maps consulted by staff show standing structures in the RSPP APE, the Kern County Mining Map of 1904 does record three mines in section 35 of T27S, R39E. The original GLO survey map of 1856 and the Kern County map of 1875 both show only the dry creek beds traversing the APE. The later maps show the historic alignment of the original highway 395. This is now known as Brown Road and traverses the middle of the APE, while the current Highway 395 passes to the north. Also shown are an unnamed dirt road running northwest-southeast paralleling the Terese Siding (sic, as shown on the 1915 Searles 60' USGS quad, actually the Code Siding) of the SP Mojave-Owenyo Branch line and an unnamed dirt road running southwest-northeast leading out from Freeman Canyon, crossing the Los Angeles Aqueduct, passing the Terese Siding road, and ending in a junction with the present-day Brown Road alignment. These roads, as well as the SP Mojave-Owenyo Branch line, appear on the USGS Searles Lake 1915 quadrangle.

C.3.5.1.7.3.3 Local Agency and Organization Consultation

California counties and cities may recognize particular cultural resources as locally historically important by ordinance, in general plans, or by maintaining specific lists. To facilitate the environmental review of their projects, applicants acquire information on locally recognized cultural resources specific to the vicinity of their project by consulting local planning agencies and local historical and archaeological societies.

C.3.5.1.7.3.3.1 Results of Inquiries to Local Agencies and Organizations

The applicant contacted local museums and historical societies by letter on June 1, 2009, requesting any pertinent information regarding historic or other cultural resources within or near the RSPP APE. The applicant had received no responses by August, 2009. However, at the time of the public meeting held in Ridgecrest on December 15, 2009, two tribal members made public comments and the chair of a neighboring tribe sent in her written comments.

The following organizations were contacted (SM 2009a, p.31):

Clan Diggers Genealogical Society;
Historical Society of the Upper Mojave Desert;
Kern County Museum;
Maturango Museum; and
Kern River Valley Historical Society and Kern Valley Museum.

The applicant visited the Historical Society of the Upper Mojave Desert and the Maturango Museum in Ridgecrest, California, on May 9 and 10, 2009. These two institutions provided supplementary material for the historical narrative of the area, consisting of secondary sources compiling historical information. Staff at the two institutions did not comment on any specific cultural resources within the APE (SM 2009a, Vol. 2, Append. G, p. 30).

On December 15, 2009, staff visited the Maturango Museum. Subsequent to that visit, Curator Alexander K. Rogers sent to staff a lengthy database of all the historic maps related to the area around Ridgecrest held by the museum. Additionally, the curator informed staff that archaeological collections made on the RSPP site could be curated at the museum at a competitive rate, to be determined in consultation between the applicant and the museum.

C.3.5.1.7.3.4 Native American Consultation

The Native American Heritage Commission (NAHC) maintains two databases to assist cultural resources specialists in identifying cultural resources of concern to California Native Americans, referred to by staff as Native American ethnographic resources. The NAHC's Sacred Lands File is a database that has records for places and objects that Native Americans consider sacred or otherwise important, such as cemeteries and gathering places for traditional foods and materials. The NAHC Contacts database has the names and contact information for individuals, representing a group or themselves, who have expressed an interest in being contacted about development projects in specified areas. Both applicants and staff request information from the NAHC on the presence of sacred lands in the vicinity of a proposed project and also request a list of Native Americans to whom inquiries will be made to identify both additional cultural resources and any concerns the Native Americans may have about a proposed project. While the BLM must formally consult, government-to-government, with the federally recognized Indian tribes that have traditional cultural ties to the area in which the project is located, the Energy Commission provides information and sends notices of all public

events regarding the project to all Native American groups and individuals whom the NAHC identifies as having an interest in development in the area, whether federally recognized or not.

On April 13, 2009, the applicant contacted the Native American Heritage Commission (NAHC) requesting information on sacred lands and traditional cultural properties, as well as a list of Native American individuals and organizations that might have knowledge or concerns with cultural resources within the APE. The April 20, 2009 NAHC response stated that Native American cultural resources are located within a 0.5-mile radius of the RSPP APE. The NAHC was not specific as to the nature of the cultural resources, but strongly encouraged the applicant to contact the local Native Americans (Singleton 2009).

C.3.5.1.7.2.4.1 Results of Inquiries Made to Native Americans

Six Native American representatives were identified by the NAHC, representing the following tribes, groups, and organizations (SM 2009a, vol. 2, Append. G, pp. 30-31):

Tule River Indian Tribe;
Tejon Indian Tribe;
Kern Valley Indian Council; and
Tubatulabals.

The applicant sent letters to these individuals informing them of the project and asking for their input and concerns, and, additionally, made follow-up telephone calls to them. To date, the applicant has received one response from Harold Williams, past Chairperson of the Kern Valley Indian Council. However, upon further contact Mr. Williams stated that he was no longer Chairperson and that the applicant should contact Robert Robinson and/or Ron Wermuth (SM 2009a, Vol. 2, Append. G, p. 31).

At Energy Commission-BLM public meetings held in Ridgecrest on December 15, 2009 and again on January 5, 2010, Mr. Robinson and Mr. Wermuth made comments on their concerns about the RSPP, specifically the likelihood of disturbing burials, destruction of archaeological sites, and the proximity of the project to the El Paso Mountains Sacred lands. On December 15, 2009, they took Energy Commission and BLM cultural resources staff on a tour of a portion of the sacred area and pointed out two previously unrecorded village sites within a mile of the western edge of the RSPP APE. In addition to expressions of concern from Mr. Robinson and Mr. Wermuth, the written comments from Dr. Donna Miranda-Begay, Tribal Chairwoman of the Tubatulabals of Kern Valley were provided to the CEC and are entered into the docket. The Tubatulabals are a tribe whose traditional territory adjoins that of the Kawaiisu, who are directly associated with the RSPP site.

Since the proposed site is on federal land, BLM has initiated government-to-government consultation with Native Americans to facilitate the preparation of a Programmatic Agreement.

Efforts to contact Native American groups and the results of those efforts are as follows (Storm 2010):

- June 17, 2009 Letter to Tribes. This letter was an initial briefing on project and requested comments and concerns. The deadline for response was August 7, 2009. Letter mailed to 6 recipients. No formal responses received.

    1) Mr. Harold William, Tribal Chair; Kern Valley Indian Council, PO Box 147, Caliente CA 93518; primary federally unrecognized tribe in eastern Kern County, representing Kawaiisu, Tubatulabals, Paiute, and Yokuts native peoples.

    2) Mr. Bob Robinson, Tribal Historic Preservation Officer, Kern Valley Indian Council, PO Box 401, Weldon CA 93283

    3) Ms. Donna Miranda-Begay, Tribal Chair; Tubatulabals of Kern Valley Tribe; primary federally unrecognized tribe in eastern Kern County representing Tubatulabals of the Miranda and White Blanket tribal allotments, Kern River Valley.

    4) Mr. Ron Wermuth, Council Chair; Monache Intertribal Council, PO Box 168, Kernville CA 93238; oldest Native American community organization in Kern River Valley.

    5) Ms. Arlene Apalatea, Co-Chair, Nuui Cunni Interpretative Center, PO Box 3984, Wofford Heights CA 93285; operated the Nuui Cunni Center under Special Use Permit from Sequoia National Forest for public education on the culture of the Indians of Kern County. Also known as the Kern River Paiute Council, and Raymond Vega.

    6) Ms. Kathy Paradise, Program Lead, Lake Isabella Office, Owens Valley Career Development Center, PO Box 2895, Lake Isabella CA 93240; community social outreach organization in Lake Isabella area.

- October 21, 2009 Letter to Tribes. This letter provided a reminder, contained in a consultation letter regarding three wind energy projects near the City of Mojave, eastern Kern County, that BLM was reviewing this project, and again asked for comments and concerns.The deadline for response was December 18, 2009. Letter mailed to 6 recipients. No formal responses received.

    1) Tribal Chair, Kern Valley Indian Council, PO Box 1010, Lake Isabella CA 93240

    2) Mr. Bob Robinson, Tribal Historic Preservation Officer, Kern Valley Indian Council

    3) Ms. Donna Miranda-Begay, Tribal Chair; Tubatulabals of Kern Valley Tribe

    4) Mr. Ron Wermuth, Council Chair; Monache Intertribal Council

    5) Ms. Arlene Apalatea, Co-Chair, Nuui Cunni Interpretative Center

6) Ms. Kathy Paradise, Lake Isabella Office, Owens Valley Career Development Center

- February 5, 2010 Letter to TribesThis letter provided an update on the status of the siting case and the analysis of cultural resources, on Energy Commission and BLM workshops held from December 2009 through January 2010, on Native American input received to date, on the pending release of the SA/DPA/DEIS for the project, and on the results of the cultural resources survey of summer 2009.The groups were also invited to consult on eligibility evaluations of archeological sites in the project area of analysis and invited to be consulting parties on the PA being prepared by BLM, SHPO, and ACHP. The letter proposes a deadline for response of March 12, 2010. Letters mailed to 5 recipients. No formal responses received to date.

  1) Ms. June Price, Tribal Chair, Kern Valley Indian Council,

  2) Mr. Bob Robinson, Tribal Historic Preservation Officer, Kern Valley Indian Council

  3) Ms. Donna Miranda-Begay, Tribal Chair; Tubatulabals of Kern Valley Tribe

  4) Mr. Ron Wermuth, Council Chair; Monache Intertribal Council

  5) Ms. Arlene Apalatea, Co-Chair, Nuui Cunni Interpretative Center

C.3.5.1.7.3.5 Consultation with Others

Additionally, staff has been in contact with two archaeologists, Dr. Alan Gold and Mr. Mark Faull, who were co-authors of the Sacred Lands File nomination submitted to the Native American Heritage Commission that encompasses the adjacent El Paso Mountains area.

C.3.5.1.7.2.5.1 Results of Consultations with Others

Dr. Gold described a wide variety of cultural sites in the El Paso Mountains including village sites, rock art, rock alignments, rock rings, caves, quarries and other special activity areas. Gold emphasized the supernatural significance of the area to the Kawaiisu and referred to the sacred sites study that he had co-authored regarding the El Paso Mountains (cf. Faull et al. n.d.).

C.3.5.1.7.4 Field Inventory Investigations

To facilitate the environmental review of their projects, applicants conduct surveys to identify previously unrecorded cultural resources in or near their proposed project areas. These surveys include a pedestrian archaeological survey and a built-environment windshield survey. The applicant includes the acquired new survey information as part of the information provided to staff in the AFC and may undertake additional field research, including geoarchaeological studies and site testing, to respond to staff's data requests. Staff may also undertake additional field research to supplement information provided by the applicant.

C.3.5.1.7.1 Survey methodology

A Class III archaeological survey of the project disturbance area and a 200 foot buffer surrounding it (per CEC requirements) was conducted by AECOM/EDAW between May 4 and May 13, 2009. A survey corridor for linear components included the ROW alignment and 50 feet on both sides of the alignment. A historical architecture survey of the built environment with a buffer of 0.5 mile was also completed by EDAW.

The Class III survey was conducted by qualified four- to nine-person survey teams, each led by a qualified crew chief. Survey intervals of no wider than 20 m were used. After the survey teams identified the sites and noted their GPS location, the sites were flagged using flagging tape. An arbitrary distance of 50 m was used to determine whether features and/or artifacts formed separate sites or simply loci of a single site. The surveyors utilized 7.5' USGS topographic maps, aerial photos and hand held sub-meter GPS units loaded with shape files of the APE, to include previously recorded sites.

A separate recording team later came in to record the sites. Photographic documentation, site sketch maps (using sub-meter GPS units), artifact and feature descriptions and environmental context were then recorded on DPR 523 site forms. The site forms included at a minimum Primary forms (DPR 523A) and USGS location maps (DPR 523J). If resources were more complex, additional forms were used as appropriate including the archaeological site record (DPR 523C), linear feature form (DPR 523E) and/or a sketch map (DPR 523K). Sketch maps included a site datum and features, artifact concentrations, and other cultural elements. Isolated finds were noted and their locations mapped using GPS devices and recorded on a single primary (DPR 523A) form. Completed DPR site forms will be sent to the appropriate Information Center to be assigned permanent numbers in the state inventory system. Artifacts were not collected and all flagging tape was removed from the site after it was recorded (SM 2009a, vol. 2, Append. G, p. 33).

An additional Class III pedestrian archaeological survey was conducted by PAR Environmental from February 28 to March 3, 2010 to cover an additional 413.2 acres added to the original project footprint in the new revised project configuration. The area was surveyed by three archaeologists walking abreast at approximate 15 meter intervals. Transect paths zigzagged to increase coverage. Apparent historic prehistoric resources both sites and isolated artifacts were photographed, described and a GPS fix taken on the location. Information was recorded on data sheets for inclusion on DPR standard cultural resource record forms (PAR 2010).

C.3.5.1.7.4.1.1 Results of Pedestrian Archaeological Survey

Inventory of the cultural resources in the project's area of analysis was accomplished by the applicant through its contractor, AECOM/EDAW whose cultural resources team undertook to locate and record cultural sites including archaeological sites and architectural features that exist both in the ROW of the site and to determine from previous surveys within a mile of this area any other cultural resources.

A subsequent survey of additional parcels of land due to the revised configuration of the RSPP APE was carried out by PAR Environmental on behalf of the Energy Commission from February 28 to March 3, 2010. This resulted in the finding of 11 new sites and 30 isolates.

The combined inventory identified 545 cultural resources. Of these, 92 are archaeological sites of which 71 sites (14 prehistoric and 59 historic) are within the area of direct impact in one or more of the four configurations of the RSPP.

All 37 of the architectural features are outside the APE and therefore have not been evaluated. Of the 386 isolated finds identified, 309 were in the APE. The majority of the isolated finds were single metal cans. Fifty nine prehistoric isolates were documented, consisting primarily of stone flakes. (SM 2009a, vol. 2, append. G, p. 41; SM 2009d, Cult. Res., pp. 16-18; EDAW/AECOM 2009, p. 18; SM 2010a [SM 2010a, tn:55004]).

Cultural Resources Table 4
Known Cultural Resources Located in the Vicinity of the RSPP

Resource Type and Designation	Resource Description [type, size, age, data absences]	Previously Known/New	Information Source
Prehistoric Archaeological Resources			
Lithic scatters	Stone flakes, non diagnostic	1/6	SM 2009d
Milling stones and flakes	Metate fragments with some stone flakes, non-diagnostic	1/7	SM 2009d; PAR 2010
Mano cache	Surface cache of manos, non diagnostic	0/1	SM 2009d
Piled rock feature (cairn?)	Possible cairn, but uncertain whether prehistoric or historic	0/2	SM 2009d; PAR 2010
Isolates	Isolated stone artifacts	6/59	SM 2009a, vol. 2, append. G, pp. 27-28, 41)
Rock Ring	Prehistoric rock ring	0/1	PAR 2010
Ethnographic Resources			
Last Chance Canyon Archaeological District	Archaeological district set mainly in El Paso mountains but whose boundaries overlap the project area	1/0	SM 2009a, vol. 2, Append. G, p. 28; Apostolides 1971
Historical Archaeological Resources			
Tin can scatter	Scatters of 20th cent. Tin cans ranging from early to second half of 20th century	0/41	SM 2009d

Resource Type and Designation	Resource Description [type, size, age, data absences]	Previously Known/New	Information Source
Tin can and glass scatter	Scatters of 20th century tin cans mixed with glass fragments	0/4	SM 2009d
Historic Debris Scatter	Wider variety of historic debris, suggesting household trash	0/7	SM 2009d
Claim post/ can scatter	Claim post with attached can and small scatter of other cans, date uncertain.	0/3	SM 2009d
Claim post/rock pile feat.	Claim post with attached can plus rock pile feature (cairn?); date uncertain	0/4	SM 2009d
RR camp dugout	Camp dugout from construction of railroad circa 1908	0/1	SM 2009d
Cistern and well	Shallow cistern and pipes for a well, date unknown	0/1	SM 2009d
	Depressed roadbed alignment with side berms	0/1	SM 2009d
	Historic road alignment	0/3	SM 2009d
	Old Highway 395 alignment	1/0	SM 2009d
Isolates	Isolated historic artifacts	0/327	SM 2009a, vol. 2, append. G, p. 41)
Built-Environment Resources			
Homestead building	Single family dwellings, mostly second half 20th century.	0/37	EDAW 2009, p. v

C.3.5.1.7.4.3 Results of Geoarchaeological Investigations

A geo-archaeological study seeking to determine the makeup of the soils in the project area from July 14 through July 18, 2009 with a view to the likely presence of deeply buried sites was undertaken (Steinkamp 2010). This study was in the form of geo-archaeological monitoring done in conjunction with a geotechnical study that combined drilling 11 bore holes and digging ten 1x2 meter test pits using a backhoe. The locations of the bore holes and test pits were determined by project engineers, not the archaeologists. Only the material excavated from the ten test pits was examined by the geoarchaeologist (Steinkamp 2010, p. 3). While this form of testing gives indications of the likelihood of buried sites, since it was designed with engineering concerns in mind, it

does not represent a formal archaeological testing program wherein predicted areas of sites, or even locations where there are surface indications of sites are used to guide the selection.

Steinkamp recommended that the whole length of the El Paso Wash (Fig. C.3-2) be subjected to archaeological monitoring, in particular in the area between TP-7 and TP-5 and between TP-5 and TP-2, since this area "has a high probability for well-developed paleosols and the possibility of intact archaeological deposits." Steinkamp further stated that "the area between the above-mentioned trash pits has the potential to contain buried archaeological deposits, however the potential for buried archaeological deposits decreases rapidly away from the main drainage. Monitoring of target areas should be conducted from the surface to a depth of 10 feet below ground surface. All other areas of the RSPP [APE] have a relatively low potential for buried archaeological deposits" (Steinkamp 2010, p. 15).

C.3.5.1.7.4.4 Results of Windshield Survey for Built-Environment Resources

No built environment resources were observed in the project area with the possible exception of a standpipe and water cistern used for stock watering (RS-614).

An historic architecture (EDAW 2009) windshield survey along the route of the water line was conducted in May 2009. The investigation was undertaken to identify potential historic architectural resources that may be affected by the construction of a water line (EDAW 2009, p. v). This study identified 37 built resources (see table 5) with the AAPE-WL (EDAW 2009, pp. v-viii), however, none of these resources will be affected by the water line construction.

C.3.5.1.7.5 Summary of Identified Cultural Resources in the APEs

Cultural Resources Table 5 (below) summarizes the identified cultural resources in the RSPP area of analysis that were identified in the course of Applicant's surveys.

Cultural Resources Table 5
Cultural Resources Inventory for the Project Area of Analysis

Cultural Resource Type and Designation (Year of Initial Recordation)	Description	Project Area Location (likely impact by Alternatives)	Preliminary California Register of Historical Resources (CRHR) Eligibility	Siting Case Report Reference
Archaeological Resources				
Prehistoric Archaeological Resources				
RS-19c (2009)	Metate Milling Feature and biface	Disturbance Area (APE)	Treated as eligible	SM 2010a
RS-154 (2009)	Lithic scatter of cryptocrystalline silicate[1] (CCS) flakes	APE in Alt 4; Out of APE (Alt. 1)	Treated as eligible. Appears to meet requirements for CARIDAP	SM 2010a
RS-407 (2009)	Piled Rock Features	CEC buffer (Alt 1); APE (Alt. 4)	Treated as eligible for NRHP, not evaluated for CRHR	SM 2010a
RS-409 (2009)	Metates and obsidian flake	Disturbance Area	Treated as eligible for NRHP, not evaluated for CRHR	SM 2010a
RS-410 (2009)	Lithic Scatter	Disturbance Area	Treated as eligible. Appears to meet requirements for CARIDAP	SM 2010a
RS-604 (2009)	Whole metate and metate fragment	Disturbance Area	Treated as eligible for NRHP,not evaluated for CRHR	SM 2010a
RS-617 (2009)	Mano cache	Disturbance Area	Treated as eligible	SM 2010a
RS-720 (2009)	Groundstone scatter—mano and metate fragments	Disturbance Area	Treated as eligible under NRHP and not evaluated under CRHR	SM 2010a

[1] Cryptocrystalline silicates are rocks such as flint, chert, chalcedony, or jasper that contain a high percentage of silica (SiO^2), the primary compound that composes quartz.

Cultural Resource Type and Designation (Year of Initial Recordation)	Description	Project Area Location (likely impact by Alternatives)	Preliminary California Register of Historical Resources (CRHR) Eligibility	Siting Case Report Reference
RS-850 (2009)	Lithic scatter	Disturbance area	Treated as eligible. Appears to meet requirements for CARIDAP	SM 2010a
RS-870 (2009)	Lithic and groundstone scatter	Disturbance Area (Alt 4. Out of APE Alt 1	Treated as eligible for NRHP and not evaluated for CRHR	SM 2010a
RC-S-6	Basalt boulder metate	Disturbance Area	Treated as eligible for CRHR and not evaluated for NRHP	PAR 2010
RC-S-7	Rock ring	Disturbance Area	Treated as eligible for CRHR and not evaluated for NRHP	PAR 2010
RC-S-8	Basalt metates	Disturbance Area	Treated as eligible for CRHR and not evaluated for NRHP	PAR 2010
Historical Archaeological Resources				
RS-1 (2009)	Can scatter—Post-1935	APE	Not significant for NRHP or CRHP	SM 2010a
RS-1b (2009)	Can scatter—post 1935	APE	Not significant for NRHP or CRHP	SM 2010a
RS-1c (2009)	Can scatter—post 1935	APE	Not significant for NRHP or CRHP	SM 2010a
RS-2 (2009)	Claim post feature and tin can scatter—post 1935	APE	Not significant for NRHP or CRHP	SM 2010a
RS-3 (2009)	Can scatter—post 1935	APE	Not significant for NRHP or CRHP	SM 2010a

Cultural Resource Type and Designation (Year of Initial Recordation)	Description	Project Area Location (likely impact by Alternatives)	Preliminary California Register of Historical Resources (CRHR) Eligibility	Siting Case Report Reference
RS-5a (2009)	Can scatter—post 1935	APE	Not significant for NRHP or CRHP	SM 2010a
RS-6 (2009)	Rock-lined historic roadbed—mid 20th century(?)	APE	Not significant for NRHP or CRHP	SM 2010a
RS-8 (2009)	Claim post and can scatter—post 1935	APE	Not significant for NRHP or CRHP	SM 2010a
RS-10 (2009)	Claim post/rock pile feature—post 1907	APE	Not significant for NRHP or CRHP	SM 2010a
RS-11 (2009)	Claim post/rockpile feature—early to mid 20th century	APE	Not significant for NRHP or CRHP	SM 2010a
RS-12 (2009)	Claim post/rock pile feature—early to mid-20th century	APE	Not significant for NRHP or CRHP	SM 2010a
RS-13 (2009)	Claim post/rock pile feature—early to mid 20th century	APE	Not significant for NRHP or CRHP	SM 2010a
RS-15 (2009)	Can scatter—post 1935	APE	Not significant for NRHP or CRHP	SM 2010a
RS-18/19 (2009)	Can scatter—post 1935	APE	Not significant for NRHP or CRHR	SM 2010a
RS-21 (2009)	Can scatter with wood—early to mid-20th century	APE	Not significant for NRHP or CRHR	SM 2010a
RS-23 (2009)	Claim post feature—early to mid 20th century	Out of APE (Alt 1); APE (Alt 4)	Not significant for NRHP or CRHR	SM 2010a
RS-32 (2009)	Can scatter-post 1935	APE	Not significant for NRHP or CRHR	SM 2010a
RS-37 (2009)	Can and glass scatter—early to mid-20th century	APE	Not significant for NRHP or CRHR	SM 2010a
RS-38 (2009)	Can scatter—post 1935	APE	Not significant for NRHP or CRHR	SM 2010a
RS-39b (2009)	Can scatter—post 1935	APE (Alt 4); buffer (Alt 1)	Not significant for NRHP or CRHR	SM 2010a

Cultural Resource Type and Designation (Year of Initial Recordation)	Description	Project Area Location (likely impact by Alternatives)	Preliminary California Register of Historical Resources (CRHR) Eligibility	Siting Case Report Reference
RS-40b (2009)	Can scatter—post 1935	APE	Not significant for NRHP or CRHR	SM 2010a
RS-42 (2009)	Can scatter—post 1935	APE (Alt 4); buffer (Alt 1)	Not significant for NRHP or CRHR	SM 2010a
RS-150 (2009)	Railroad camp (dugout tent pad and debris)-early 20th century	APE	Assumed eligible for NRHP or CRHR	SM 2010a
RS-151 (2009)	Historic debris scatter—post 1935	APE	Not significant for NRHP or CRHR	SM 2010a
RS-153 (2009)	Can scatter with glass and wood—early to mid 20th century	Out of APE (Alt 1); APE (Alt 4)	Not significant for NRHP or CRHR	SM 2010a
RS-155 (2009)	Can and glass scatter—early to mid-20th century	APE	Not significant for NRHP or CRHR	SM 2010a
RS-157 (2009)	Can scatter—post 1935	CEC buffers (Alt 1); APE (Alt 4)	Not significant for NRHP or CRHR	SM 2010a
RS-158 (2009)	Can scatter—post 1935	APE	Not significant for NRHP or CRHR	SM 2010a
RS-159 (2009)	Can scatter—early to mid-20th century	APE	Not significant for NRHP or CRHR	SM 2010a
RS-161 (2009)	Can scatter—post 1935	APE	Not significant for NRHP or CRHR	SM 2010a
RS-162/163 (2009)	Can scatter—early 20th century	APE	Assumed significant for NRHP and CRHR*	SM 2010a
RS-166 (2009)	Historic debris scatter (cans, milled wood, amethyst and other glass fragments)—mid 20th century	APE	Not significant for NRHP or CRHR	SM 2010a
RS-167 (2009)	Can scatter—early to mid-20th century	APE	Not significant for NRHP or CRHR	SM 2010a

Cultural Resource Type and Designation (Year of Initial Recordation)	Description	Project Area Location (likely impact by Alternatives)	Preliminary California Register of Historical Resources (CRHR) Eligibility	Siting Case Report Reference
RS-325 (2009)	Can scatter—early to mid-20th century	APE	Not significant for NRHP or CRHR	SM 2010a
RS-603 (2009)	Can scatter—post 1935	APE	Not significant for NRHP or CRHR	SM 2010a
RS-607 (2009)	Can scatter—early to mid-20th century	CEC buffers (Alt 1); APE (Alt 4)	Not significant for NRHP or CRHR	SM 2010a
RS-614 (2009)	Cistern and well—early to mid-20th century	APE	Not significant for NRHP or CRHR *	SM 2010a
RS-616 (2009)	Can scatter—post 1935	APE	Not significant for NRHP or CRHR	SM 2010a
RS-618 (2009)	Can scatter—post 1935	APE	Not significant for NRHP or CRHR	SM 2010a
RS-700 (2009)	Cans and glass fragments—post 1935	APE	Not significant for NRHP or CRHR	SM 2010a
RS-726 (2009)	Can scatter—early to mid-20th century	APE	Not significant for NRHP or CRHR	SM 2010a
RS-728/731 (2009)	Can scatter—early to mid-20th century	APE	Assumed significant for NRHP and CRHR *	SM 2010a
RS-739 (2009)	Can scatter early to mid 20th century	APE	Not significant for NRHP or CRHR	SM 2010a
RS-742 (2009)	Can scatter—early 20th century	APE	Not significant for NRHP or CRHR	SM 2010a
RS-746 (2009)	Can scatter—early 20th century	APE	Not significant for NRHP or CRHR	SM 2010a
RS-750 (2009)	Cans and barrel straps scatter—early to mid 20th century	CEC buffers (Alt 1); APE (Alt 4)	Not significant for NRHP or CRHR	SM 2010a
RS-752 (2009)	Can scatter—early 20th century	APE	Not significant for NRHP or CRHR	SM 2010a

Cultural Resource Type and Designation (Year of Initial Recordation)	Description	Project Area Location (likely impact by Alternatives)	Preliminary California Register of Historical Resources (CRHR) Eligibility	Siting Case Report Reference
RS-773 (2009)	Can scatter—mid 20th century	APE	Not significant for NRHP or CRHR	SM 2010a
RS-781 (2009)	Can scatter—mid 20th century	Out of APE (Alt 1); APE (Alt 4)	Not significant for NRHP or CRHR	SM 2010a
RS-856 (2009)	Can scatter—post 1935	Out of APE (Alt 1); APE (Alt 4)	Not significant for NRHP or CRHR	SM 2010a
RS-866 (2009)	Can scatter—mid 20th century	Out of APE (Alt 1); APE (Alt 4)	Not significant for NRHP or CRHR	SM 2010a
RS-868 (2009)	Historic road alignment—pre-1915	APE	Not significant for NRHP or CRHR	SM 2010a
RS-869 (2009	Historic road alignment—pre-1915	APE	Not significant for NRHP or CRHR	SM 2010a
CA-KER-6837H	Old Highway 395 alignment and associated historic debris—early to mid 20th century	APE	Assumed eligible under NRHP Criterion A and CRHR Criterion 1	SM 2010a
Multiple-Component Archaeological Resources				
Last Chance Canyon/El Paso Mtns/Black Hills/Indian Wells Historical District	Petroglyph sites, open campsites, house-ring complexes, burials	Adjacent to project area on west; boundary overlaps project APE	Listed on the NRHP (1971)	Apostolides 1971
Ethnographic Resources				
El Paso Mountains Sacred Site	Large Traditional Cultural Property (TCP) sacred to local Native Americans located immediately west of southern part of project APE. Boundaries are confidential information held by the Native American Heritage Commission, but stated to be within one half mile of project boundary. This is assumed eligible under NRHP and CRHR.			
Built-Environment Resources	No built environment resources are in the APE.			

C.3.5.1.8 NRHP and CRHR Evaluations of Cultural Resources in the APEs

For this project, staff's standard evaluation process is being abbreviated by the process described above (see "Methodology and Thresholds for Determining Environmental Consequences"). With this approach, staff does not evaluate the historical significance of each individual resource, but rather treats those sites that cannot be evaluated without additional testing and analysis as eligible for the NRHP, the CRHR, or both. The project's impacts to resources treated as eligible would have to be mitigated by means of avoidance or mitigation appropriate to the qualities and values that make the resource significant.

For any resources where staff has sufficient information to determine the resource's eligibility for either register, staff will make that determination. If, on the basis of data staff has in hand, staff can determine that a resource is not eligible for either register, then no avoidance or mitigation would be necessary for project impacts to the resource. If staff can determine, on the basis of data in hand, that a resource is eligible for either register, then avoidance or mitigation would be necessary. Similarly, if staff cannot determine, on the basis of data in hand, whether a resource is register-eligible or not, staff would treat the site as eligible, and impacts to the resource would have to be resolved.

Each resource will be evaluated by Energy Commission staff and BLM staff separately. Energy Commission staff will determine each resource's CRHR eligibility and BLM will determine its NRHP eligibility.

C.3.5.1.8.1 SITE DESCRIPTIONS AND SIGNIFICANCE ASSESSMENTS FOR SITES DEEMED INELIGIBLE TO THE NRHP OR THE CRHR

Site RS-1

RS-1 is a historic debris scatter consisting of five tin cans sparsely scattered over a 49 m (165 ft) east-west by 7 m (23 ft) north-south area. The site is located on a sandy plain of a stable alluvial fan. Vegetation at the site is dominated by creosote and saltbush, with lesser numbers of cholla and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 2 to 8 cm in length. Artifacts at RS-1 include one church-key-opened three piece cylindrical juice can, three churchkey-opened beverage cans and one small hole-in-top evaporated milk can with punched holes. The use of church keys to open beverage cans and punched sanitary cans suggest that these artifacts date to the late 1930s or early 1940s (Rock 1987). The site does not appear to have been impacted. The small number of artifacts suggests that the site represents a single event refuse deposit, though alluvial or aeolian action may have caused redeposition from other areas. Based on the nature of artifacts at RS-1, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under

CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-1b

RSRS-1b is a historic debris scatter consisting of six tin cans sparsely scattered over a 35 m (115 ft) northeast-southwest by 12.5 m (41 ft) northwest-southeast area. The site is located along a low rise on a semi-level sandy plain of a stable alluvial fan. Vegetation at the site is dominated by creosote and saltbush, with lesser numbers of cholla and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 1 to 5 cm in length.

Artifacts at RSRS-1b include four church-key-opened beverage cans, one bayonet-opened coffee can, and one bi-metal pull-tab. All cans have crimped seams. The use of church keys, postdating 1935, to open beverage cans and the presence of the bi-metal pull-tab which originated in the late 1950s, suggests that this site may constitute a single depositional event dating to the first half of the twentieth century or that it is a secondary deposition of cans resulting from alluvial or aeolian processes (Rock 1987). The site does not appear to have been impacted. Based on the nature of artifacts at RS-1b, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-1c

RS-1c is a small historic debris scatter consisting of three tin cans sparsely scattered over an approximately 7 m (22 ft) northeast-southwest by 8 m (27 ft) northwest-southeast area. The site is located on a level sandy plain of a stable alluvial fan. Vegetation at the site consists of creosote, saltbush, and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 2 to 8 cm in length. Artifacts at RS-1c consist of one knife-opened hole-in-top evaporated milk can and two church-key-opened beverage cans. Based on the opening methods observed, these artifacts post-date 1935. The use of church keys to open beverage cans suggest that these artifacts date to the late 1930s or early 1940s (Rock 1987). The site does not appear to have been impacted. The small number of artifacts suggests that the site may represent a single event refuse deposit, though alluvial or aeolian action may have caused redeposition from other areas. Based on the nature of artifacts at RS-1c, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not

eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-2

RS-2 is a small historic debris scatter consisting of five tin cans and one piece of milled wood sparsely scattered over an approximately 15 m (50 ft) east-west by 14 m (45 ft) north-south area. The site is located on a level sandy plain of a stable alluvial fan. Vegetation at the site is consists of creosote, saltbush, and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 1 to 5 cm in length. Artifacts at RS-2 consist of five church-key-opened beverage cans and one piece of milled wood measuring 4" by 4", possibly a fallen claim post though no evidence of a post hole or rock pile base were observed. Based on the methods used to open the beverage cans, these artifacts postdate 1935 (Rock 1987). The site does not appear to have been impacted. The small number of artifacts suggests that the site may represent a single event refuse deposit, though alluvial or aeolian action may have caused redeposition from other areas. Based on the nature of artifacts at RS-2, the site is recommended not eligible for inclusion to the CRHR and NRHP The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-3

RS-3 is a small historic debris scatter consisting of seven tin cans sparsely scattered over an approximately 61.5 m (202 ft) northwest-southeast by 15 m (50 ft) northeast-southwest area. The site is located on a level sandy plain of a stable alluvial fan; exfoliated granitic outcrops are present in the center of the site. Vegetation at the site consists of creosote, saltbush, and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 1 to 5 cm in length. Artifacts at RS-3 consist of six church-key-opened beverage cans and one 64 oz. three-piece cylindrical can. The use of church keys, posting-dating 1935, to open the beverage cans suggest that these artifacts date to the late 1930s or early 1940s (Rock 1987). The site does not appear to have been impacted. The small number of artifacts suggests that the site may represent a single event refuse deposit, though alluvial or Aeolian action may have caused redeposition from other areas.

Based on the nature of artifacts at RS-3, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the

site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-5a

RS-5a is a small historic debris scatter consisting of eight tin cans sparsely scattered over an approximately 30 m (98 ft) east-west by 7.5 m (25 ft) north-south area. The site is located on among granitic outcrops rising above a stable alluvial fan north of an unnamed dirt road. Vegetation at the site consists of creosote, saltbush, beavertail cactus, and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 1 to 5 cm in length. Artifacts at RS-5a consist of six church-key-opened beverage cans, one hole-in-top evaporated milk can opened with punched holes, and one external friction coffee can. The use of church keys to open beverage cans and punched sanitary cans suggest that these artifacts date to the late 1930s or early 1940s (Rock 1987). The site does not appear to have been impacted. The small number of artifacts suggests that the site may represent a single event refuse deposit, though alluvial or Aeolian action may have caused redeposition from other areas.

Based on the nature of artifacts at RS-5a, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-6

Site RS-6 consists of 136 m (446 ft) of an abandoned east-west trending road alignment approximately 3 m (10 ft) in width and lined on either side with small basalt and granite boulders . The resource is located on the slope of a north-south trending rise with exfoliated granitic outcrops north. Vegetation consists of creosote, saltbush, and annual native grasses. Soil at the site is brown-yellow sand with aggregate pebbles ranging from 1 to 5 cm in length. There are no associated artifacts and the alignment does not appear on historic topographic maps, though the 1973 Ridgecrest South 7.5" USGS topographic map shows that the alignment leads toward a cluster of five mining prospects on the ridge. The section of RS-6 retains integrity of location and setting but has lost integrity of condition and only a small segment of what was likely a longer alignment remains. Further, it cannot definitively be associated with any locations or activities in the area.

Given these factors, RS-6 does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B.

The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-8

RS-8 is a small historic debris scatter of tin cans and a mining claim post in a 25 m (83 ft) east-west by 26.5 m (87 ft) north-south area. The site is located on a level sandy plain of a stable alluvial fan west of a low ridge of granitic outcrops. Vegetation at the site consists of creosote, saltbush, cholla, and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 1 to 5 cm in length. Artifacts at RS-8 consist of two church-key-opened beverage cans, one knife-opened beverage can, two rotary-opened food cans, one half gallon paint can, and one coffee can. The mining claim feature is comprised of remnants of a 5” x 1” wood post embedded in a 2’ by 2’ pile of six stacked rocks. Based on the methods used to open the beverage cans, these artifacts post-date 1935 (Rock 1987). The site does not appear to have been impacted. The small number of artifacts suggests that the site may represent a single event refuse deposit, though alluvial or aeolian action may have caused redeposition from other areas and it is unclear whether they are associated with the undated claim post.

Site RS-8 is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California’s history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California’s past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible

Site RS-10

RS-10 is a deflated mining claim feature with one associated tin can in an approximately 1 m (3 ft) east-west by 1.5 m (5 ft) north-south area. The site is located on a level sandy plain of a stable alluvial fan west of a low ridge of granitic outcrops. Vegetation at the site consists of creosote, saltbush, and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 1 to 5 cm in length. The mining claim feature consists of a 4-foot tall 3.5” x 3.5” wood post resting adjacent to the eastern edge of an approximately 3’ by 5’ pile of 23 rocks which would previously have been stacked to form the foundation for the claim post. One upright pocket tobacco tin embossed with “PRINCE ALBERT” is associated with the feature, located directly in the center of the rock pile. While no wire was found at the site, it is possible that the tin can was used to hold the claim, as evidenced on other claim features of this type. Patented in 1907, pocket tobacco tins began being manufactured in 1908 and were used throughout the first half of the 20th century (Rock 1987). The site has been disturbed though it is unclear whether by natural or human impact.

This site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-11

RS-11 is comprised of the remains of a mining claim feature measuring approximately 1.5 m (5 ft) east-west by 1 m (3 ft) north-south. The site is located on a level sandy plain of a stable alluvial fan south of a two-track unpaved road. Vegetation at the site consists of creosote, saltbush, and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 1 to 5 cm in length. The mining claim feature consists of a 5-foot 4" x 4" wood post fragmented length-wise and its associated base of 16 piled rocks. The majority of the post lies approximately .6 m (2 ft) to the northwest of the rock pile, with a long thin fragment resting atop the pile in a generally north-south direction. The stacked rock base for the claim appears intact. It is unclear whether the claim post was removed by natural or human impact and no associated tin can for holding the claim was observed.

Based on the condition and nature of RS-11, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-12

RS-12 is comprised of the remains of a mining claim feature measuring approximately 1 m (3 ft) east-west by 1.2 m (4 ft) north-south. The site is located on a level sandy plain of a stable alluvial fan on the shoulder of a two track unpaved road. Vegetation at the site consists of creosote, saltbush, cholla, and annual native grasses. Sediments at the site include brownish yellow sand with angular to subangular aggregate pebbles ranging from 1 to 5 cm in length. The mining claim feature consists of a 3-foot 1" x 3" wood post fragmented length-wise and its associated base of 16 piled rocks.The majority of the post lies less than .2 m (.75 ft) to the west of the rock pile, with a long thin fragment embedded in the pile under a larger rock and pointing to the south. With the exception of the rock pinning the post fragment, the stacked rock base for the claim post appears intact. It is unclear whether the claim post was removed by natural or human impact and no associated tin can for holding the claim was observed.

This site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-13

RS-13 is comprised of the remains of a mining claim feature measuring approximately 1 m (3 ft) northwest-southeast by 0.6 m (2 ft) northeast-southwest. The site is located on a level sandy plain of a stable alluvial fan west of a low ridge containing granitic outcrops. Vegetation at the site consists of creosote, saltbush, and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 1 to 5 cm in length. The feature consists of a deflated pile of 14 rocks and an associated fragmented 2" by 4" wood post approximately 1.5 m (5 ft) to the west of the rock pile. The stacked rock base for the claim post has been severely disturbed, though it is unclear whether the claim post was removed by natural or human impact and no associated tin can for holding the claim was observed.

Based on the nature of RS-13, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-15

RS-15 is a historic debris scatter consisting of three tin cans distributed linearly over a 35 m (115 ft) east-west by 8.5 m (28 ft) north-south area. The site is located north of a major north-south trending seasonal wash on a sandy plain of a stable alluvial fan. Vegetation at the site is dominated by creosote, saltbush, and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 1 to 5 cm in length. Artifacts at RS-15 include one gasoline can and two church-key-opened beverage cans. Based on the use of the church key opener, these artifacts post-date 1935 (Rock 1987). The site does not appear to have been impacted. The small number of artifacts and linear distribution suggests that the site represents secondary deposition as a result of alluvial or Aeolian action.

Based on the nature of artifacts at RS-15, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and

recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-18/19

RS-18/19 is a small historic debris scatter consisting of nine tin cans and two can lids sparsely scattered over a 38 m (125 ft) northwest-southeast by 24 m (80 ft) northeast-southwest area. The site is located on a sandy plain of a stable alluvial fan. Vegetation at the site is dominated by creosote and saltbush, with lesser numbers of cholla and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 1 to 5 cm in length. Artifacts at RS-18/19 include one church-key-opened beverage can, three knife-opened sanitary cans, one knife-opened hole-in-cap food can, one key strip sardine lid, one key strip one pound coffee lid, and four unidentified crushed cans. The use of church keys to open beverage cans and punched sanitary cans suggest that these artifacts date to the late 1930s or early 1940s (Rock 1987). The site does not appear to have been impacted, though the small number of artifacts and relatively wide distribution suggests that the site may represent an accumulation of artifacts due to alluvial or Aeolian action.

Based on the nature of artifacts at RS-18/19, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-21

RS-21 is a small historic debris scatter consisting of four tin cans and one piece of milled wood sparsely scattered over an approximately 17 m (57 ft) north-south by 8.5 m (28 ft) east-west area. The site is located on a level sandy plain of a stable alluvial fan and is bordered on the east by a seasonal wash. Vegetation at the site is consists of creosote, saltbush, and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 1 to 5 cm in length. Artifacts at RS-21 consist of one "T"-cut knife-opened 3" x 4" sanitary evaporated milk can, three unidentifiable crushed cans, and one approximately 16" fragment of milled wood. Little diagnostic information is available, though the sanitary can indicates the site dates to the twentieth century and likely the early to middle portion. The site does not appear to have been impacted. The small number of artifacts suggests that the site may represent a single event refuse deposit, though alluvial or aeolian action may have caused redeposition from other areas.

Based on the nature of artifacts at RS-21, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-23

RS-23 is comprised of the remains of a mining claim feature measuring approximately .6 m (2 ft) east-west by O.6 m (2 ft) north-south. The site is located on a level sandy plain of a stable alluvial fan on the shoulder of a two track unpaved road. Vegetation at the site consists of creosote, saltbush, and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 2 to 8 cm in length. The mining claim feature consists of a pile of eight stacked rocks with a fallen 5-foot 8 ½-inch 4" x 4" wood post with a knife-opened three-piece cylindrical sanitary food can attached approximately 6" below the post top. The claim post lies to the northwest atop the stacked rocks. With the exception of the fallen post, the stacked rock base for the claim post appears intact.

Based on the nature of RS-23, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-32

RS-32 is a small historic debris scatter consisting of seven tin cans sparsely scattered over an approximately 62.5 m (205 ft) northwest-southeast by 46 m (150 ft) northeast-southwest area. The site is located on a level sandy plain of a stable alluvial fan. Vegetation at the site consists of creosote, saltbush, and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 2 to 8 cm in length. Artifacts at RS-32 consist of one external friction coffee tin, one rotary-opened sanitary can, and five church-key-opened beverage cans. Based on the opening methods observed, these artifacts post-date 1935 (Rock 1987). The site does not appear to have been impacted. The small number of artifacts may suggest that the site represent a single event refuse deposit, although the wide distribution of the artifacts suggests that alluvial or aeolian processes may have formed site.

Based on the nature of artifacts at RS-32, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-37

RS-37 is a large historic debris scatter consisting of approximately 200 tin cans sparsely scattered over an area measuring 303 m (994 ft) east-west by 118 m (390 ft) north-south. The site is located on a level sandy plain of a stable alluvial fan, with an unpaved road running north-south through the western portion of the site and a seasonal wash running northwest-southeast through the eastern portion of the site. Vegetation at the site consists of creosote, saltbush, and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 1 to 5 cm in length. Artifacts at RS-37 are distributed in three separate loci, connected by lower densities of tin cans. Each locus consists of a relatively sparse scatter. Locus 1 is the primary deposit, consisting of approximately 150 cans located 30 m (94 ft) west of the unpaved road. Represented can types include sanitary cans, oblong key strip opened fish tins, upright pocket tobacco tins, metal pails, knife-opened three piece cylindrical sanitary food cans, sanitary cans opened with punched holes, water soluble coffee tins, internal friction cans, meat tins, a lid marked "STIR THOROUGHLY ONE PINT", evaporated milk cans, and numerous pieces of wire and metal strap. Locus 2 is situated 150 m (492 ft) east of Locus 1, contains 11 beverage cans, including a bi-metal pull-tab "Olympia" beer can, intermixed with church-key-opened cans. Locus 3, containing over 50 cans with some milled wood, is located 80 m (262 ft) east of Locus 2 and is bisected by the seasonal wash. This locus again contains predominantly church-key-opened beverage cans with occasional bimetal pull-tab cans. Non-diagnostic aqua, amber, and clear glass fragments as well as one amethyst glass fragment are also present in each of the loci. The artifacts at RS-37 reflect tin can types and opening methods used over the course of the early to middle twentieth century. Upright pocket tobacco tins appear as early as 1908 and church-key-opened cans and oblong key-strip fish tins date to the 1930s and 1940s, though the bi-metal pull-tab dates to post-1962 (Rock 1987). While the site does not show evidence of human impact, the lack of discrete concentrations and potentially wide date range suggests that this site does not reflect multiple discrete episodes of refuse deposition over time and space, but rather the uneven distribution of collections of artifacts across the landscape by alluvial or aeolian processes.

Based on the nature of the artifacts at RS-37, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP

under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-38

RS-38 is an extremely sparse historic debris scatter consisting of two tin cans and a tin can part as well as multiple clear glass fragments scattered over an approximately 30.5 m (100 ft) north-south by 9 m (30 ft) east-west area. The site is located on a level sandy plain of a stable alluvial fan west of an unpaved road. Vegetation at the site consists of creosote, saltbush, and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 1 to 5 cm in length. Artifacts at RS-38 consist of two church-key-opened beverage cans and a ring from a one pound coffee can. The use of the church key indicates these beverage cans post-date 1935 (Rock 1987). A “Diamond O-I” Owens-Illinois maker’s mark is present on one glass fragment, indicating manufacture between 1929-1930 and 1954. Based on these dates, the site appears to date between 1935 and 1954. However, the small number of artifacts and their sparse distribution suggests that the site may reflect the unassociated deposition of individual artifacts or the result of alluvial or aeolian redeposition from other areas.

Based on the nature of artifacts at RS-38, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California’s history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California’s past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-39b

RS-39b is a small historic debris scatter consisting of 15 tin cans sparsely distributed over an approximately 46.5 m (153 ft) northwest-southeast by 21 m (70 ft) northeast-southwest area. The site is located on a level sandy plain of a stable alluvial fan. A small seasonal wash bisects the site. Vegetation at the site consists of creosote, saltbush, and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 2 to 8 cm in length. Artifacts at RS-39b consist of nine church-key-opened beverage cans, two bayonet-opened sanitary cans, two key strip tapered rectangular meat cans, one external friction coffee can, and one gallon rectangular fuel can. The use of church keys, posting-dating 1935, to open the beverage cans suggest that these artifacts date to the late 1930s or early 1940s (Rock 1987). The site does not appear to have been impacted. The small number of artifacts suggests that the site may represent a single event refuse deposit, though alluvial or aeolian action may have caused redeposition onsite or from other areas, particularly as the site is crossed by a wash.

Based on the nature of artifacts at RS-39b, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-40b

RS-40b is a small historic debris scatter consisting of three tin cans sparsely scattered over an approximately 15 m (50 ft) east-west by 5.5 m (18 ft) north-south area. The site is located on a low slope on stable alluvial fan. A small seasonal wash crosses the site. Vegetation at the site consists of creosote, saltbush, and annual native grasses. Sediments at the site include brownish yellow sand with angular to subangular aggregate pebbles ranging from 2 to 8 cm in length. Artifacts at RS-40b consist of one upright pocket tobacco tin, one hole-in-top can with matchstick post filler, and one church-key-opened beverage can. The use of church keys, posting-dating 1935, to open the beverage cans suggest that these artifacts date to the late 1930s or early 1940s (Rock 1987). The site does not appear to have been impacted. However, the small number of artifacts suggests that the site may represent redeposited materials as a result of alluvial or aeolian action.

Based on the nature of artifacts at RS-40b, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-42

RS-42 is a small historic debris scatter consisting of four tin cans scattered over an approximately 11m (36 ft) east-west by 10 m (32 ft) north-south area. The site is located on a low slope on stable alluvial fan east of a seasonal wash. Vegetation at the site consists of creosote, saltbush, and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 1 to 5 cm in length. Artifacts at RS-42 consist of one church-key-opened beverage can, one rotary open sanitary can, an unidentified rectangular metal box, and an oil can lid. The use of a church key, posting-dating 1935, to open the beverage can suggests that these artifacts, if associated, date to the late 1930s or early 1940s (Rock 1987). The site does not appear to have been impacted. However, the small number of artifacts suggests that the site may represent redeposited materials as a result of alluvial or aeolian action.

Based on the nature of artifacts at RS-42, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-151

RS-151 is a historic debris scatter comprised of ceramics, glass fragments, and four tin cans in an area measuring approximately 28 m (93 ft) north-south by 23 m (76 ft) east-west area. The site is located on a sandy plain of a stable alluvial fan. Vegetation at the site consists of creosote, saltbush, and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 1 to 5 cm in length. The non-metal artifacts at RS-151 consist of 35 unidentifiable white ceramic figurine fragments, non-diagnostic whiteware fragments with brown glaze decoration, a whiteware fragment finished with a mustard slip, numerous aqua glass fragments. Tin cans represented include three hole-in-cap cans, one church-key-opened beverage can, and one external friction lid. While most of the material at RS-151 is non-diagnostic, the use of church keys to open the beverage cans suggest that these artifacts date to the late 1930s or early 1940s (Rock 1987). The site does not appear to have been impacted. The presence of multiple fragments of the same vessels suggests that the site has not undergone significant disturbance, though it appears limited to the ground surface and is unlikely to have a subsurface deposit.

Based on the nature of artifacts at RS-151, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-153

RS-153 is a small historic debris scatter consisting of two tin cans, milled lumber with wire nails, and an end portion of a wood-framed metal box spring scattered over an approximately 33 m (109 ft) north-south by 7.5 m (25 ft) east-west area. The site is located on a level sandy plain of a stable alluvial fan. Vegetation at the site consists of creosote, saltbush, and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 1 to 5 cm in length. Artifacts at RS-153 consist of a knife-opened hole-in-cap milk can and a rotary-opened sanitary can. The milled wood fragments measure 7'2" by 1", 1 1/2" by 1", and

2’ by 2 1/2” and the box spring end appears to be approximately ¼ of a twin size bed. While the hole-in-cap milk can suggests a date in the early decades of the 20th century and wire nails also appeared early in the century, these nails continue to be used today and any association between the artifacts or their deposition at RS-153 is unclear.

Based on the nature of artifacts at RS-153, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California’s history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California’s past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-155

RS-155 is a historic debris scatter consisting of four tin cans and glass fragments sparsely scattered over a 35 m (85 ft) east-west by 12.5 m (63 ft) north-south area. The site is located along a low rise on a level sandy plain of a stable alluvial fan directly north of an unpaved east-west trending unpaved roadway alignment. Vegetation at the site is sparse and includes creosote, saltbush, foxtail, and annual native grasses. Sediments at the site are primarily angular to subangular aggregate pebbles ranging from 1 to 5 cm in length underlain by silt and brown-yellow sand. Artifacts at RS-155 consist of two upright pocket tobacco tins, including one embossed with “PRINCE ALBERT”, a rotary-opened side crimped three piece cylindrical sanitary can, and a side crimped three piece cylindrical sanitary food can. Numerous non-diagnostic green and amber glass bottle fragments are also present. The standardization of machine made glass colors early in the 20th century, and which is reflected in modern glass bottles as well, hinders the utility of the glass fragments to provide chronological information. Pocket tobacco tins began being manufactured in 1908 and were used until mid-century, suggesting that this site may constitute a single depositional event dating to the first half of the twentieth century or that it is a secondary deposition of cans resulting from alluvial or aeolian processes (Rock 1987). The site does not appear to have been otherwise impacted.

Based on the nature of artifacts at RS-155, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California’s history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California’s past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-157

RS-157 is a small historic debris scatter consisting of eight tin cans scattered over an approximately 9.5 m (31 ft) north-south by 5.5 m (18 ft) east-west area. The site is located on a low rise directly west of a major braided wash and east of an unpaved road on a stable alluvial fan. Vegetation at the site consists of creosote, saltbush, and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 2 to 8 cm in length. Artifacts at RS-157 consist of two church-key-opened beverage cans, five bayonet-opened sanitary cans, and one hole-in-top with match-stick filler can. Based on the opening methods observed, these artifacts post-date 1935 (Rock 1987). The site does not appear to have been impacted. The small number of artifacts may suggest that the site represent a single event refuse deposit, although the wide distribution of the artifacts suggests that alluvial or aeolian processes may have formed site.

Based on the nature of artifacts at RS-157, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-158

RS-158 is an extremely sparse historic debris scatter consisting of 11 tin cans scattered over an approximately 9.5 m (148 ft) east-west by 5.5 m (63 ft) north-south area. The site is located on a level sandy plain of a stable alluvial fan. Vegetation at the site consists of creosote, saltbush, and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 2 to 8 cm in length. Artifacts at RS-158 consist of one knife-opened hole-in-top with matchstick post filler condensed milk can, one church-key-opened hole-in-top with matchstick post filler milk can, one internal friction gallon paint can, five rotary-opened sanitary cans, one knife-opened gallon hole-in-cap can, and two church-key-opened beverage cans. Based on the church key and rotary opening methods observed, these artifacts post-date 1935 and possibly into the 1940s and 1950s (Rock 1987). The site has been disturbed by off-road vehicular traffic.

Based on the nature of artifacts at RS-158, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the

site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-159

RS-159 is a small historic debris scatter consisting of four tin cans scattered over an approximately 17 m (55 ft) east-west by 7 m (22 ft) north-south area. The site is located on a level sandy plain of a stable alluvial fan. Vegetation at the site consists of creosote, saltbush, and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 1 to 5 cm in length. Artifacts at RS-159 include one screw top rectangular charcoal lighter fluid can, three rotary-opened sanitary cans, and a ham tin lid. Based on the rotary opening methods observed and the charcoal lighter fluid can, these artifacts likely do not pre-date the mid-20th century. The small number of artifacts may suggest that the site represent a single event refuse deposit, although the wide distribution of the artifacts suggests that alluvial or aeolian processes may have formed the association between the artifacts. Based on the nature of artifacts at RS-159, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-161

RS-161 is a small, relatively dense historic debris scatter consisting of approximately 50 tin cans in an approximately 14 m (46 ft) north-south by 26.5 m (87 ft) east-west area. The site is located on a level sandy plain of a stable alluvial fan west of a large north-south trending seasonal wash. Vegetation at the site consists of creosote and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 2 to 5 cm in length. The site has been disturbed by the deposition of modern, non-historic refuse. Identifiable artifacts observed at RS-161 consist of church-key-opened sanitary food cans and beverage cans. The use of church keys, posting-dating 1935, to open the beverage cans suggest that these artifacts date to the late 1930s or early 1940s (Rock 1987). The large number of artifacts deposited in a relatively small area, and the limited variety of artifact types suggests that the site represent a single event refuse deposit representing the detritus of multiple meals or a large provisioning effort. The deposit rests on the ground surface and there is no observable indication of a subsurface deposit.

While RS-161 may represent one of the few examples of a single depositional event in the RSPP, it has been impacted by the addition of non-historical material over time. As such, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is

not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-166

RS-166 is a small historic debris scatter comprised of three tin cans, milled wood fragments, and glass bottle fragments distributed over an approximately 17 m (55 ft) east-west by 14.5 m (48 ft) north-south area. The site is located on a sandy plain of a stable alluvial fan. Vegetation at the site consists of creosote, saltbush, and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 1 to 5 cm in length. RS-166 is comprised of three key strip opened sardine tins, milled wood, and numerous amethyst, amber, green, and aqua glass fragments. Among the glass fragments are an olive crown finish and an amber crown finish. The low density of artifacts, diversity of artifacts (in particular glass bottles) represented, and the highly fragmented condition of the glass suggests that the site may have accumulated slowly over time through repeated use of the area. However, the condition of the glass may also reflect disturbance from vehicular traffic or recreational shooting known to occur in the area.

Based on the nature of artifacts at RS-166, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-167

RS-167 is a historic debris scatter consisting of three tin cans scattered over an approximately 16.5 m (54 ft) north-south by 9 m (30 ft) east-west area. The site is located on a level sandy plain of a stable alluvial fan. Vegetation at the site is consists of creosote, saltbush, and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 1 to 5 cm in length. Artifacts at RS-167 include a five-gallon rectangular fuel can, a knife-opened hole-in-cap milk can, and a one-gallon rectangular fuel can. Little diagnostic information is available, though the method of knife opening on the hole-in-cap can indicates the site dates to the twentieth century and possibly the early to middle portion. The site does not appear to have been impacted. The small number of artifacts suggests that the site may represent a single event refuse deposit, though alluvial or aeolian action may have caused redeposition from other areas.

Based on the nature of artifacts at RS-167, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-325

RS-325 is a historic debris scatter consisting of seven tin cans scattered over an approximately 24.5 m (81 ft) northwest-southeast by 16 m (52 ft) northeast-southwest area. The site is located on a low, very slight slope southeast of a small seasonal wash trending north-south west of an unpaved north-south trending road. Vegetation at the site is sparse and consists of saltbush, creosote, and annual native grasses though the flora lining the wash is denser. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 1 to 5 cm in length. Artifacts at RS-325 consist of two hole-in-top milk cans, three key strip sardine cans, one possible paint can, and one non-diagnostic knife-opened can. Little diagnostic information is available, though the method of knife opening on the hole-in-cap can indicates the site dates to the twentieth century and possibly the early to middle portion. The small number of artifacts suggests that the site may represent a single event refuse deposit, though alluvial or aeolian action may have caused redeposition from other areas. Site RS-325 has been impacted through recent use as a refuse dump with a significant amount of modern glass and household refuse.

Based on the nature of artifacts at RS-325, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-603

RS-603 is comprised of a secondary historic debris scatter situated in a large seasonal wash. Approximately 40 cans are sparsely scattered in an 85 m (280 ft) northwest-southeast by 12 m (40 ft) northeast-southwest area. The site sits within a major braided wash trending north-south and measuring approximately 30 m (98 ft) in width. The wash is flanked on both sides by low rising grass-covered knolls and includes several long, low rises aligned with the water flow in the creek bed. Unpaved north-south trending roads are located east and west of the site. Vegetation along the wash is denser than in surrounding areas and includes creosote, saltbush, cholla, and native grasses.

Artifacts at RS-603 consist of one upright pocket “Prince Albert” tobacco tin, two one-gallon knife-opened paint cans with holes punched in the can, one evaporated milk can, five metal nursery containers, one wastebasket, one 5-gallon bucket, two church-key-opened food tins, one church-key-opened beer can, two kerosene cans, two key strip sardine tins, a non-diagnostic sanitary can, a key strip gallon can, one bimetal pull-tab, ten rotary open cans, and nine unidentified church-key-opened cans. The range of can types and opening methods representing a range of dates, as well as the linear distribution of the artifacts within the seasonally active wash, indicate that this site represents a secondary deposit of likely unassociated cans accumulated by alluvial action.

Site RS-603 is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California’s history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California’s past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-607

RS-607 is a small, low density historic debris scatter consisting of six tin cans scattered over an approximately 5 m (16 ft) diameter area. The site is located on a level sandy plain of a stable alluvial fan adjacent to an unpaved northwest-southeast trending road located to the west. Vegetation is very sparse, consisting of creosote, saltbush, cholla, and annual native grasses. Soils onsite consist of brown-yellow sand with aggregate pebbles between 2 and 5 cm long, with occasional pebbles larger than 5 cm.
Artifacts at RS-607 include three evaporated milk cans, two hole-in-cap cans and one unidentifiable can. While the hole-in-cap cans may suggest a date sometime in the early twentieth century, little diagnostic information is available as standard evaporated milk cans continued to be produced for a much longer period of time. While the site does not show any observable impacts, the small number of artifacts suggests that the site either represents a limited single event refuse deposit or is the result of alluvial or aeolian action redepositing objects from other areas.

Based on the nature of site RS-607, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California’s history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California’s past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-614

RS-614 is a hydrologic feature location in an area measuring 54 m (178 ft) east-west by 23 m (75 ft) north-south. The site is located on a level sandy plain of a stable alluvial fan approximately 23 m (75 ft) west of an unpaved two-track road. Vegetation at the site consists of creosote, saltbush, and annual native grasses. Soils onsite consist of brown-yellow sand with aggregate pebbles between 2 and 8 cm long. The feature consists of a primarily subsurface circular galvanized tin receptacle measuring approximately 2 m (8 ft) in diameter and 0.5 m (1.5 ft) deep, and a hydraulic engineering feature comprised of two vertical iron water main stand pipe lengths embedded in the ground. The first measures approximately 10 inches in diameter and extends 14 inches above grade; the second is placed inside the first, measuring approximately 7 inches in diameter with a threaded lip and extending 24 inches above grade. The interior pipe is capped by a 4-inch iron threaded joiner cuff measuring 7.5 inches in diameter. The lower portion of the feature is encased by two milled wood brackets held together by two 17 inch iron bolts with large iron plate washers and 1-inch nuts at each end. A raised earth feature extends 39.5 m (130 ft) west from the hydraulic feature, indicating a possible pipe alignment. The remnants of a 1.5-inch pipe with attached spun wire cord are located approximately 8 feet west of the feature. A basalt rock pile measuring approximately 2 m by 3 m (7 ft by 10 ft) is located northwest of the site and may represent the clearing of basalt from the water feature site during its construction.

Based on the condition and unassociated nature of site RS-614, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-616

RS-616 is a historic debris scatter comprised of ten tin cans in an area measuring approximately 32 m (104 ft) east-west by 19 m (61 ft) north-south area. The site is located on a sandy plain of a stable alluvial fan. Vegetation at the site consists of creosote, saltbush, and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 1 to 5 cm in length. Artifacts at RS-616 consist of two knife-opened hole-in-top with matchstick post filler milk cans, a quart oil can with punched holes embossed with "SAE 30", three knife-opened sanitary cans, two church-key-opened beverage cans, and a hole-in-top with matchstick post filler milk can with punched holes. The presence of church-key-opened beverage cans indicates that at least a portion of the site assemblages dates to the late 1930s or early 1940s (Rock 1987). While there is no apparent disturbance to the site, the small number of artifacts may suggest either that the site represents a single dispersed refuse deposit event or that alluvial or aeolian action may have caused redeposition of these artifacts from other areas. Given the nature of the non-diagnostic artifacts and their dispersed distribution at RS-616, the site is recommended not eligible

for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-618

RS-618 is a historic debris scatter comprised of four tin cans in an area measuring approximately 18 m (60 ft) northeast-southwest by 8 m (26 ft) northwest-southeast area. The site is located on a sandy, basalt cobble-strewn plain on a stable alluvial fan. Vegetation at the site consists of sparse creosote, saltbush, and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 2 to 8 cm in length with basalt cobbles measuring 15 to 20 cm in length. Artifacts at RS-618 consist of two church-key-opened beverage cans, one knife-opened 64 oz three piece cylindrical can, and one bayonet-opened 1-gallon hole-in-cap can. A rock pile of basalt stacked on the ground surface approximately 35 cm high is present on site and appears to be of either historic or recent construction. The presence of church-key-opened beverage cans indicates that the site post-dates 1935 (Rock 1987). While there is no apparent disturbance to the site, the small number of artifacts may suggest either that the site represents a single dispersed refuse deposit event or that alluvial or aeolian action may have caused redeposition of these artifacts from other areas.

Given the nature of the artifacts at RS-618, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-700

Site RS-700 consists of a small historic refuse deposit in an area measuring 3 m (10 ft) by 3 m (10 ft). The site is located on a low slope overlooking an unpaved road to the east. Vegetation consists of creosote, saltbush, and annual native grasses. Soil in the area of the site is brown-yellow sand with aggregate pebbles ranging from 2 to 8 cm in length. The deposit contains approximately 30 cans, three one pound coffee can lids, turquoise glazed Fiestaware fragments, a steel medical tape roll, and numerous glass fragments. Can types include key strip hole-in-cap meat tins, church-key-opened beverage cans, spice tins, and food tins. Glass fragments are clear, green, milk, and amber in color. Some of them are solarized. The glass fragments are from screw top

jars, bottles, cold cream containers, and window panes. Maker's marks represented include Latchford-Marble and Owens-Illinois, including Duraglas dating to the 1950s. Some cans are slightly embedded in the sandy soil, though it appears that the site consists only of the surface scatter. Based on this chronologically diagnostic mark, the site appears to be a small, discrete episode of refuse dumping dating to the mid-twentieth century. The site does not appear to have been disturbed.

Based on the nature of artifacts at RS-700, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-726

Site RS-726 is a sparse historic debris scatter consisting of six tin cans in an area measuring 82 m (270 ft) north-south by 50 m (165 ft) east-west. The site is located on a level sandy plain on a stable alluvial fan. Vegetation consists of creosote, saltbush, and annual native grasses. Soil at the site is brown-yellow sand with aggregate pebbles ranging from 1 to 5 cm in length. Artifacts at RS-726 include five large knife-opened hole-in-cap cans, one large cylindrical, circle-slice can, and one 5 gallon rectangular kerosene can modified with a braided wire handle. Little diagnostic information is available, though the method of knife opening on the hole-in-cap can and lack of church-key-opened cans suggests the site dates to the twentieth century and possibly the early to middle portion. The small number of artifacts suggests that the site may represent the deposition of isolated refuse items, though alluvial or aeolian action may have caused redeposition from other areas. The site does not appear to have been otherwise disturbed.

Based on the nature of the artifacts and their distribution at RS-726, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-739

Site RS-739 is a sparse historic debris scatter comprised of four tin cans in an approximately 34 m (110 ft) by 34 m (110 ft) area. The site is located on a level sandy plain on a stable alluvial fan. Vegetation consists of creosote, saltbush, and annual

native grasses. Soil in the area of the site is brown-yellow sand with aggregate pebbles ranging from 1 to 5 cm in length. Artifacts at the site consist of two church-key-opened beverage cans, one 25-pound blasting powder can, and one half-gallon external friction can modified with a wire handle to form a bucket. While the blasting powder can may be associated with the construction of the Mojave-Owenyo branch of the Southern Pacific Railroad beginning in 1908, the presence of church-key opened cans dates these artifacts to post-1935. Combined with the sparse distribution of artifacts, this suggests that the site may reflect the deposition of refuse repeatedly over time individual artifacts or may be the result of alluvial or aeolian redeposition from other areas. The site does not appear to have been otherwise disturbed.

Based on the nature of artifacts at RS-739, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-742

Site RS-742 is a sparse historic debris scatter consisting of 12 historic tin cans in an approximately 55 m (180 ft) northeast-southwest by 35 m (115 ft) northwest-southeast area. The site is located on a level sandy plain on a stable alluvial fan. Vegetation consists of creosote, saltbush, and annual native grasses. Soil in the area of the site is brown-yellow sand with aggregate pebbles ranging from 1 to 5 cm in length. Cans in the scatter include eight knife-opened hole-in-cap cans, two knife-opened sanitary cans, one knife-opened hole-in-top with matchstick post filler can, and one knife-opened one gallon hole-in-cap can. The lack of church-key-opened cans and presence of hole-in-cap cans indicates an early 20th century date for the site. The sparse nature of the site suggests that it may reflect a single episode of refuse deposition which has been redistributed by alluvial or aeolian processes, or that the site itself may have been formed by those processes redistributing artifacts from other areas. The site does not appear to have been otherwise disturbed.

Based on the nature of artifacts at RS-742, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-746

Site RS-746 is a small historic debris scatter consisting of six historic tin cans in an approximately 18 m (60 ft) east-west by 9 m (30 ft) north-south area. The site is located on a level sandy plain on a stable alluvial fan. Vegetation at the site consists of creosote, saltbush, and annual native grasses. Sediments at the site include brown-yellow sand with aggregate pebbles ranging from 1 to 5 cm in length. Artifacts at RS-746 consist of two knife-opened sanitary cans, one small rectangular spice tin, one upright pocket tobacco tin with strike plate, and two knife-opened hole-in-cap cans. The lack of church-key-opened cans and predominance of hole-in-cap cans suggests that this site dates to the early decades of the twentieth century. While the small number of artifacts may indicate that the site represents a single event refuse deposit, alluvial or aeolian action may have caused secondary redeposition. The site does not otherwise appear to have been disturbed

Based on the nature of artifacts at RS-746, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-750

RS-750 is a sparse historic debris scatter in an approximately 34 m (113 ft) northwest-southeast by 14 m (45 ft) northeast-southwest area. The site is located on a level sandy plain on a stable alluvial fan east of the abandoned Southern Pacific Railroad alignment (IF-KER-3366H). Vegetation at the site consists of creosote, saltbush, and annual native grasses. Sediments at the site include brown-yellow sand with aggregate pebbles ranging from 1 to 5 cm in length. Artifacts at RS-750 consist of one bayonet-opened hole-in-cap can, one lid from a bayonet-opened gallon hole-in-cap can, and nine metal barrel straps. The lack of church-key-opened cans and presence of hole-in-cap cans suggests an early twentieth century date for the site; the barrel straps may be associated with containers whose materials were used in the construction of the Mojave-Owenyo branch line located west of the site. The site has been heavily disturbed by the deposition of modern refuse and off-road vehicular activity.

Based on the nature of artifacts at RS-750, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and

NRHP under Criterion D.

Site RS-752

RS-752 is a sparse historic debris scatter consisting of four historic tin cans in an approximately 18 m (60 ft) east-west by 15 m (50 ft) north-south area. The site is located on a level sandy plain on a stable alluvial fan about 365 m (1200 feet) east of the abandoned Southern Pacific Railroad alignment (IF-KER-3366H). The site is crossed by a small seasonal wash. Vegetation at the site consists of creosote, saltbush, and annual native grasses. Sediments at the site include brown-yellow sand with angular to subangular aggregate pebbles ranging from 1 to 5 cm in length. Artifacts at RS-752 include one 25-pound blasting powder can, one upright pocket tobacco tin, one rectangular gallon fuel can, and one knife-opened hole-in-top with matchstick post filler can. The blasting powder can. The blasting powder cans may be associated with the construction of the Mojave-Owenyo branch of the Southern Pacific Railroad beginning in 1908, and the lack of church key-opened cans suggests a pre-1935 date for the assemblage. The small number of artifacts and sparse distribution, however, suggests that the site reflects either the deposition of individual unassociated cans or that the site may be the result of alluvial or aeolian redeposition, particularly given the wash bisecting the site. The site does not appear to have been otherwise disturbed.

Based on the nature of artifacts at RS-752, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-773

Site RS-773 is a historic debris scatter consisting of 15 historic tin cans in an area measuring 70 m (230 ft) north-south by 28 m (92 ft) east-west. The site is located on a level sandy plain on a stable alluvial fan south of Brown Road. Vegetation consists of creosote, saltbush, cholla, and annual native grasses. Soil at the site is brown-yellow sand with aggregate pebbles ranging from 1 to 5 cm in length. Artifacts at RS-773 include two corrugated one-gallon three piece cylindrical food cans, four bimetal pull-tab beverage cans, one hinged-top spice tin, one rectangular kerosene can, one bayonet-opened sanitary food can, one knife-opened hole-in-cap can, one knife-opened hole-in-top with matchstick-post-filler can, and four rotary-opened sanitary cans. This site appears to be a mix of material dating from the early to mid twentieth century, with the bi-metal pull-tab cans post-dating 1962. While the site does not show evidence of human impact, the lack of discrete concentrations and potentially wide date range suggests that this site does not reflect multiple discrete episodes of refuse deposition over time and space, but rather the uneven distribution of collections of artifacts across the landscape by alluvial or aeolian processes. The site does not appear otherwise disturbed.

Based on the nature of artifacts at RS-773, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-781

Site RS-781 is a sparse historic debris scatter consisting of 12 tin cans distributed linearly in an approximately 87 m (285 ft) northwest-southeast by 7 m (22 ft) northeast-southwest area. The site is located on a flat, sandy plain of an alluvial fan. Vegetation consists of creosote, saltbush, and annual native grasses. Soil in the area of the site is brown-yellow sand with aggregate pebbles ranging from 1 to 5 cm in length. Artifacts at RS-781 include eight church-key-opened beverage cans, one rotary-opened sanitary can, one bi-metal pull-tab beverage can, one knife-opened one-gallon hole-in-cap can, and one unidentifiable crushed can. The linear distribution of the artifacts, following the flow of the seasonally active wash, indicate that this site represents a secondary deposit of likely unassociated cans accumulated by alluvial action.

Based on the nature of artifacts at RS-781, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-856

Site RS-856 is a sparse historic debris scatter consisting of five tin cans in an approximately 39 m (128 ft) northwest-southeast by 41 m (135 ft) northeast-southwest area. The site is located on a flat, sandy plain of an alluvial fan adjacent to a seasonal drainage to the northeast. Vegetation consists of creosote, saltbush, and annual native grasses. Soil in the area of the site is brownish yellow sand with aggregate pebbles generally ranging from 1 to 5 cm in length. Artifacts at RS-856 include two church-key-opened beverage cans, one strip-opened sanitary can, and two knife-opened sanitary cans. The presence of church-key-opened cans suggests that this site post-dates 1935, when the church key opener was introduced. However, given its location adjacent to a seasonal wash, the site may represent a secondary deposit of cans accumulated by alluvial action. The site otherwise appears undisturbed.

Based on the nature of artifacts at RS-856, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-866

Site RS-866 is a large historic debris scatter comprised of over 50 tin cans in an approximately 73 m (240 ft) north-south by 52 m (170 ft) east-west area. The site is situated north of Brown Road on a flat, sandy plain of an alluvial fan. Vegetation consists of creosote, saltbush, cholla, and annual native grasses. Soil in the area of the site is brown-yellow sand with aggregate pebbles generally ranging from 1 to 5 cm in length, with some pebbles larger than 5 cm. The majority of the artifacts at RS-866 cans are church-key-opened beverage cans. Bi-metal pull-ring beverage cans, rotary-opened sanitary cans, one quart oil cans, and bayonet-opened sanitary cans are also present. The presence of church-key-opened cans suggests that this site post-dates 1935, when the church key opener was introduced. However, given its location adjacent to a seasonal wash, the site may represent a secondary deposit of cans accumulated by alluvial action. The site otherwise appears undisturbed.

Based on the nature of artifacts at RS-866, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-868

Site RS-868 consists of a 4.7-km (2.9-mile) segment of an unpaved one-lane historic road alignment paralleling the Terese Siding section of the Southern Pacific Railroad's Mojave-Owenyo branch line (CA-INY4607H/IF-KER-3366H). The northwest-southeast trending roadway is approximately 2.4 m (8 ft) wide and runs between 270 m (886 ft) and 495 m (1624 ft) east of the former railway grade cut into a basalt boulder-covered slope of a low ridgeline. The road first appears on the 1915 Searles Lake 60' USGS topographic quadrangle. Vegetation along the alignment consists of creosote, saltbush, and annual native grasses with smaller amounts of cholla and foxtail near the roadway. Soil in the area of the resource is brown-yellow sand with aggregate pebbles ranging

from 2 to 8 cm in length. It is still in use as an unpaved road. RS-868 maintains integrity of location and setting, though no concrete associations with historical persons or events have been determined.

Based on the nature of RS-868, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Site RS-869

Site RS-869 consists of a 3.4-km (2.1-mile) segment of an unpaved one-lane historic road alignment. The road first appears on the 1915 Searles Lake 60' USGS topographic quadrangle. On this map, the road continued westward toward Freeman Canyon and the homestead settlement of Freeman Junction. Vegetation along the alignment consists of creosote, saltbush, and annual native grasses. Soil along the resource is brown-yellow sand with aggregate pebbles ranging from 2 to 8 cm in length. It is still in use as an unpaved road. RS-869 maintains integrity of location and setting, though no concrete associations with historical persons or events have been determined.

Based on the nature of RS-869, the site is recommended not eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

C.3.5.1.8.1 Summary of Cultural Resources Treated as Eligible for Listing in the CRHR and for Inclusion in the NRHP Summary of Cultural Resources Subject to Evaluation of Historical Significance

Staff is treating a total of 14 cultural resources in the inventory of the project area of analysis as eligible for listing in the CRHR and for inclusion in the NRHP. A discussion of each of these resources follows.

C.3.5.1.8.1.1. Prehistoric Archaeological Sites

Ten prehistoric sites are being treated as eligible for inclusion in the CRHR and the NRHP. The lack of temporally diagnostic artifacts in what is seen on the surface makes a clear judgment as to their eligibility difficult. These resources are being treated as eligible pending testing if avoidance is not possible. One consideration is that because these sites have been long visible and prone to collecting by relic hunters, the failure to

find diagnostic tools on the surface may be skewed by the removal of these tools, which means that only subsurface testing can resolve the question of their eligibility.

The types of sites found in the area are:

- *Milling Stones and Flaked Stone*. Seven of the sites include a mix of milling stones and flaked stone that suggest possible habitation sites.
- *Lithic Scatters*. Three others are strictly lithic scatters that may provide information on special activity areas.

C.3.5.1.8.1.2. Historical Archaeological Sites

The overwhelming preponderance of historic sites identified in the survey (45 out of 66) were tin can scatters. The remaining sites reflect construction of either the railroad, property claims, or early roadways. Of these 66 historic sites, 12 are now out of the APE. That leaves 54 that needed to be considered for eligibility. Fifty of these historic sites were judged to be ineligible for CRHR or NRHP and four others are assumed eligible.

Can Scatters. These can scatters vary in their chronology. Applying knowledge of known characteristics of various types of can permits approximate dating of a site. Of the can sites within the APE, nine date to the early 20th century and four of these had black powder cans. Of these nine sites, only two were deemed by staff to be potentially eligible for the California Register as contributors to the questions of local history. There is some evidence that there may have been mines in the area prior to 1904. The question is whether studying these sites to better understand a little known aspect of the local history is important enough to raise their level of “uniqueness” to meet the CRHR criteria.

Transportation Alignments. In the project area these include roads and railroads. The old alignment of Highway 395 is now called Brown Road and it traverses the site area on a diagonal. In addition, a portion of the old Mojave-Owenyo Railroad line built about 1908 cut along the west side of the APE, but outside the area of disturbance. Possible earlier trails and roads would include an unnamed dirt road that runs roughly parallel to the rail line.

Power Lines. a major power line, the Inyokern-Kramer 220 KV Transmission Line, also runs along the west side of the project area. Some alternatives would dictate the need to relocate portions of this line to avoid the southern solar field.

C.3.5.1.8.2 Description of Archaeological Sites

Seventeen archaeological sites, thirteen prehistoric and four historic, are being treated as eligible to either the NRHP or the CRHR. For the prehistoric sites, additional archaeological testing is needed to determine if they represent intact deposits and/or features or are simply random artifacts that lie on the surface. Their proximity to a major archaeological district (Last Chance Canyon) suggests that they may be able to provide important information concerning past lifeways on the relatively flat land outside of the foothills of the El Paso Mountains.

In the case of the historic sites, two of the sites were chosen because an initial evaluation of the artifacts composing the trash deposits indicated that they dated to the early 20th century, a time when the area was principally being visited by railroad building crews or by miners. Site RS 728/731 had a wide enough variety of artifacts to suggest a long-term living or campsite and siteRS-162/163 had a smaller quantity of artifacts, but these included indications of use of black powder and evidence of possible claim markings. Although the history of the construction of the railroad has been addressed in past studies (Burke 1988; Hall 1992), mining in the immediate vicinity of the project has not. Discovery by staff of an historic map of Kern County mines dating to 1904 (Aubury 1904) that identifies three mines having been dug in the southern portion of the APE could possibly give meaningful context to sites that would otherwise not be considered eligible for the National and State registers (Fig. C.3-1). This is particularly the case because the man identified as the owner of the mines, Frank A. Huntington, was prominent in 19th century California (Wikipedia 2009), especially as an inventor of mining machinery. Based on a later study (Troxel and Morton 1962, pp. 153, 162) that casts into doubt the accuracy of the 1904 report, the applicant was asked to perform additional archival research and, if it upheld the location of these mines as shown in the Aubury report being in the APE, archaeological testing would be required under the PA to verify the actual locations of these mines.

Site RS-150 is apparently a campsite associated with the building of the railroad line in 1908 and therefore may contribute to our knowledge of the early 20th century living arrangements of such a work camp. Finally, linear feature CA-KER-6837H (now Brown Road) was formerly an alignment of Highway 395 and is already a formally recorded site.

C.3.5.1.8.2.1 Prehistoric Archaeological Sites

The following thirteen prehistoric archaeological sites are being treated as eligible for the CRHR and the NRHP, and the effects of the proposed action on them will be mitigated under the PA.

Site RS-19c

This site comprises of a basalt milling feature and a crypto-crystalline silicate (CCS) biface. The basalt metate has a surface area of 44 by 43 cm and is 9 cm tall with a milling surface measuring 25 by 29 cm. The CCS biface measures 2.5 by 1.3 by .3 cm. The feature is located on a small north-facing rise on the south side of a small seasonal drainage (El Paso Wash). Creosote bush and salt bush make up the primary vegetation at the site today. The soil on the site is coarse brown sand, with basalt cobbles and pebbles of various lithic materials. Overall site dimensions are 18m EW by 5 m NS. The EDAW archaeologists noted that it appears the metate would have been too heavy to be portable and thus suggests that it was used in place at a milling station that would be visited repeatedly. The location of this site in the vicinity of El Paso Wash fits the prediction of the geo-archaeologist (Steinkamp 2010, p.15) who suggested that the soil in the vicinity of the wash was most likely to have archaeological deposits.

The condition of the site, possibly either deflated or obscured by alluvial deposition, and the types of artifacts at the site indicates that the site may have information important to prehistory, especially in regards to the research about sites containing milling

implements and possibly diagnostic flaked stone artifacts (possibly of a locally available material) in proximity to local sources and prehistoric lakeshores.

Site RS-19c is, therefore, treated as eligible under CRHR Criterion 4 and is unevaluated under NRHP Criterion D, pending further site evaluation under the PA. It is recommended not eligible for inclusion to the CRHR under Criteria 1-3,or for inclusion to the NRHP under Criteria A-C. Under CRHR Criteria 1 and NRHP Criteria A, site RS-19c does not contribute to the broad patterns of history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not related to the lives of people important to the past and is recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. RS-19c is recommended not eligible for inclusion to the CRHR under Criterion 3 and NRHP Criterion C because it does not represent a unique style, type, or design. Site RS-19c may, however, yield information important to history or prehistory and is, therefore, assumed eligible under CRHR Criterion 4 and eligible under NRHP Criterion D.

Site RS-154

Approximately 22 CCS flakes were found in an area 26 m EW by 18 m NS. The vegetation on the site is very sparse, consisting of creosote and annual native grasses. Due to the similarity of the flakes, it is difficult to determine whether a single event or multiple visits to the site for purposes of lithic reduction are indicated. The site is a flat desert plain and appears to be subject to sheet runoff during rainstorm events. This site was in the original disturbance area, however, it is outside the revised plan.

The condition of the site, possibly either deflated or obscured by alluvial deposition, and the types and materials of artifacts at the site indicates that the site may have information important to prehistory, especially in regards to the research about sites containing possibly local CCS flaked stone materials, and located in proximity to local sources and prehistoric streams.

Site RS-154 is recommended not eligible for inclusion to the CRHR under Criteria 1-3, or to the NRHP under Criteria A-C. Under CRHR Criteria 1 and NRHP Criteria A, site RS-154 does not contribute to the broad patterns of history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not related to the lives of people important to the past and is recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. RS-154 is recommended not eligible for inclusion to the CRHR under Criterion 3 and NRHP Criterion C because it does not represent a unique style, type, or design. Site RS-154 may, however, yield information important to history or prehistory and is, therefore, treated as eligible under CRHR Criterion 4 and is unevaluated under NRHP Criterion D, pending further evaluation under the PA. This site does appear to qualify to be addressed under California Archaeological Resources Identification Data Acquisition Program (CARIDAP): Sparse Lithic Scatters (OHP 1988). Successful treatment under CARIDAP would result in a no historic property finding.

Site RS-407

Two rounded rock pile features characterize this site. Feature 1 is made up of about 14 basalt cobbles stacked to a maximum height of 24 cm. This feature is oval in shape,

measuring 110 cm NS by 90 cm EW. Feature 2 is also oval in shape with measurements of 79 cm NS by 117 cm EW and comprised of 16 basalt cobbles stacked 22 cm high. Vegetation on the site is sparse and composed of saltbush, creosote and annual native grasses. The bottom course of the rocks is firmly embedded in the soil, so the full height of these features is uncertain. On a visit to the site on November 4, 2009, BLM archaeologist Donald Storm suggested that these features may have been historic rather than prehistoric, however, since there were neither prehistoric nor historic artifacts found in the vicinity of the site, it would take further testing to determine the actually nature of these piles.

The intact condition of the features at the site, and the degree to which the stones are imbedded into the soil, possibly indicating their existence for a considerable period of time, may imply an association with the other prehistoric sites and activities situated in this same area of the project. Consequently, the site may have information important to prehistory, especially in regards to the research about adjacent sites located in proximity to prehistoric lakeshores.

Site RS-407 is, therefore, treated as eligible under CRHR Criterion 4 and unevaluated under NRHP Criterion D. It is recommended not eligible for inclusion to the CRHR under Criteria 1-3, or for inclusion to the NRHP under Criteria A-C. Under CRHR Criteria 1 and NRHP Criteria A, site RS-407 does not contribute to the broad patterns of history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not related to the lives of people important to the past and is recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. RS-407 is recommended not eligible for inclusion to the CRHR under Criterion 3 and NRHP Criterion C because it does not represent a unique style, type, or design. Site RS-407 may, however, yield information important to history or prehistory and is, therefore, treated as eligible under CRHR Criterion 4 and under NRHP Criterion D under the PA.

Site RS-409

Two basalt metates, a basalt metate fragment, and a possibly utilized obsidian flake were found on this site. One metate is 18 cm high with a surface area of 33 by 36 cm and the second metate is 20 cm high, with a surface area of 32 by 25 cm. The obsidian flake was found approximately 31 m southwest of the two metates. There are no discernible water sources near this site. Its vegetation is sparse and is made up of saltbush and creosote along with annual native grasses. Although one of the metates seems portable, the other does not, again suggesting use in place. No cultural deposit was observed in the area, but the possibility of wind deflation of the site is high. The condition of the site, possibly either deflated or obscured by alluvial deposition, and the types of artifacts at the site indicates that the site may have information important to prehistory, especially in regards to the research about sites containing milling implements and possibly diagnostic flaked stone artifacts (of an imported, and datable and sourceable material) in proximity to prehistoric freshwater streams.

Site RS-409 is, therefore, treated as eligible under CRHR Criterion 4 and unevaluated under NRHP Criterion D, pending treatment under the PA. It is recommended not eligible for inclusion to the CRHR under Criteria 1-3, or for inclusion to the NRHP under Criteria A-C. Under CRHR Criteria 1 and NRHP Criteria A, site RS-409 does not

contribute to the broad patterns of history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not related to the lives of people important to the past and is recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. RS-409 is recommended not eligible for inclusion to the CRHR under Criterion 3 and NRHP Criterion C because it does not represent a unique style, type, or design. Site RS-409 may, however, yield information important to history or prehistory and is, therefore, treated as eligible under CRHR Criterion 4 and is unevaluated under NRHP Criterion D pending treatment under the PA.

Site RS-410

A low density lithic scatter made up of approximately seven flakes (one obsidian, two CCS, three fine-grained metavolcanics and one chert), are located within an area 45 m NS by 20 m EW. The site is located about 100 m from a low, NS running rise, but there are no discernible surface water features in the vicinity. The presence of the non-local obsidian and the general variety of other lithics on the site suggests the likelihood of it being visited on multiple occasions. The vegetation is made up of creosote, saltbush and annual grasses.

The condition of the site, possibly either deflated or obscured by alluvial deposition, and the types and raw materials of the artifacts at the site indicates that the site may have information important to prehistory, especially in regards to the research about sites containing possibly local CCS flaked stone materials, and obsidian, and located in proximity to local sources and prehistoric lakeshores.

Site RS-410 is, therefore, treated as eligible under CRHR Criterion 4 and unevaluated under NRHP Criterion D, pending further evaluation under the PA. It is recommended not eligible for inclusion to the CRHR under Criteria 1-3, or for inclusion to the NRHP under Criteria A-C. Under CRHR Criteria 1 and NRHP Criteria A, site RS-410 does not contribute to the broad patterns of history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not related to the lives of people important to the past and is recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. RS-410 is recommended not eligible for inclusion to the CRHR under Criterion 3 and NRHP Criterion C because it does not represent a unique style, type, or design. Site RS-410 may, however, yield information important to history or prehistory and is, therefore, treated as eligible under CRHR Criterion 4 and is unevaluated under NRHP Criterion D. This site does appear to qualify to be addressed under California Archaeological Resources Identification Data Acquisition Program (CARIDAP): Sparse Lithic Scatters (OHP 1988). Successful treatment under CARIDAP would result in a no historic property finding.

Site RS-604

This site has one whole metate and two large metate fragments. The whole metate is 11 cm high, 14 cm wide and 26 cm long. The metates are located on a small east-facing rise that slopes down to a seasonal wash running NS. Vegetation includes cholla cactus, creosote and saltbush. This site also suggests an isolated milling station.

The condition of the site, possibly either deflated or obscured by alluvial deposition, and the types of artifacts at the site indicates that the site may have information important to

prehistory. Site RS-604 is, therefore, treated as eligible under CRHR Criterion 4 and unevaluated under NRHP Criterion D, pending further evaluation under the PA. It is recommended not eligible for inclusion to the CRHR under Criteria 1-3, or for inclusion to the NRHP under Criteria A-C. Under CRHR Criteria 1 and NRHP Criteria A, site RS-604 does not contribute to the broad patterns of history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not related to the lives of people important to the past and is recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. RS-604 is recommended not eligible for inclusion to the CRHR under Criterion 3 and NRHP Criterion C because it does not represent a unique style, type, or design. Site RS-604 may, however, yield information important to history or prehistory and is, therefore, treated as eligible under CRHR Criterion 4 and is unevaluated under NRHP Criterion D, pending further evaluation under the PA.

Site RS-617

A cache of eight manos (six basalt and two granitic), one core, and one flake appear to have been placed under a creosote bush. The core tool is a green metavolcanic rock and seems to be a small scraper plane. The flake is red jasper. The site is in close proximity to both Brown Road and the 500 kV power line, so the area has been impacted by construction and use of an unpaved access road associated with the power line. The placement of the cache may be prehistoric or the artifacts might have been gathered in modern time and simply left where they were found. This site was originally outside the APE but with the proposed changes, it now is considered to be in the disturbance zone.

The condition of the site, possibly either deflated or obscured by alluvial deposition, and the types of artifacts at the site indicates that the site may have information important to prehistory. Site RS-617 is located inside of the revised Project and will be impacted by construction of the RSPP. Site RS-617 is, therefore, treated as eligible under CRHR Criterion 4 and unevaluated under NRHP Criterion D, pending further evaluation under the PA. It is recommended not eligible for inclusion to the CRHR under Criteria 1-3, or for inclusion to the NRHP under Criteria A-C. Under CRHR Criteria 1 and NRHP Criteria A, site RS-617 does not contribute to the broad patterns of history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not related to the lives of people important to the past and is recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. RS-617 is recommended not eligible for inclusion to the CRHR under Criterion 3 and NRHP Criterion C because it does not represent a unique style, type, or design. Site RS-617 may, however, yield information important to history or prehistory and is, therefore, treated as eligible under CRHR Criterion 4 and is unevaluated under NRHP Criterion D, pending further evaluation under the PA.

RS-720

This site is a groundstone scatter, including two manos and four metate fragments in an area measuring 15 m NE/SW by 12 m NW/SE. No flaked stone was observed at the site. The site vegetation is made up of creosote, saltbush and annual native grasses. The condition of the site, possibly either deflated or obscured by alluvial deposition, and

the types of artifacts at the site indicates that the site may have information important to prehistory, especially in regards to the research about sites containing milling implements.

Site RS-720 is, therefore, treated as eligible under CRHR Criterion 4 and is unevaluated under NRHP Criterion D. It is recommended not eligible for inclusion to the CRHR under Criteria 1-3, or for inclusion to the NRHP under Criteria A-C. Under CRHR Criteria 1 and NRHP Criteria A, site RS-720 does not contribute to the broad patterns of history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not related to the lives of people important to the past and is recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. RS-720 is recommended not eligible for inclusion to the CRHR under Criterion 3 and NRHP Criterion C because it does not represent a unique style, type, or design. Site RS-720 may, however, yield information important to history or prehistory and is, therefore, treated as eligible under CRHR Criterion 4 and subject to evaluation under NRHP Criterion D under the PA.

Site RS-850

This site consists of a prehistoric lithic scatter of three CCS flakes and one CCS biface fragment in a 22 m east-west by 25 m north-south area. The site is situated on a level sandy plain with vegetation consisting of creosote, saltbush, cholla, and native grasses. An unnamed wash is located approximately 1.4 km to the east. Soil at the site is brown-yellow sand with aggregate cobbles and pebbles ranging from 1 to 5 cm in length. The CCS biface fragment appears to be from a tool broken early during manufacture and, consequently, does not have any temporally diagnostic attributes. The CCS flakes consist of chalcedony, jasper, and chert, all of various hues of red, and all of probable local origin. All of the artifacts are located on the alluvial surface and no cultural deposit was observed at the site. It may be possible that a limited cultural deposit could have either been deflated over time, as periods of high wind are common in the area, or, while not likely, a deposit could be obscured by an accumulation of alluvium on the valley floor from the adjacent El Paso Mountains. Based on artifacts at the site, it is not clear if the site is the remnant of a temporary camp, or is a single lithic reduction episode. Potential impacts to the site are associated with continued sheet runoff actions from the adjacent El Paso Mountains that could result in either erosion to the site or possibly the gradual burial of it by alluvium.

The condition of the site, possibly either deflated or obscured by alluvial deposition, and the types and raw materials of the artifacts at the site indicates that the site may have information important to prehistory, especially in regards to the research about sites containing possibly local CCS flaked stone materials, located in proximity to local sources and prehistoric lakeshores . Site RS-850 is, therefore, treated as eligible under CRHR Criterion 4 and is unevaluated under NRHP Criterion D, pending further evaluation under the P.A. It is recommended not eligible for inclusion to the CRHR under Criteria 1-3, or to the NRHP under Criteria A-C. Under CRHR Criteria 1 and NRHP Criteria A, site RS-850 does not contribute to the broad patterns of history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not related to the lives of people important to the past and is recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. RS-758 is

recommended not eligible for inclusion to the CRHR under Criterion 3 and NRHP Criterion C because it does not represent a unique style, type, or design. Site RS-850 may, however, yield information important to history or prehistory and is, therefore, treated as eligible under CRHR Criterion 4 and is unevaluated under NRHP Criterion D. This site does appear to qualify to be addressed under California Archaeological Resources Identification Data Acquisition Program (CARIDAP): Sparse Lithic Scatters (OHP 1988). Successful treatment under CARIDAP would result in a no historic property finding.

Site RS-870

Lithics and a groundstone artifact scatter characterize this site. There is a sandstone metate, a mano fragment, a CCS scraper and a piece of CCS debitage. The metate measures 35 by 35 cm and is 10 cm high with a 1 cm deep oval basin. There is no water source immediately adjacent to the site. Creosote, saltbush and annual native grasses form the vegetation. The site is 14 m EW by 8 m NS.

The condition of the site, possibly either deflated or obscured by alluvial deposition, and the types of artifacts at the site indicates that the site may have information important to prehistory, especially in regards to the research about sites containing milling implements and possibly diagnostic flaked stone artifacts (possibly of a locally available material). Site RS-870 is, therefore, treated as eligible under CRHR Criterion 4 and is unevaluated under NRHP Criterion D. It is recommended not eligible for inclusion to the CRHR under Criteria 1-3, or for inclusion to the NRHP under Criteria A-C. Under CRHR Criteria 1 and NRHP Criteria A, site RS-870 does not contribute to the broad patterns of history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not related to the lives of people important to the past and is recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. RS-870 is recommended not eligible for inclusion to the CRHR under Criterion 3 and NRHP Criterion C because it does not represent a unique style, type, or design. Site RS-870 may, however, yield information important to history or prehistory and is, therefore, treated as eligible under CRHR Criterion 4 and unevaluated under NRHP Criterion D, pending further evaluation under the PA.

Site RC-S-6

The resource consists of a single unshaped basalt boulder metate with no known associated cultural materials. The vesicular basalt boulder measures 31 cm x 35.5 cm x >17 cm (this axis is buried and not measured in its entirety). The grinding surface on the metate is oval shaped with a basin-shaped cross-section over 7 mm deep, smooth polish and some pecking. The grinding surface measures 25 cm long x 15 cm wide x 0.8 cm deep, and is oriented approximately at a 45° angle to the desert floor. Either the groundstone was moved from its original use position or it was used at an angle with a catch tray (basket or otherwise) at its base. The milling feature is located 1 m south of an ephemeral two-track dirt road oriented WNW/ESE, on a 3° to 5° NNW-facing alluvial fan deposit, on a low rise with two seasonal drainages 175 to 200 m to the east and west. The present vegetation in the immediate area consists of creosote, bursage and cholla. The local soil is a granitic-derived brown sand, with quartzite, agate, and meta-sedimentary gravels/cobbles. A 10 m buffer was placed around the milling feature to establish site boundaries.

In regards to its spatial relation to other milling features recorded in the area, this site could provide important insight into prehistoric land use and variance in groundstone implements in the western Mojave Desert. Furthermore, the site appears to have been affected by alluvial or Aeolian deposition and may have a subsurface deposit.

RC-S-6 is treated as eligible under Criterion 4 of the CRHR and is unevaluated under NRHP Criterion D, pending further evaluation of the site under the Programmatic Agreement (PA). It is recommended as not eligible under criteria 1-3, or for inclusion to the NRHP under criteria A-C. The site does not contribute to the broad patterns history considered by Criterion A and Criterion 1, is not associated with the lives of people important to the past considered by Criterion B and Criterion 2, and is neither unique nor representative of a style, type, or design important historically as addressed by Criterion C and Criterion 3.

Site RC-S-7

This resource consists of a rock ring measuring 4.5 m east-west and 3.54 m north-south. The ring is marked by individual cobbles separated by approximately 0.5 m. A cluster of other cobbles is present adjacent to the northwest quarter of the ring. A single bipolar core of agate was noted 67 m west of the ring near the edge of a large wash. A total of 28 cobble and boulder-sized stones are used in or are located adjacent the ring. Local soils consist of gravelly sand with metamorphic and quartzite present as dominant gravel components. Vegetation is very sparse in the vicinity of the feature and consist of scattered creosote bush. Occasional white bursage and cholla occur in the area.

The condition of the site, partially obscured by alluvial deposition, and the paired metates suggests that the site may retain information important in understanding local prehistory. Rock rings are a known component of prehistoric sites in the Western Mojave Desert and this feature may add to the general understanding of these sites.

RC-S-7 is therefore treated as eligible under Criterion 4 of the CRHR and is unevaluated under NRHP Criterion D, pending further evaluation of the site under the PA. It is recommended not eligible under criteria 1-3, or for inclusion to the NRHP under criteria A-C. The site does not contribute to the broad patterns history considered by Criterion A and Criterion 1, is not associated with the lives of people important to the past considered by Criterion B and Criterion 2, and is neither unique nor representative of a style, type, or design important historically as addressed by Criterion C and Criterion 3.

Site RC-S-8

This site consists of two basalt metates. One is a complete boulder metate with visible dimensions of 33.3 cm length, 22.1 cm width and more than 13 cm thickness. The artifact is partially buried and was left in that state. The second metate is a thick slab metate fragment. The remaining dimensions are 17. 0 cm long, 16.1 cm wide and 8.5 cm thick. Both artifacts are of coarse-grained finely-vesicular basalt. The artifacts are located near the bottom of a shallow wash in near-level alluvial fan deposits. The overall dimensions of the area were arbitrarily assigned a 10-m diameter. The soil consists of medium grained brown sand. The vegetation consists of creosote bush, cholla and white bursage. Annual plants include scant grass and filaree.

The condition of the site, partially obscured by alluvial deposition, and the paired metates suggests that the site may retain information important in prehistory. This is particularly true in regard to prehistoric milling pattern and land use.

RC-S-8 is therefore treated as eligible under Criterion 4 of the CRHR and is unevaluated under NRHP Criterion D, pending further evaluation of the site under the PA. It is recommended not eligible under criteria 1-3, or for inclusion to the NRHP under criteria A-C. The site does not contribute to the broad patterns history considered by Criterion A and Criterion 1, is not associated with the lives of people important to the past considered by Criterion B and Criterion 2, and neither unique nor representative of a style, type, or design important historically as addressed by Criterion C and Criterion 3.

C.3.5.1.8.2.2 Historical Archaeological Sites

The following four historic sites have been recommended as eligible or are being treated as eligible for the CRHR and will be evaluated under the PA for eligibility to the NRHP.

Site RS-150

Site RS-150 is a historic campsite which may be associated with construction of the Southern Pacific Railroad's Mojave-Owenyo branch line alignment (CA-INY-4607H/IF-KER-3366H). The campsite measures approximately 10.5 m (35 ft) north-south and 7.5 m (25 ft) east-west, consists of a rectangular area cleared of basalt cobbles at the bottom of an east-facing volcanic basalt field in an area of approximately 3% slope. The site also has a historic debris scatter consisting of one key strip sardine can, one meat tin, pieces of wire and wood, at least four amethyst glass fragments, and fragments of an aqua glass insulator that are embedded in the soil. The presence of sun-colored amethyst glass suggests that the site dates to the early decades of the 20th century, possibly contemporaneous with the construction of the rail line on the grade to the east. The site is located adjacent to a seasonal wash that runs north-south and is lined with large creosote and saltbush specimens. Vegetation surrounding the site is sparse due to the concentration of basalt cobbles measuring 15 to 50 cm covering the ground surface. Soil at the site is yellow-brown silty loam with basalt pebbles between 2 and 10cm in length.

Site RS-150 is located in the revised project APE and thus will be impacted by construction of the RSPP. The placement of the site in proximity to the Mojave-Owenyo Branch railroad constructed in 1908 to facilitate the construction of the Los Angeles Aqueduct provides it with an historic context (see Mikesell and Riggs 1992, pp.45). It is, therefore, recommended eligible under CRHR Criterion 4 and is unevaluated under NRHP Criterion D, pending further site evaluation under the PA. It is recommended not eligible for inclusion to the CRHR under Criteria 1-3, or for inclusion to the NRHP under Criteria A-C. Under CRHR Criteria 1 and NRHP Criteria A, site RS-19c does not contribute to the broad patterns of history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site is not related to the lives of people important to the past and is recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. RS-150 is recommended not eligible for inclusion to the CRHR under Criterion 3 and NRHP Criterion C because it does not represent a

unique style, type, or design. Site RS-150 may, however, yield information important to history or prehistory and is, therefore, recommended eligible under CRHR Criterion 4 and eligible under NRHP Criterion D.

Site RS-162/163

This site is a scatter of approximately 16 historic can and one piece of milled wood with wire attached was found in an area measuring 445 ft NS by 87 ft EW. The cans included eight large knife-opened hole-in-top cans, one hand soldered internal friction gallon paint can, one key strip gallon can, three knife opened 3" x 4" hole-in-cap cans and one 25 pound blasting powder can. The milled wood is a 4x4" piece that is 6' 7" long. The character of the cans, especially the knife-opened, the hole-in-cap and the machine-soldered cans along with lack of any church-key opened cans (post 1935) suggest an early 20th century single depositional event rather than a site added to over time. The blasting powder can is of special interest in that it would like have been used in either railroad building or in mining. If further historic research on the 1904 map of mines in Kern County confirms the association, this site may be associated with Frank A. Huntington, a prominent inventor of mining equipment in late 19th century California.

While the site appears to reflect an earlier date than most historic assemblages in this area of the Mojave Desert, this limited scatter of cans and wood is treated as eligible for inclusion to the CRHR and NRHP. The site does not contribute to the broad patterns of California's history and is recommended not eligible under CRHR Criterion 1 and NRHP Criterion A. The site may be associated with a person important to California's past and so is recommended eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. However, if further historical research into the mines in section 35 demonstrates that mines or prospects were located in this area, the site may to yield further information important to history and is treated as eligible for inclusion to the CRHR under Criterion 4. Pending further information developed under the PA, the site may be eligible as an NRHP under Criterion D.

Site RS-728/731

Consisting of a large scatter of over 100 historic cans, milled lumber, aqua and amber glass fragments and a stove pipe this site extends over an area measuring 475 ft EW by 300 ft NS. The variety of can types, including key strip srdine tins, hole-in-top with matchstick post filler sanitary cans, knife-opened gallon hole-in-cap cans, 25 pound DuPont blasting powder cans, and knife-opened 3.4" hole-in-top cans, which all would date to early 20th century. However, there were also some church-key opened beverage cans which would date to no earlier than 1935. The full range of cans indicates a continued deposit on the site running into the mid-20th century. The variety of materials found here suggests a habitation site, probably a work camp. The applicant has suggested that this may have been a work camp associated with the Mojave-Owenyo Branch railroad. However, since it is located approximately 1500 feet from the railroad line, it may be related to other possible activities, in particular mining.

Based on the nature of artifacts at RS-728/731, the site is treated as eligible for inclusion to the CRHR and NRHP, pending further research by the applicant and under

the PA. The site may contribute to the broad patterns of California's history and is assumed eligible under CRHR Criterion 1 and NRHP Criterion A. The site may also be associated with a person important to California's past and is recommended eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. However, this site may yield information important to history and is recommended eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D, pending further research called for under the P.A. regarding the accuracy of the 1904 map.

Site CA-KER-6837H

This resource consists of 4.5 km (2.8 miles) of the historic road alignment of Old Highway 395 from its easterly curve away from the Southern Pacific Railroad's Mojave-Owenyo branch line alignment (CA-INY-4607H/IF-KER-3366H) on the west to the previously recorded 400 m (1312 ft) long abandoned portion of the alignment and its former intersection with South China Lake Boulevard. Now known as Brown Road and maintained by Kern County, the resource includes 11 associated historic debris scatter loci adjacent to the historic road alignment. The resource cuts through a flat, sandy plain elevated up to approximately five feet above the current roadbed on the north side of the alignment and up to approximately 2 feet along the south side of the alignment. The alignment first appears on the 1915 Searles Lake 60' USGS topographic quadrangle, where it connects with a northwest-southeast trending roadway associated with the Terese (sic, Code) Siding of the Mojave-Owenyo branch line on the west and connects with a second east-west trending alignment on the east, continuing toward the rail line's Rademacher Siding. The alignment was designated Highway 395 in 1925 and in use as a two-land asphalt road until 1965 when the highway was officially rerouted to the northeast, bypassing 22 miles of the original highway north through Inyokern and Brown, and the eastern portion of the original alignment was abandoned. Vegetation along the alignment and surrounding the historic debris loci consists of creosote, saltbush, and annual native grasses with smaller amounts of cholla and foxtail near the roadway. Soil in the area of the resource is brown-yellow sand with aggregate pebbles ranging from 1 to 5 cm in length; soil disturbance is present along the road cuts and resulting soil berms on either side of the two-lane paved roadbed.

Locus 1 is a large historic debris scatter consisting of over 150 tin cans in a 149 m (490 ft) east-west by 49 m (160 ft) north-south area located along the north side of Brown Road. The locus is bisected by an unpaved 115kV and 220kV transmission line access road. The majority of the cans are church-key-opened beverage cans, with smaller numbers of bimetal pull-tab cans. Also observed were cone-top beer cans, 1 quart church-key-opened oil cans and rotary-opened sanitary cans. This locus also contains prehistoric isolate R-1-900. Locus 2 is a historic debris scatter measuring 87 m (285 ft) north-south by 41 m (135 ft) east/west, located north of Brown Road. The locus consists of eight non-diagnostic flattened tin cans, a piece of milled wood measuring 2" by 4" by 11", and non-diagnostic fragments of aqua and amethyst glass. An unpaved road is located along the eastern boundary of the locus. Locus 3 is a historic debris scatter consisting of five non-diagnostic church-key-opened cans in a 24 m (78 ft) north-south by 35.5 m (117 ft) east-west area. The locus is situated north of Brown Road. A modern grave or memorial consisting of a handmade wood headstone reading "Paul E.

Nelson/"WOG"/'49-'90/SEE YA LATER" over arranged stones, fishing hooks, lures, reels, and a popsicle stick cross is present in the site. Fragments of apparently modern fiesta ware-style ceramics and plastic tail light are also found within the locus.
Locus 4 is a historic debris scatter of five tin cans and a metal tub in a 76.5 m (251 ft) north-south by 43 m (142 ft) east-west area located in and around a sandy wash north of Brown Road. Cans consist of one external friction 1 lb. coffee can lid, three church-key-opened beverage cans, one bimetal pull-tab "Olympia" beer can, three knife-opened sanitary cans, and one rotary open sanitary can.

Locus 5 is a historic debris scatter of 29 tin cans and one metal lid in a 61 m (200 ft) north-south by 30.5 m (100 ft) east-west area north of Brown Road. The locus is bisected by a wash running east-west. Components consist of one rotary open sanitary can, ten bimetal pull-tab beverage cans, 18 church-key-opened beverage cans, and one external friction 1 lb. coffee can lid.

Locus 6 is a historic debris scatter consisting of nine tin cans in a 14 m (47 ft) east-west by 7.5 m (25 ft) north-south area located south of Brown Road. Cans represented include two bimetal pull-tab beverage cans, two church opened key beverage cans, three non-diagnostic crushed cans, and two knife-opened beverage cans.

Locus 7 is a historic debris scatter of at least 42 tin cans in a 70 m (231 ft) northeast-southwest by 43.5 m (143 ft) northwest-southeast area located north and south of Brown Road. Cans include 20 church-key-opened beverage cans, two sanitary rotary-opened cans, one knife-opened meat tin, and 19 bimetal pull-tab cans.

Locus 8 is a historic debris scatter consisting of 26 tin cans in a 74 m (242 ft) east-west by 21 m (70 ft) north-south area located north of Brown Road. Cans consist of 17 church-key-opened beverage cans, four non-diagnostic crushed cans, one cone-top beer can, one key strip tobacco tin, one bimetal pull-tab can, and two knife-opened sanitary cans. Milled wood and a large asphalt pile are present within the locus.
Locus 9 is a historic debris scatter of 11 tin cans in a 46 m (151 ft) north-south by 24 m (80 ft) east-west area north of Brown Road. Cans consist of eight church-key-opened beverage cans, one steel pull-tab can, one rotary-opened juice can, and one rotary-opened sanitary can. Modern refuse is also present.

Locus 10 is a historic debris scatter of six tin cans in a 38 m (125 ft) east-west by 12 m (40 ft) north-south area located north of Brown Road. Artifacts in the locus include five church-key opened beverage cans and one cone-top beer can. The site has been impacted by off-road vehicular traffic.

Locus 11 is a historic debris scatter consisting of eight tin cans in a 33.5 m (110 ft) east-west by 6 m (20 ft) north-south area located south of Brown Road. Cans consist of one bimetal pull-tab can, two church-key-opened beverage cans, four non-diagnostic crushed cans, and one rotary-opened sanitary can. The locus also contains modern refuse including clear glass fragments.

The various loci along the pre-1915 alignment reflect the use of the historic road over the course of the 20th century. Deposits along the roadway appear to reflect the casual dumping of refuse, whether a collection of material or individual items, by users of the

thoroughfare. Little information on specific activities, however, can be discerned within the loci. The historic road alignment of CA-KER-6837H retains integrity of location and setting and, as the original alignment of Highway 395, is recommended eligible for inclusion to the CRHR under Criterion 1 and to the NRHP under Criterion A as contributing to the broad patterns of California's history. The historic alignment was an early thoroughfare through Indian Wells Valley, and part of the early development of the Federal Highway System and its development in California. The site is not associated with persons important to California's past and recommended not eligible for inclusion to the CRHR under Criterion 2 and the NRHP under Criterion B. The site does not represent a distinct type, style, or design and recommended not eligible under CRHR Criterion 3 and NRHP Criterion C. Lastly, the site is unlikely to yield information important to history or prehistory and is recommended not eligible for inclusion to the CRHR under Criterion 4 and NRHP under Criterion D.

Cultural Resources Table 6
NRHP and/or CRHR-Eligible Known Cultural Resources for Which Avoidance or Mitigation of Project Impacts Would Be Required

Resource Type, Designation	Resource Description (type, size, age)	NRHP and/or CRHR Eligibility
Prehistoric Archaeological Resources		
RS-19c	Metate and milling stone feature and biface	NRHP and CRHR treated as eligible (approach 3)
RS-154	Lithic scatter	NRHP and CRHR treated as eligible (approach 3)
RS-407	Piled rock features (cairns?)	NRHP and CRHR treated as eligible (approach 3)
RS-409	Metate and obsidian flake	NRHP and CRHR treated as eligible (approach 3)
RS-410	Lithic scatter	NRHP and CRHR treated as eligible (approach 3)
RS-604	Metate and metate fragments	NRHP and CRHR treated as eligible (approach 3)
RS-617	Cache of 8 manos, 1 core, and 1 flake	NRHP and CRHR treated as eligible (approach 3)
RS-720	Groundstone scatter (manos & metates)	NRHP and CRHR treated as eligible (approach 3)

Resource Type, Designation	Resource Description (type, size, age)	NRHP and/or CRHR Eligibility
RS-850	Lithic Scatter	NRHP and CRHR treated as eligible (approach 3)
RS-870	Lithic and groundstone	NRHP and CRHR treated as eligible (approach 3)
RC-S-6	Isolated metate and collection of boulders, possible trace of associated trail	NRHP and CRHR treated as eligible (approach 3)
RC-S-7	Rock ring ca. 4 meters in diameter, possibly house ring, agate core nearby	NRHP and CRHR treated as eligible (approach 3)
RC-S-8	Two metates near small wash, both basalt, one intact boulder metate and one fragmental slab metate	NRHP and CRHR treated as eligible (approach 3)
Ethnographic Resources		
El Paso Mountains Sacred Lands site	Sacred area including village sites, petroglyphs, quarries, etc.	Visual impacts under NRHP and CRHR
Historical Archaeological Resources		
CA-KER-6837H	Alignment of old Highway 395 with can scatter loci	NRHP and CRHR recommended eligible
RS-150	Camp site associated with Mojave-Owenyo line railroad	NRHP and CRHR treated as eligible (approach 3)
RS-162/163	Scatter of cans—early 20th century	NRHP and CRHR treated as eligible (approach 3)
RS-728/731	Work camp site—early 20th century	NRHP and CRHR treated as eligible (approach 3)
Built-Environment Resources		
None		

C.3.5.2. ASSESSMENT AND MITIGATION OF IMPACTS

Staff's assessment of the impacts/effects on cultural resources of an action (the proposed project), including direct, indirect, and cumulative impacts, was discussed above, as "Assessing Action Effects," under "Methodology and Thresholds for

Determining Environmental Consequences." Staff's determination of appropriate mitigation of significant impacts/effects is also discussed above, as "Resolving Significant Effects," under "Methodology and Thresholds for Determining Environmental Consequences."

C.3.5.2.1 Construction

Staff will assess as significant and adverse all project-related construction impacts, direct, indirect, and cumulative, to all known cultural resources located in the APEs and not determined by Energy Commission staff or the BLM archaeologist to be ineligible for either the CRHR or the NRHP. Staff will make recommendations that these impacts will have to be avoided or mitigated with specific mitigation detailed in a programmatic agreement (PA), to be negotiated and signed by the BLM, the State Historic Preservation Officer, the ACHP, the Energy Commission, and other consulting parties.

To determine the RSPP's impacts, staff developed an alternate concept of the area in which cultural resources would be impacted by the project as one large, three-dimensional spatial block—an "impact block," entailing the full extent of the project's below-grade impacts (inclusive of all foundations and trenches) and above-grade impacts (inclusive of all above-ground facilities), and delimiting both the project's physical impacts to surficial and buried cultural resources and perceptual impacts to the settings of built-environment resources. Staff's assessment of the RSPP's impacts to register-eligible and treated as register-eligible cultural resources entails assuming as well that all cultural resources located within the impact block would be significantly impacted by the project and that these impacts would require mitigation.

C.3.5.2.2 Operation

It is anticipated that initial construction will have the ultimate impact on any cultural resources in the project area and that little would remain to be affected during normal operations of the facility. However, it is possible that there would be some additional ground disturbing work that might be necessary in the course of maintenance to the subsurface linear facilities and that such activity could affect resources that had escaped damage in the original construction. Monitoring of such work will be addressed in subsequent documents, in particular the Programmatic Agreement.

C.3.5.2.3 Project Closure and Decommissioning

Upon the closure and decommissioning of the facility, it is expected that little additional damage to the cultural resources would occur. However, in the course of demolition there would be the likelihood of collateral damage to areas of soil that had not been impacted in the original construction.

C.3.5.2.4 Applicant's Recommended Mitigation Measures

Recommended mitigation measures from the applicant (SM 2009a, vol. 2, append. G, pp. 103-113) stress preservation of cultural resources through avoidance by re-design. However, if avoidance is not possible, further investigation of the cultural resources to determine eligibility to the NRHR and CRHR is required. If significant, or potentially significant, cultural resources cannot be avoided, the project owner should retain a qualified Cultural Resources Specialist to prepare and implement a data recovery

program for the affected resources. The Principal Investigator for the mitigation program will meet the minimum Secretary of Interior Standards for a Principal Investigator.

A designated Cultural Resources specialist should be available during the construction to inspect and evaluate any finds of potentially significant buried cultural material. The Cultural Resources Specialist will coordinate with the project construction manager and environmental compliance manager to stop all work in the vicinity of the find until it can be assessed. If the discovery is determined to be not significant through consultation with CEC and BLM staff, work will be allowed to continue.

If a discovery is determined to be significant in consultation with the Energy Commission and BLM, a mitigation plan should be prepared and carried out in accordance with State guidelines. If the resources cannot be avoided, a data recovery plan should be developed to ensure collection of sufficient information to deal with archaeological and/or historical research questions.

A professional technical report should be prepared documenting any assessment and data recovery investigations. The report should describe the methods and materials collected, and provide conclusions regarding the results of the investigations. The report should be submitted to the curatorial facility with the artifacts.

Curatorial material collected as part of an assessment or data recovery mitigation should be curated at a qualified curation facility. Field notes and other pertinent materials should be curated along with the archaeological collections (SM 2009a, vol. 2, append. G, pp. 103-113).

C.3.5.2.3 BLM and Energy Commission Required Resolution of Significant Effects

As noted above, the resolution of the significant effects of the RSPP would be set forth in a PA. The process through which the PA is created is under the management of the BLM Ridgecrest Field Office, which has recently initiated the consultation process with an invitation to the Advisory Council on Historical Preservation and to the State Historic Preservation Officer for California. The BLM will also invite the California Energy Commission, Indian Tribes, the applicant, as well as other interested parties to consult in the drafting of the PA for the RSPP. Specific mitigation measures for the eligible and treated-as-eligible cultural resources will be developed through the PA consultation process, but staff expects that the project will be subject to many of the mitigation measures traditionally required by the Energy Commission and recognized as effective mitigation among cultural resource specialists. The following list describes mitigation measures, many of which, staff anticipates will be incorporated into the final PA and Condition of Certification.

C.3.5.2.3.1 Mitigation Measures for an Archaeological District

The Last Chance Canyon Archaeological District (LCCAD) is a national register district that was nominated for listing in the NRHP in 1971. The district established arbitrary boundaries (based on available 15 minute USGS quads) that overlap the APE of the RSPP on its western boundary. Potential mitigation for RSPP impacts to the LCCAD could entail further research to determine how the prehistoric archaeological sites found

in the AECOM/EDAW surveys fit with the district's cultural resources. Due to the limited amount of site identifications in the original LCCAD nomination, an updated NRHP district nomination may have to be created to better reflect the cultural inventory of the district.

C.3.5.2.3.2 Mitigation Measures for Individual Sites

- For some historic-period archaeological sites, including those with possible mining claim cairns and small early twentieth-century refuse deposits, no additional field work may be necessary, but, rather, existing data, such as photographs or detailed artifact recording forms would just need to be incorporated into the site forms.
- For many of the prehistoric and historic-period archaeological sites, additional field recordation may be needed to fill gaps in the existing recordation, as represented in the site forms, and to resolve questions about historic-period sites attribution.
- Additional field investigation may also be needed on some archaeological sites to determine if subsurface deposits exist and, if they do, to adequately sample those deposits.
- Application of a method of recordation of isolated refuse deposits such as the IHDP (Isolated Historic Refuse Deposits) program developed by Caltrans archaeologists could be a way to mitigate the destruction of the large number of artifact scatters (mostly cans) that are found throughout the project area. Since these can scatters can often be broken down into relatively discrete time periods, the recording and subsequent analysis of these sites could enrich studies of the early development of roads, trails, mining, and railroad camps in the project area and relate them to broader studies of linear resources (railroad lines, roads, power line corridors, etc.). Application of this method of mitigation would be particularly appropriate to the numerous can scatter loci associated with the old Highway 395 linear feature CA-KER-6837H.
- The site forms for both prehistoric and historic-period archaeological sites in the vicinity of the two remnant Pleistocene Colorado River terraces on the west side of the proposed plant site mention that observed artifacts were partially embedded in silt. This is evidence for the possibility of buried resources in the area to the west (up-slope) of the terraces, which evidently have served to locally block the sheet flow of water and thus have caused the deposition of sediments. Testing, possibly of a geophysical nature, for subsurface deposits may be necessary to further assess this possibility.
- Archival research may be needed for sites with possible connections to early 20th century mining in the area (RS-162/163 and RS-728/731), indicated on the Kern County Mining map of 1904 (Aubury 1904).

C.3.5.2.3.3 Mitigation Measures for the Discovery of Sites During Construction

Staff commonly recommends a set of standard measures providing for the contingency of discovering archaeological resources during construction and related activities. These measures usually include the following:

- Measure-1 requires a Cultural Resources Specialist (CRS) to be retained and available during construction-related excavations to evaluate any discovered buried resources and, if necessary, to conduct data recovery as mitigation for the project's unavoidable impacts on them.
- Measure-2 requires the project owner to provide the CRS with all relevant cultural resources information and maps.
- Measure-3 requires the CRS to write and submit to the Energy Commission Compliance Project Manager (CPM) a Cultural Resources Monitoring and Mitigation Plan (CRMMP).
- Measure-4 requires the CRS to write and submit to the CPM a final report on all cultural resources monitoring and mitigation activities.
- Measure-5 requires the project owner to train workers to recognize cultural resources and instruct them to halt construction if cultural resources are discovered.
- Measure-6 prescribes the monitoring, by an archaeologist and, possibly, by a Native American, intended to identify buried archaeological deposits.
- Measure-7 requires the project owner to halt ground-disturbing activities in the area of an archaeological discovery and to fund data recovery, if the discovery is evaluated as CRHR-eligible.

In Measure-6, staff commonly specifies the parts of a project site where ground disturbance must be monitored by an archaeologist and, possibly also, by a Native American. For RSPP construction, it is likely that staff would minimally recommend archaeological and Native American monitoring of the parts of the project site in proximity to the El Paso Wash where the geo-archaeologist recommended monitoring (Steinkamp 2010, p. 15).

C.3.6 RECONFIGURED ALTERNATIVE

The current project has been revised from the original plan submitted. To address resource management agencies' comments regarding habitat values, the RSPP site plan has been reconfigured to avoid the impacts to natural storm water flows across the El Paso Wash. South of Brown Road, this avoidance will be accomplished by shifting the south solar field slightly to the north and west, placing it entirely out of and to the west of the Wash. This adjustment results in an approximate 4% reduction in the area of disturbance of the southern solar field. The reconfiguration also includes relocation of the power block to the north of Brown Road. The main site access road and main office are also moved to north of Brown Road. The reduced footprint of the south solar field requires the number of solar collector array loops, which individually have dimensions of approximately 1,300 feet long by 140 feet wide, to be decreased from 133 to 119.

The design of the 230 kV switchyard has been optimized, resulting in a reduction of the footprint to 3.2 acres (425 ft x 325 ft) from 5.5 acres (600 ft x 400 ft). The new location of the switchyard is such that its western boundary limit will be contiguous with the eastern boundary line of the proposed Southern California Edison (SCE) permanent easement. Modifications to the planned reroute of the existing SCE lines west of the south solar field are consistent with the original intent to closely follow the western limits of the field. The length of the existing lines that will need to be relocated (through a shift to the west) is now 8,600 feet (compared to 8,000 ft in the original site configuration. The length of the proposed realigned segments of the existing SCE 115 kV and 230 kV transmission lines will run 9,060 ft around the southwest corner of the south solar field.

North of Brown Road, the north solar field is shifted north and east to move the field entirely out of the El Paso Wash. The area of disturbance associated with the north solar field has increased by approximately 25% to offset the reduction of the south solar field. The number of solar collector array loops in the north solar field has increased from 145 to 167. In order to contain the entire field between the east side of the El Paso Wash and US Highway 395, the east-west dimensions of the two original segments of the north solar field are reduced and the field is reconfigured into a total of six segments, with some segments of the field shifted east. The reconfiguration of the RSPP results in a slight increase in the ROW to 3,995 acres. Engineered drainages along the perimeters of both the north and south solar fields are being redesigned to accommodate the new solar field configuration. Total disturbed acreage for the project will be increased from approximately 1,760 acres to 1,944 acres (a 10% increase). Several factors contributed to the increase in disturbance area of the north field. The greatest factor is more unused space within the fence lines of the solar fields due to segmentation of the field to avoid the wash and fit into the remaining available area. The new design is not as efficient as the previous design, in both use of land area and conversion of solar radiation into electricity. Process efficiency is reduced, requiring approximately 3% more solar loops due to the heat transfer requirements associated with the solar collection and pumping inefficiencies that occur with the staggered field configuration.

To mitigate the overall losses in process efficiency resulting from the new configuration, the process performance of the steam cycle was improved by adding cells to the air-cooled condenser (ACC). This change approximately doubled the area occupied by this piece of equipment, from about 1.66 acres to 3.27 acres; ACC height remains at 120 feet. The increase in ACC size will reduce the steam system backpressure. To accommodate the larger ACC, the layout within the power block was rearranged somewhat, although the overall impact to the power block footprint is negligible. In addition, regarding the less efficient use of land area, the staggered field configuration results in triangular spaces at the “offsets” in the field design that may be disturbed in the process of grading the site. These areas are currently being evaluated to minimize any impact. The segmentation in the north field has also increased the number of subfields of solar arrays from 4 to 6, resulting in additional terraces, access roads, and on-site drainage channels being required between the subfields. Also, the new SCE lines have been pushed further to the west, which also has resulted in some space inefficiencies and corresponding increase in total disturbance area. The areas of disturbance associated with the relocated SCE transmission lines are included within

the total disturbance area cited above. The disturbed areas west of the south field may be able to be further reduced at such time as SCE has finalized their design for the re-alignment.

The movement of the power block to the north of Brown Road will result in a longer gen-tie line alignment and a greater number of monopoles between the power block and the switchyard. The length of the t-line alignment will increase from approximately 1,250 ft to 3,900 ft, and the number of poles will increase from 3 to 4. The reconfiguration will also result in the need for the gen-tie line to cross over Brown Road. The longer north-south dimensions of the north solar field will result in an overall longer run of in-field HTF piping, and the new relative positioning of the two solar fields will result in a longer run of out-of-field HTF piping. The major length of out-of-field piping is a 2,200-foot run from the power block, spanning over El Paso Wash via a new pipe bridge, under Brown Road via a pair of culverts, and onward into the south solar field.

Because the offsite portion of the water pipeline is shortened in the new design, total disturbed acreage for the offsite water line will be reduced from approximately 18 acres to approximately 16.3 acres. The diameter for the water pipeline has increased from 12” to 16” to accommodate a request from the Indian Wells Valley Water District.

C.3.6.1 SETTING AND EXISTING CONDITIONS

This alternative includes the North and South solar fields, the power plant, the water line and the installation of a longer conductoring alignment to connect with the main power utility line. The setting for the north and south solar units would be adjusted to increase the northern unit and decrease the southern unit. Also, the power block would be moved from south of Brown Road to north of the road.

The extension of the North solar field at its north end would be located partially on land that had been previously surveyed for cultural resources in connection with the original proposed project, but approximately 300 acres of BLM-managed land for the north unit has not been surveyed for cultural resources, although in response to cultural Data Requests 110-112, applicant states that the survey and documentation will be completed by June 2010. Consequently, at this time, staff cannot say how many and what kind of additional cultural resources the Reconfigured Alternative would impact, beyond those already identified for the proposed project.

C.3.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff would assess as significant and adverse all project-related construction impacts, direct, indirect, and cumulative, to all known cultural resources located in the APE of this alternative and not determined by Energy Commission staff or the BLM archaeologist to be ineligible for either the CRHR or the NRHP.

Staff would make recommendations that the impacts of this alternative on cultural resources would have to be avoided or mitigated with specific modes of mitigation detailed in the programmatic agreement (PA), executed for this project.

C.3.6.3 CEQA LEVEL OF SIGNIFICANCE OF IMPACTS

Staff would assume that all construction impacts, direct, indirect, and cumulative, to all eligible and staff-assumed-eligible cultural resources located in the APE of this alternative would be significant and adverse under "approach 3." Staff also assumes that these impacts would be reduced to a less-than-significant level by the implementation of CUL-1 and the PA.

C.3.7.1 NORTH OF BROWN ROAD ALTERNATIVE

The North of Brown Road Alternative would be a 146-MW solar facility located to the north of Brown Road within the boundaries of the proposed project. This alternative is analyzed for two major reasons: (1) it eliminates impacts to the area south of Brown Road where the majority of the treated as eligible archaeological sites are located, so all impacts are reduced, and (2) by removing the south solar field, which is located in an identified Mojave Ground Squirrel habitat area, this alternative minimizes impacts to wildlife movement corridors.

C.3.7.1.1 Setting and Existing Conditions

This alternative is located entirely within the ROW boundaries of the proposed project, however, it extends the APE boundary to the north encompassing approximately 300 acres. It also eliminates the southern solar field (809 acres). As a result, the environmental setting consists of the northern portions of the proposed project, as well as the area affected by the linear facilities corridor. This alternative would be located mostly within the previously evaluated APE boundaries, though it will require field survey of the additional acreage to the north.

C.3.7.1.2 Assessment of Impacts and Discussion of Mitigation

Staff would assess as significant and adverse all project-related construction impacts, direct, indirect, and cumulative, to all known cultural resources located in the APEs of this alternative and not determined by Energy Commission staff or the BLM archaeologist to be ineligible for either the CRHR or the NRHP.

Staff would make recommendations that the impacts of this alternative on cultural resources would have to be avoided or mitigated with specific modes of mitigation detailed in the previously referenced PA.

C.3.7.1.3 CEQA Level of Significance of Impacts

Staff would assume that all construction impacts, direct, indirect, and cumulative, to all eligible and treated-as-eligible cultural resources located in the APE of this alternative would be significant and adverse. Staff also assumes that these impacts would be reduced to a less-than-significant level by the implementation of CUL-1 and the PA.

C.3.7.2 SOUTH OF BROWN ROAD ALTERNATIVE

The South of Brown Road Alternative would be a 104-MW solar facility located to the south of Brown Road within the boundaries of the proposed project. This alternative is analyzed for two major reasons: (1) it eliminates impacts to the area north of Brown Road where 7 out of 17 of the treated-as-eligible archaeological sites are located, so

some impacts are reduced, and (2) by removing the north solar field, which is located in an area with a high Desert Tortoise population (see Biological Resources section of this SA/EIS), this alternative minimizes impacts to a newly discovered remarkable population of this special status wildlife species.

C.3.7.2.1 Setting and Existing Conditions

This alternative is located entirely within the APE of the proposed project. It also eliminates the north solar field (1118 acres). As a result, the environmental setting consists of the southern portions of the proposed project to include the power plant, which would remain in place as in the original proposed configuration. This configuration would lie wholly within the previously evaluated APE boundaries and thus not require additional survey.

C.3.7.2.2 Assessment of Impacts and Discussion of Mitigation

Staff would assess as significant and adverse all project-related construction impacts, direct, indirect, and cumulative, to all known cultural resources located in the APEs of this alternative and not determined by Energy Commission staff or the BLM archaeologist to be ineligible for either the CRHR or the NRHP.

Staff would make recommendations that the impacts of this alternative on cultural resources would have to be avoided or mitigated with specific modes of mitigation detailed in the PA.

C.3.7.2.3 CEQA Level of Significance of Impacts

Staff would assume that all construction impacts, direct, indirect, and cumulative, to all eligible and staff-treated-as-eligible cultural resources located in the APE of this alternative would be significant and adverse. Staff also assumes that these impacts would be reduced to a less-than-significant level by the implementation of CUL-1 and the PA.

C.3.7.3 GARLOCK ROAD SITE ALTERNATIVE

The Garlock Road site is an off-site (off of the BLM ROW for the RSPP). It will be discussed in a separate section of alternatives.

C.3.8 NO-PROJECT/NO-ACTION ALTERNATIVE

The No-Project Alternative under CEQA (or the No-Action Alternative under NEPA) considers the scenario that would exist if the proposed RSPP were not constructed. The CEQA Guidelines state that “the purpose of describing and analyzing a ‘no project’ alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project” (Cal. Code Regs., tit. 14 § 15126.6(i)). The No-Project analysis here considers existing conditions and “what would be reasonably expected to occur in the foreseeable future if the project were not approved…” (Cal. Code Regs, tit. 14 § 15126.6(e)(2)). Under NEPA, the No-Action Alternative is used as a benchmark of existing conditions by which the public and decision makers can compare the environmental effects of the proposed action and the alternatives.

If the No-Project/No-Action Alternative were selected, the construction and operational impacts of the RSPP would not occur. The 2,002-acre site would not be graded, and no cultural resources would be destroyed. The No-Project/No-Action Alternative would also eliminate contributions to cumulative impacts on cultural resources and environmental parameters in Kern County and in the Mojave Desert as a whole in keeping with the objectives of the West Mojave Desert Plan (WEMO).

In the absence of the RSPP, however, other power plants, based on both renewable and non-renewable technologies, would have to be constructed to serve the demand for electricity and to meet the state-mandated Renewable Portfolio Standards (RPS). If the No-Project/No-Action Alternative were chosen, other utility-scale solar power facilities might be built, and their impacts to the environment might be similar to those of the proposed project because solar technologies require large amounts of land, as for the RSPP. The No-Project/No-Action Alternative might also lead to siting other non-solar renewable technologies to help achieve the California RPS.

Additionally, if the No-Project/No-Action Alternative were chosen, it is likely that additional gas-fired power plants would be built or that existing gas-fired plants could operate longer. If the proposed project were not built, California would not benefit from the reduction in greenhouse gases that this facility would provide, and SCE would not receive the 250-MW contribution to its renewable state-mandated energy portfolio.

C.3.9 COMPARISON OF ALTERNATIVES AND RECOMMENDATION OF LEAST-IMPACT CR ALTERNATIVE

Of the prehistoric sites treated as eligible for the NRHP under criterion D and the CRHR under criterion 4 by the Applicant and by staff, eight of the thirteen are located in the area to be impacted by the southern solar field configuration and two by the northern solar field. Of the four historic sites that are treated as eligible, three are in the area of the southern solar field and the fourth is Brown Road, a linear feature that bisects the north and south portions of the RSPP APE. **Cultural Resources Table 7** below provides a comparison of the number of sites that would be affected by each alternative.

Cultural Resources Table 7
Comparison of Proposed Project and Alternatives by Impacted Sites

Impacts	Proposed Project (Revised) (250 MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250 MW)	No Project/No Action*
Loss of prehistoric sites	Y(10 sites)	Y (5 sites)	Y (8 sites)	Y (9 sites)	N
Loss of Historic sites	Y (4 sites)	Y (1 site)	Y (3 sites)	Y(3 sites)	N
Visual Impact on Sacred Lands	Y	Y	Y	Y	N
Last Chance Canyon Archaeological District	Y	Y	Y	Y	Y
Impact On Built Environment	N	N	N	N	N

*All No Project/No Action alternatives assume that the RSPP project would not be built on the proposed site

Based on the findings shown on **Cultural Resources Table 7** (above), the order of the four alternatives from least effect (1) to most effect (5) would be as follows:

1. The No Project Alternative which would not affect any cultural resources.

2. The Northern Unit alternative would have the least effect due to affecting 6 sites (5 prehistoric and one historic) found in that area.

3. The Southern Unit alternative would affect 11 sites (8 prehistoric and 3 historic), and would be closer to the El Paso Mountains sacred site and to the Last Chance Canyon Archaeological District. ,

4. The original proposed site would affect a total of 12 sites (9 prehistoric and 3 historic), but it would also encroach more on the El Paso Wash which is considered likely to have buried deposits

5. The revised project would affect the largest number of known sites (a total of 14 (10 prehistoric and 4 historic), but it would avoid the potentially sensitive area of the El Paso Wash.

Cultural Resources Table 8
Ranked Comparison of Proposed Project and Alternatives

	Proposed Project (250 MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250 MW)	No Project/No Action*
Summary of Impacts of Proposed and Alternative Actions	The project would impact the greatest number of identified cultural sites, but would avoid an area sensitive for buried sites (El Paso Wash).	Would have the least effect on cultural sites and be more removed from the El Paso Mountains Sacred Lands area and the Last Chance Canyon Archaeological District.	Would have a considerable effect on many archaeological sites, but would avoid impacts on the El Paso Wash.	This project would affect slightly fewer cultural sites than the proposed project, but would have more potential to affect the El Paso Wash with its potential for buried sites.	Would have no effect on the cultural resources.
Impact Severity Rank (1–5, 1 = least impact and 5 = greatest impact)	5	2	3	4	1

*All No Project/No Action alternatives assume that the RSPP project would not be built on the proposed site

C.3.9.1 CUMULATIVE ANALYSIS OF POTENTIAL DEVELOPMENT PROJECTS IN RSPP AREA

Section B.3, **CUMULATIVE SCENARIO**, provides detailed information on the potential cumulative solar and other development projects in the project area. Together, these projects comprise the cumulative scenario that forms the basis of the cumulative impact analysis for the proposed project. In summary, these projects are:

- Renewable energy projects on BLM, State, and private lands, as shown on in **Section B.3 Cumulative Figure 1** and in **Cumulative Tables 1A and 1B.** Although not all of those projects are expected to complete the environmental review processes, or be funded and constructed, the list is indicative of the large number of renewable projects currently proposed in California.
- Foreseeable future projects in the immediate vicinity of the Ridgecrest Solar Power Project, as shown on **Cumulative Impacts Figure 2, Ridgecrest Solar Power Project – Renewable Energy Applications in the Ridgecrest District Area , and Cumulative Tables 2 and 3**. Table 2 presents existing projects in this area and Table 3 presents future foreseeable projects in the Ridgecrest District Area. Both tables indicate project name and project type, its location and its status.

These projects are defined within a geographic area that has been identified by the CEC and BLM as covering an area large enough to provide a reasonable basis for evaluating cumulative impacts for all resource elements or environmental parameters. Most of these projects have, are, or will be required to undergo their own independent environmental review under CEQA and/or NEPA. Even if the cumulative projects described in Section B.3 have not yet completed the required environmental processes, they were considered in the cumulative impacts analyses in this SA/Draft

Geographic Scope of Analysis

The geographic area considered for cumulative impacts on cultural resources is defined as the Ridgecrest District Area. Cumulative impacts can occur if the implementation of the Ridgecrest Solar Power Project could combine with the impacts of other local or regional projects. Cumulative impacts would occur locally if Ridgecrest Solar Power Project impacts combined with the impacts of projects located within the Western Mojave Desert. Cumulative impacts could also occur as a result of the development of some of the many proposed solar and wind development projects that have been, or are anticipated to be, under consideration by the BLM and the Energy Commission in the near future. This geographic scope is appropriate because it is likely that cultural resources similar to those in the Ridgecrest Solar Power Project area of analysis are present throughout the Western Mojave Desert.

Regional cumulative impacts are those that could occur as a result of the implementation of future solar and wind development projects that are currently proposed on over one million acres of the California Desert Conservation Area, as well as on BLM land in Nevada and Arizona. Therefore, the geographic extent for the analysis of regional cumulative impacts is defined as the desert areas of southeastern California, southern Nevada, and western Arizona, as shown on Cumulative Impacts Figure 1 (Regional Renewable Applications).

Effects of Past and Present Projects

For this analysis, the projects and developments listed in Table 1A that are expansive and have disturbed the most acreage are considered most relevant to effects on cultural resources. Within the BLM Desert District Area these projects include 64 solar energy projects and 63 wind energy projects with a combined acreage of more one million acres. Among the solar projects included on Table 1A, the Ridgecrest Office area includes five projects with a combined acreage of 32,463 acres. Solar energy projects are in general likely to incur more extensive direct physical effects and more concentrated effects than wind power projects because of the intensive nature of the necessary development work.

Cultural resources in the geographic area have been impacted by past and currently approved projects by virtue of extensive ground disturbance that is required for construction of buildings, facilities, roads, and other infrastructure. All ground disturbances have the potential for destroying known or unknown cultural resources. Thus, many resources have likely been destroyed by developments throughout the Southern California Desert Region. In the case of military installations and maneuvers, however, avoidance of substantial adverse changes to CRHR- and NRHP-eligible cultural resources have been accomplished through deliberate project planning. Impacts

to previously unknown cultural resources have been reduced to less than significant by implementing mitigation measures requiring construction monitoring, evaluation of resources discovered during monitoring, and avoidance or data recovery for resources evaluated to be CRHR-eligible. The CEC planning process implementing CEQA regulations introduces parallel resource-preservation tactics to protect cultural resources

Effects of Reasonably Foreseeable Future Projects

Cultural resources are also expected to be affected by the following reasonably foreseeable future projects. As detailed in Table 3 and shown in Cumulative Impacts Figure 1, the future development of residential and infrastructure uses of land within the geographic extent of regional cumulative impacts will undoubtedly result in impacts to cultural resources. Many archaeological resources occur within the Southern California Desert Region that could be destroyed through construction activities of these projects, especially renewable projects that require broad expanses of land. For example, more than 20,000 cultural resources have been identified and documented by the California Historical Resources Information System within Riverside and San Bernardino counties, alone. Because less than 20% of the land in these counties has been surveyed for cultural resources, there is a high potential to discover previously unknown resources. If resources are impacted where the values can be fully recovered through data recovery or other recordation (photography, drawings, and descriptive history), the cumulative impact of these future projects would not be significant. However, even with mitigation of individual projects at specific sites, there would still be a loss of resources due to the large number of acres disturbed.

Buildings and structural sites throughout the desert would also be impacted by the numerous proposed renewable projects. Potential impacts would include physical disturbance or alteration directly as a result of construction activities or diminished visual character of such sites due to the presence of industrial structures. Mitigation would be implemented for each project to minimize impacts.

Construction of the solar and wind projects proposed throughout this region would result in substantial changes in the setting and feeling, and association of the areas in which they are constructed. The current design of these projects would result in a significant cumulative impact to the region. Within the desert region there are numerous traditional use areas and lands sacred to Native Americans. Potential impacts would include physical disturbance or alteration directly as a result of construction activity or diminished visual character of traditional use areas due to the presence of industrial structures. If impacts to traditional use areas would occur at any individual site, mitigation would be implemented to minimize project impacts; however, the potential for vast disturbance of the desert would potentially lead to a loss of resources and impacts to visual character, thereby resulting in a significant cumulative impact.

Unknown, unrecorded cultural resources may be found at nearly any development site. When discovered, cultural resources are treated in accordance with applicable federal and state laws and regulations as well as in compliance with the mitigation measures and permit requirements applicable to a project. It is not known what cultural resources, if any, would be affected by development of all foreseeable future projects within southeastern California, southern Nevada, and western Arizona. Because, however, of

the large area of proposed development (over one million acres of desert land), it is very likely that cultural resources exist and would be expected to be uncovered at most of these sites. As would be done during the construction of the Ridgecrest Solar Power Project, should resources be discovered during construction of any of the proposed solar and wind development projects, they would be subject to legal requirements designed to protect or mitigate them, thereby reducing the effect of impacts.

Contribution of the Ridgecrest Solar Power Project to Cumulative Impacts

Construction

The development of the Ridgecrest Solar Power Project is expected to result in permanent adverse impacts to cultural resources related to construction activities. It is expected that some of the cumulative projects described above that are not yet built may be under construction at the same time as the Ridgecrest Solar Power Project, and will also impact cultural resources. As a result, there may be substantial permanent impacts during construction of those cumulative projects related to cultural resources.

The Ridgecrest Solar Power Project would be expected to contribute to the possible permanent cumulative impacts related to cultural resources. Until the resources present within the project area are evaluated, the extent of the impact cannot be fully assessed. Known significant resources in the region are limited, the largest numbers comprising the Last Chance Canyon Archaeological District. A related aspect is the presence of nearby traditional use areas. The El Paso Mountains border the Ridgecrest Solar Power Project and are a known area of important archaeological, religious and traditional resource gathering areas. The evidence of the geographic extent of the prehistoric resources, including both sites and isolates, indicates that the project area itself was at one time extensively used by Native American groups.

The construction of other projects in the same vicinity as the proposed project could affect unknown cultural resources of the same types that the RSPP would affect. Until the identified potential resources within the RSPP are evaluated, the true cumulative effect cannot be determined. However, project proponents for other future projects in the area may be able to avoid causing substantial adverse changes to CRHR-eligible cultural resources through deliberate project planning, or reduce such impacts to presently unknown cultural resources to less-than-significant by implementing mitigation measures requiring construction monitoring, evaluation of resources discovered during monitoring, and avoidance or data recovery for resources evaluated to be CRHR-eligible. Such avoidance or mitigation of potential future significant impacts to presently unknown cultural resources would reduce the potential contribution of the Ridgecrest Solar Power Project to cumulative impacts on such resources.

Unknown, unrecorded cultural resources may be encountered during construction at nearly any site. It is not and cannot be known what cultural resources, if any, would be affected by the development of all the proposed present and future projects within the Southern California Desert Region. It is certain that cultural resources exist and will be encountered at some of these sites. During RSPP construction, should resources be discovered, they would be subject to the Federal and State legal requirements designed to protect them. Ideally, with preconstruction evaluation and completion of staff recommended mitigative steps, RSPP construction impacts, when combined with

impacts from past, present and reasonably foreseeable future projects will not significantly affect known and unknown cultural resources.

Operation

The Ridgecrest Solar Power Project is not expected to result in extensive direct adverse impacts to cultural resources during operation of the Project. The chief on-going indirect impact once construction is complete will be visual. Other indirect effects may result from increased access to the project area. Cultural resources on and in the immediate vicinity of the project site may experience increased vandalism as a result of improved access to the area. It is expected that some of the cumulative projects described above may be operational at the same time as the Ridgecrest Solar Power Project. As a result, there may be similar long term cumulative direct and indirect impacts to cultural resources during operation of those projects. As a result, the Ridgecrest Solar Power Project and the other projects may contribute to a cumulative adverse impact on cultural resources as a result in increased access to the area and the potential for increased vandalism, illegal collection of artifacts, and/or destruction of resources during operation related activities.

Decommissioning

The decommissioning of the Ridgecrest Solar Power Project is not expected to result in adverse impacts related to cultural resources similar to construction impacts. It is unlikely that the construction or decommissioning of any of the cumulative projects would entail adverse impacts to cultural resources, whether such decommissioning was serial or concurrent. The impacts of the decommissioning of the Ridgecrest Solar Power Project would not be expected to contribute to cumulative impacts related to cultural resources because direct impacts to significant resources would have occurred during construction and operation, prior to decommissioning.

Conclusion

Provided that the recommendations of CEC staff with respect to Cultural Resources that may be affected by the Ridgecrest Solar Power Project are completed, the cumulative effects of the project should result in less-than-significant impacts to known NRHP and CRHR-eligible resources.

C.3.10 NOTEWORTHY PUBLIC BENEFITS

Staff does not discern any public benefits in relation to cultural resources that would occur from the construction, operation, maintenance, or decommissioning of the proposed action that would reasonably be found to be noteworthy.

C.3.11 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

CUL-1 The applicant shall be bound to abide, in total, to the terms of the programmatic agreement that the BLM is to execute under 36 CFR § 800.14(b)(3) for the proposed action. If for any reason, any party to the programmatic agreement were to terminate that document and it were to

have no further force or effect for the purpose of compliance with Section 106 of the National Historic Preservation Act, the applicant would continue to be bound to the terms of that original agreement for the purpose of compliance with CEQA until such time as a successor agreement had been negotiated and executed with the participation and approval of Energy Commission staff.

Verification:

1. Under the terms of the programmatic agreement, the applicant shall submit all documentation required by the agreement to the CPM for review and approval.

C.3.12 COMPLIANCE WITH LORS

If the Condition of Certification (**CUL-1**) is properly implemented, the proposed Solar Millennium RSPP project would result in a less than significant impact on known and newly found cultural resources. The project would therefore be in compliance with the applicable state laws, ordinances, regulations, and standards listed in **Cultural Resources Table 1**.

The Kern County General Plan has general language promoting the county-wide preservation of cultural resources. The Condition of Certification requires specific actions not just to promote but to effect historic preservation and mitigate impacts to all cultural resources in order to ensure CEQA compliance. Consequently, if Solar Millennium RSPP implements these conditions, its actions would be consistent with the general historic preservation goals of Kern County.

C.3.13 CONCLUSIONS AND RECOMMENDATIONS

Energy Commission cultural resources staff has analyzed the cultural resources data currently available for the proposed RSPP. Staff has concluded that, depending on which alternative configuration is adopted the RSSP would have a significant direct impact some portion of 17 treated-as-eligible archaeological sites and has the potential to have a further significant direct impact on a part of the Last Chance Canyon Archaeological District. It may also have a visual impact on the El Paso Mountains sacred site which is adjacent to the project APE. Due to the pending development of a Programmatic Agreement between the BLM, Energy Commission, and SHPO, the adoption and implementation of Condition of Certification **CUL-1** would reduce the potential impacts of the proposed project on the subject resources to less than significant.

C.3.14 REFERENCES

The “(tn: 00000)” in a reference below indicates the transaction number under which the item is catalogued in the Energy Commission’s Docket Unit. The transaction number allows for quicker location and retrieval of individual files.

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CULTURAL RESOURCES GLOSSARY

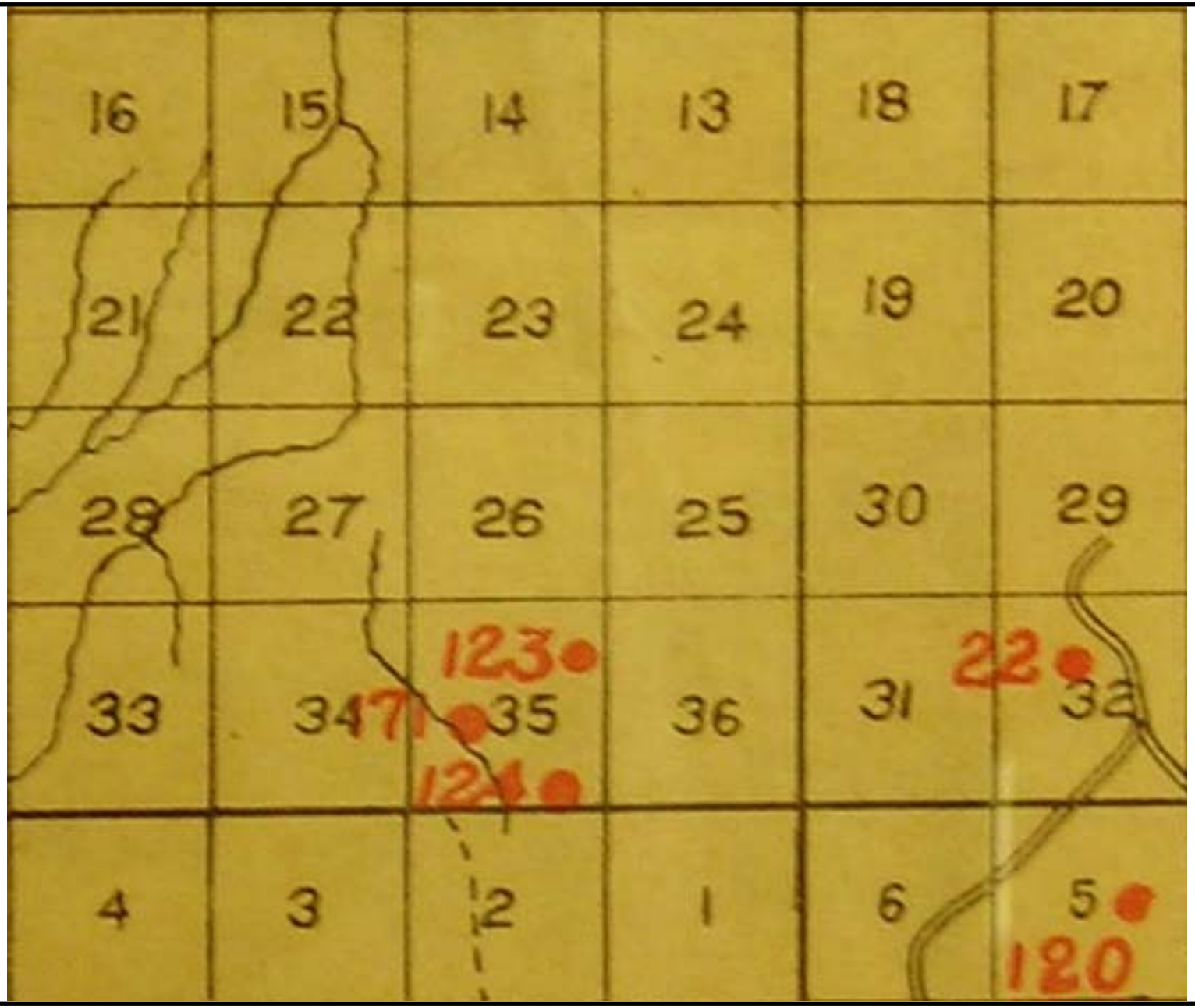
AAPE-WL	Architectural Area of Potential Effect—Water Line
ACHP	Advisory Council on Historic Preservation
AFC	Application for Certification
ARMR	Archaeological Resource Management Report

BC	Before the Birth of Christ
AD	After the Birth of Christ
BLM	Bureau of Land Management, U.S. Dept. of Interior
CEQA	California Environmental Quality Act
CHRIS	California Historical Resources Information System
Conditions	Conditions of Certification
CRHR	California Register of Historical Resources
CRM	Cultural Resources Monitor
CRMMP	Cultural Resources Monitoring and Mitigation Plan
CRR	Cultural Resource Report
CRS	Cultural Resources Specialist
DPR 523	Department of Parks and Recreation cultural resource inventory form
FSA	Final Staff Assessment
IHRD	Isolated Historic Refuse Deposit (Caltrans program)
LCCAD	Last Chance Canyon Archaeological District
LORS	Laws, ordinances, regulations, and standards
MCR	Monthly Compliance Report
MLD	Most Likely Descendant
NAHC	Native American Heritage Commission
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
OHP	Office of Historic Preservation
RSPP	Ridgecrest Solar Power Project
SA	Staff Assessment

SA/DPA/DEIS	Staff Assessment / Draft Plan Amendment / Draft Environmental Impact Statement
SHPO	State Historic Preservation Officer
SSSVIC	Southern *S*an Joaquin Valley Information Center, part of the CHRIS
Staff	Energy Commission cultural resources technical staff
WEMO	West Mojave Management Plan
WEAP	Worker Environmental Awareness Program

CULTURAL RESOURCES - FIGURE 1

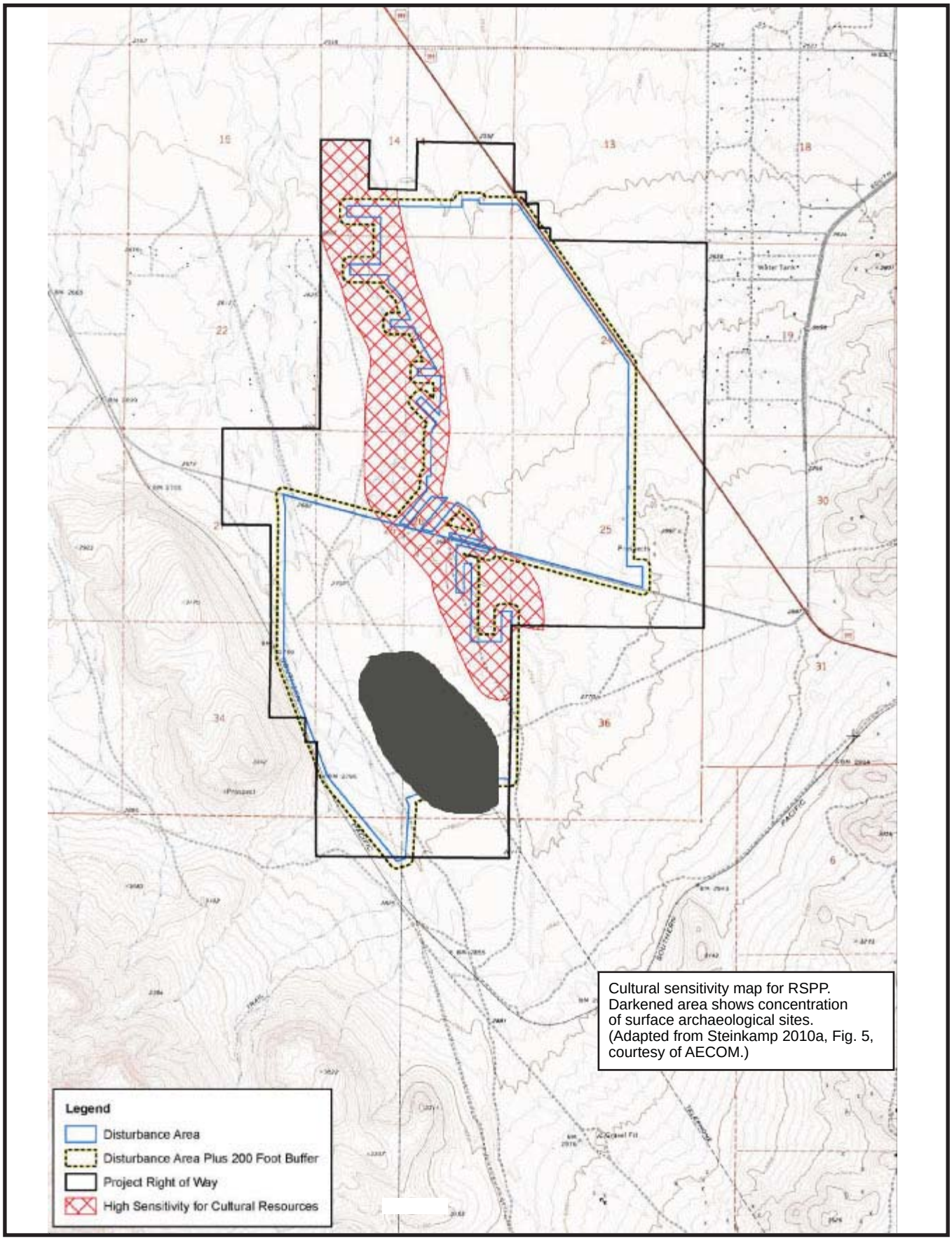
Ridgecrest Solar Power Project - Detail of a 1904 mining map of Kern County indicating three mines in section 35, T27S, R39E, MDM (Aubury 1904)



SOURCE: C.3.5.1.6.3.1 - Mining in the RSPP Area

CULTURAL RESOURCES- FIGURE 2

Ridgecrest Solar Power Project - Cultural Resouces Sensitivity Map



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010
Source: AECOM

C.4 HAZARDOUS MATERIALS MANAGEMENT

Testimony of Alvin Greenberg, Ph.D.

C.4.1 SUMMARY OF CONCLUSIONS

U.S. Bureau of Land Management and Energy Commission staff (hereafter jointly referred to as staff) evaluated the proposed Ridgecrest Solar Power Project (RSPP) in terms of hazardous materials use. Staff's analysis indicates that with implementation of staff's proposed mitigation measures **HAZ-1** through **6**, hazardous materials use at the site would not present a significant impact (pursuant CEQA) to the public. With adoption of the proposed conditions of certification, the proposed project will comply with all applicable laws, ordinances, regulations, and standards. Energy Commission staff proposes conditions of certification to address safe handling of hazardous materials, use of a Heat Transfer Fluid (HTF; Therminol VP-1), transportation of hazardous materials, and site security.

C.4.2 INTRODUCTION

The purpose of this hazardous materials management analysis is to determine if the proposed RSPP has the potential to cause significant impacts (pursuant CEQA) on the public as a result of the use, handling, storage, or transportation of hazardous materials at the proposed site. If significant adverse impacts on the public are identified, Energy Commission staff must also evaluate the potential for facility design alternatives and additional mitigation measures to reduce those impacts to the extent feasible.

This analysis does not address the potential exposure of workers to hazardous materials used at the proposed facility. Employers must inform employees of hazards associated with their work and provide them with special protective equipment and training to reduce the potential for health impacts associated with the handling of hazardous materials. The **WORKER SAFETY AND FIRE PROTECTION** section of this document describes applicable requirements for the protection of workers from these risks.

For this analysis, staff examines plausible potential loss of containment incidents (spills) for the hazardous materials to be used at the proposed facility. The worst case plausible event, regardless of cause, is considered, and analyzed to see whether the risk to local populations is significant (pursuant CEQA). Hazardous material handling and usage procedures are designed to reduce the likelihood of a spill, to reduce its potential size, and to prevent or reduce the potential migration of a spill off site to the extent that there won't be significant off-site impacts (pursuant CEQA). These measures look at potential direct contact from runoff of spills, air-borne plume concentrations, and the potential for spills to mix with runoff water and be carried offsite. Generally, staff seeks to confirm that the applicant has proposed secondary containment basins for containing liquids, and that volatile chemicals would have a restricted exposure to the atmosphere after capture.

Various hazardous materials including heat transfer fluid (HTF), lubricating oils, diesel fuel, propane, gasoline, hydraulic fluids, greases, spent batteries, spent activated

carbon, cleaning detergents, water treatment chemicals, and welding gasses will be present at the proposed RSPP project. The RSPP project would also require the transportation of hazardous materials to the facility. This document addresses all potential impacts associated with the use and handling of hazardous materials.

C.4.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

Staff reviewed and assessed the potential for the transportation, handling, and use of hazardous materials to impact the surrounding community. All chemicals that will be present on the project site at some point during construction, operation, and/or decommissioning were evaluated. Staff's analysis addresses the potential impacts on all members of the population including the young, the elderly, and people with existing medical conditions that may make them more sensitive to the adverse effects of hazardous materials. In order to accomplish this goal, staff utilized the most current public health exposure levels (both acute and chronic) that are established to protect the public from the effects of an accidental chemical release.

In order to assess the potential for released hazardous materials to travel off site and affect the public, staff analyzed several aspects of the proposed use of these materials at the facility. Staff recognizes that some hazardous materials must be used at power plants. Therefore, staff conducted its analysis by examining the choice and amount of chemicals to be used, the manner in which the applicant will use the chemicals, the manner by which they will be transported to the facility and transferred to facility storage tanks, and the way the applicant plans to store the materials on site.

Staff reviewed the applicant's proposed engineering and administrative controls concerning hazardous materials usage. Engineering controls are the physical or mechanical systems, such as storage tanks or automatic shut-off valves, that can prevent the spill of hazardous material from occurring, or which can either limit the spill to a small amount or confine it to a small area. Administrative controls are the rules and procedures that workers at the facility must follow that will help to prevent accidents or to keep them small if they do occur. Both engineering and administrative controls can act as methods of prevention or as methods of response and minimization. In both cases, the goal is to prevent a spill from moving off site and causing harm to the public.

Staff reviewed and evaluated the applicant's proposed use of hazardous materials as described by the applicant (SM 2009a, Section 5.6). Staff's assessment followed the five steps listed below.

- Step 1: Staff reviewed the chemicals and the amounts proposed for on-site use as listed in Table 5.6-3 of the AFC (SM 2009a) and determined the need and appropriateness of their use.
- Step 2: Those chemicals proposed for use in small amounts or whose physical state is such that there is virtually no chance that a spill would migrate off site and impact the public were removed from further assessment.

- Step 3: Measures proposed by the applicant to prevent spills were reviewed and evaluated. These included engineering controls such as automatic shut-off valves and different-sized transfer-hose couplings and administrative controls such as worker training and safety management programs.
- Step 4: Measures proposed by the applicant to respond to accidents were reviewed and evaluated. These measures also included engineering controls such as catchment basins and methods to keep vapors from spreading and administrative controls such as training emergency response crews.
- Step 5: Staff analyzed the theoretical impacts on the public of a worst-case spill of hazardous materials, as reduced by the mitigation measures proposed by the applicant. When mitigation methods proposed by the applicant are sufficient, no further mitigation is recommended. If the proposed mitigation is not sufficient to reduce the potential for adverse impacts to an insignificant level (pursuant CEQA), staff will propose additional prevention and response controls until the potential for causing harm to the public is reduced to an insignificant level. It is only at this point that staff can recommend that the facility be allowed to use hazardous materials.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local laws and policies apply to the protection of public health and hazardous materials management. Staff's analysis examines the project's compliance with these requirements.

Hazardous Materials Management Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
The Superfund Amendments and Reauthorization Act of 1986 (42 USC §9601 et seq.)	Contains the Emergency Planning and Community Right To Know Act (also known as SARA Title III).
The Clean Air Act (CAA) of 1990 (42 USC 7401 et seq. as amended)	Established a nationwide emergency planning and response program and imposed reporting requirements for businesses that store, handle, or produce significant quantities of extremely hazardous materials.
The CAA section on risk management plans (42 USC §112(r)	Requires states to implement a comprehensive system informing local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of both SARA Title III and the CAA are reflected in the California Health and Safety Code, section 25531, et seq.
49 CFR 172.800	The U.S. Department of Transportation (DOT) requirement that suppliers of hazardous materials prepare and implement security plans.
49 CFR Part 1572, Subparts A and B	Requires suppliers of hazardous materials to ensure that all their hazardous materials drivers are in compliance with personnel background security checks.

Applicable Law	Description
The Clean Water Act (CWA) (40 CFR 112)	Aims to prevent the discharge or threat of discharge of oil into navigable waters or adjoining shorelines. Requires a written spill prevention, control, and countermeasures (SPCC) plan to be prepared for facilities that store oil that could leak into navigable waters.
Federal Register (6 CFR Part 27) interim final rule	A regulation of the U.S. Department of Homeland Security that requires facilities that use or store certain hazardous materials to submit information to the department so that a vulnerability assessment can be conducted to determine what certain specified security measures shall be implemented.
State	
Title 8, California Code of Regulations, section 5189	Requires facility owners to develop and implement effective safety management plans that ensure that large quantities of hazardous materials are handled safely. While such requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the Risk Management Plan (RMP) process.
California Health and Safety Code, section 41700	Requires that "No person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."
California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)	Prevents certain chemicals that cause cancer and reproductive toxicity from being discharged into sources of drinking water.
Hazardous Material Business Plan, Cal HSC Sections 25500 to 25541; 19 CCR Sections 2720 to 2734	Requires the submittal of a chemical inventory and planning and reporting for management of hazardous materials.
Hazardous Substance Information and Training Act, 8 CCR Section 339; Section 3200 et seq., 5139 et seq., and 5160 et seq.	Requires listing and implementation of specified control measures for management of hazardous substances.
California HSC Sections 25270 through 25270.13	Requires the preparation of a Spill Prevention, Control, and Countermeasures (SPCC) Plan if 10,000 gallons or more of petroleum is stored on-site. The above regulations would also require the immediate reporting of a spill or release of 42 gallons or more to the California Office of Emergency Services and the Certified Unified Program Authority (CUPA).

Applicable Law	Description
Process Safety Management: Title 8 CCR Section 5189	Requires facility owners to develop and implement effective process safety management plans when toxic, reactive, flammable, or explosive chemicals are maintained on site in quantities that exceed regulatory thresholds.
Local	
Kern County Fire Code, kern County Ordinances, Title 17 chapter 17.32.001 et seq.	Adopts the 2006 International Fire Code and sets forth standards and permitting requirements regulating hazardous materials storage, use and handling; conditions hazardous to life or property in the occupancy and use of buildings and premises; and providing for the issuance of permits and collection of fees.

The Certified Unified Program Agency (CUPA) with the responsibility to review Hazardous Materials Business Plans (HMBPs) is the Kern County Environmental Health Services Department (KCEHS). With regard to seismic safety issues, the site is located in Seismic Risk Zone 4. Construction and design of buildings and vessels storing hazardous materials will meet the requirements of the 2007 California Building Code for Seismic Zone 4 (SM 2009a, Section 5.6.3.3).

C.4.4 PROPOSED PROJECT

C.4.4.1 SETTING AND EXISTING CONDITIONS

The solar power plant would be placed on 3,995 acres of land, with 1,944 disturbed acres of undeveloped public land administered by the BLM. The two proposed solar fields would consist of a northern field located north of Brown Road and a southern field located south of Brown Road, with acreages of 894 acres and 554 acres, respectively. Several factors associated with the area in which a project is to be located affect the potential for an accidental release of a hazardous material that could cause public health impacts. These include:

- Local meteorology;
- Terrain characteristics; and
- Location of population centers and sensitive receptors relative to the project.

Meteorological Conditions

Meteorological conditions, including wind speed, wind direction, and air temperature, affect both the extent to which accidentally released hazardous materials would be dispersed into the air and the direction in which they would be transported. This affects the potential magnitude and extent of public exposure to such materials, as well as their associated health risks. When wind speeds are low and the atmosphere stable, dispersion is severely reduced but can lead to increased localized public exposure.

Recorded wind speeds and ambient air temperatures are described in the Air Quality section of the Application for Certification (SM 2009a, section 5.2.2.2 and Figure 5.2-1).

Terrain Characteristics

The location of elevated terrain is often an important factor in assessing potential exposure. An emission plume resulting from an accidental release may impact high elevations before impacting lower elevations. The project layout (which has been slightly revised since the original AFC) is described and depicted in Data Response ALT-49 and accompanying figures (SM 2010a). The topography of the site is essentially flat (about 2,630 feet to 2,770 feet above sea level). Undeveloped desert surrounds the project site from all directions, with some elevated terrain existing to the east, west, and south within 2-3 miles of the site (SM 2009a, Section 2.4.1).

Location of Exposed Populations and Sensitive Receptors

The general population includes many sensitive subgroups that may be at greater risk from exposure to emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses. In addition, the location of the population in the area surrounding a project site may have a major bearing on health risk. Sensitive receptors in the project vicinity are listed in Section 5.6.2.1 of the AFC. There are four sensitive receptors within a 3-mile radius of the project site, the nearest of which is the Mountain View Christian Academy located about 1.6 miles northeast of the project site. The nearest residence is approximately 2,000 feet west of the northwestern fenceline of the reconfigured solar field #1 (SM 2009a, Section 5.6.2.1 and SM 2010a).

C.4.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Small Quantity Hazardous Materials

In conducting the analysis, staff determined in Steps 1 and 2 that some hazardous materials, although present at the proposed facility, pose a minimal potential for off-site impacts since they will be stored in a solid form or in smaller quantities, have low mobility, or have low levels of toxicity. These hazardous materials, which were eliminated from further consideration, are briefly discussed below.

During the construction phase of the project, hazardous materials proposed for use include paint, solvents, gasoline, diesel fuel, motor oil, lubricants, and welding gases. No acutely toxic hazardous materials will be used on site during construction, and none of these materials pose significant potential for off-site impacts (pursuant CEQA) as a result of the quantities on site, their relative toxicity, their physical state, and/or their environmental mobility. Any impact of spills or other releases of these materials will be limited to the site because of the small quantities involved, their infrequent use (and therefore reduced chances of release), and/or the temporary containment berms used by contractors. Petroleum hydrocarbon-based motor fuels, mineral oil, lube oil, and diesel fuel are all very low volatility and represent limited off-site hazards even in larger quantities.

During operations, hazardous chemicals such as cleaning agents, water treatment chemicals, welding gasses, various lube and insulating oils, activated carbon, and other various chemicals (see **HAZARDOUS MATERIALS APPENDIX A** for a list of chemicals proposed to be used and stored at RSPP) would be used and stored in relatively small amounts and represent limited off-site hazards because of their small quantities, low

volatility, and/or low toxicity. The project will be limited to using, storing, and transporting only those hazardous materials listed in Appendix A of this section as per staff's proposed condition **HAZ-1**.

After removing from consideration those chemicals that pose no risk of off-site impact in Steps 1 and 2, staff continued with Steps 3, 4, and 5 to review the remaining hazardous materials: propane and the Heat Transfer Fluid (Therminol VP-1^{TM}).

Large Quantity Hazardous Materials

Propane

Propane would be used at the proposed RSPP to fuel the auxiliary boilers and to prevent HTF from freezing. Up to 18,000 gallons of propane would be stored in a pressurized carbon steel tank equipped with a secondary containment structure. Propane is a flammable gas and poses a risk of fire and/or explosion. The applicant stated that due to the use of propane as a fuel, a Risk Management Plan (RMP) including an Off Site Consequence Analysis (OCA) is not required (SM 2009a, Section 5.6.3.3). Staff agrees with this determination.

Staff has reviewed the safety of storing and using large amounts of LPG at a power plant and has determined that the predominant risk is that of fire and explosion. Accordingly, these risks are discussed in the **WORKER SAFETY/FIRE PROTECTION** section of this SA/DEIS along with staff's proposed mitigation.

Therminol VP-1

Therminol VP1 is the heat transfer fluid (HTF) that will be used in the solar panels to collect solar heat and transfer it into steam to run the steam turbines. Therminol is a mixture of 73.5% diphenyl ether and 26.5% biphenyl, and is a solid at temperatures below 54 °F. Therminol can therefore be expected to remain liquid if a spill occurs. While the risk of off-site migration is minimal, Therminol is highly flammable and fires have occurred at other solar generating stations that use it. Approximately 1.3 million gallons of HTF will be stored at the RSPP, contained in the pipes and expansion tanks. Isolation valves would be placed throughout the HTF piping system designed to automatically block off sections of the piping in which a loss of pressure is detected (SM 2009a, Section 5.6.3.3).

Staff has assessed the properties of Therminol, and reviewed the record of its use at Solar Electric Generating Stations 8 and 9 at Harper Lake, California. Past leaks, spills, and fires involving this HTF were examined and discussed. It appears that the placement of additional isolation valves in the HTF pipe loops throughout the solar array would add significantly to the safety and operational integrity of the entire system by allowing a loop to be closed if a leak develops in a ball joint, flex-hose, or pipe, instead of closing off the entire HTF system and shutting down the plant. In order to ensure that HTF leaks do not pose a significant risk, staff proposes Condition of Certification **HAZ-4,** which would require the project owner to install a sufficient number of isolation valves that can be either manually or remotely activated.

The AFC indicates that the RSPP project would be bisected by Brown Road, a county maintained road, and that the north solar field will be disconnected by this road from the

power block and the control room that will be located on the south parcel. This will require pipes carrying heat transfer fluid (HTF), all command and control systems, and the fire water loop to cross Brown Road either above or beneath the road. Staff has requested in Data Requests #119 and #120 that the applicant provide certain information regarding their choice to run the HTF piping above or below Brown Road.

The applicant's data responses stated that that the HTF supply and return lines would be placed underground when crossing Brown Road. The lines would be installed in a protective structure underneath Brown Road and would have expansion loops aboveground on either side of Brown Road. The applicant does not expect to have to maintain the lines and therefore does not plan to make the portion beneath Brown Road accessible (SM 2010a, Data Responses 119 and 120).

Mitigation

Staff believes that this project's use of hazardous materials poses no significant risk (pursuant CEQA) but only if mitigation measures are used. These mitigation measures are discussed in this section. The potential for accidents resulting in the release of hazardous materials is greatly reduced by the implementation of a Safety Management Program, which includes both engineering and administrative controls. Elements of facility controls and the safety management plan are summarized below.

Engineering Controls

Engineering controls help to prevent accidents and releases (spills) from moving off site and affecting communities by incorporating engineering safety design criteria in the design of the project. The engineered safety features proposed by the applicant for use at the RSPP project include:

- Storage of small quantity hazardous materials in original, properly labeled containers;
- Construction of secondary containment areas surrounding each of the bulk hazardous materials storage areas designed to contain accidental releases that might happen during storage or delivery plus the volume of rainfall associated with a 25-year, 24-hour storm;
- Physical separation of stored chemicals in isolated containment areas in order to prevent accidental mixing of incompatible materials, which could result in the evolution and release of toxic gases or fumes;
- Installation of a fire protection system for hazardous materials storage areas; and
- Installation of continuous tank level monitors, temperature and pressure monitors and alarms, and excess flow and emergency isolation valves at the propane storage tank; and
- Continuous monitoring of HTF piping system by plant staff and by automatic pressure sensors designed to trigger isolation valves if a leak is detected.

Administrative Controls

Administrative controls also help prevent accidents and releases (spills) from moving off site and affecting neighboring communities by establishing worker training programs, process safety management programs, and complying with all applicable health and safety laws, ordinances, and standards.

A worker health and safety program will be prepared by the applicant and include (but not be limited to) the following elements (see the **WORKER SAFETY AND FIRE PROTECTION** section for specific regulatory requirements):

- Worker training regarding chemical hazards, health and safety issues, and hazard communication;
- Procedures to ensure the proper use of personal protective equipment;
- Safety operating procedures for the operation and maintenance of systems utilizing hazardous materials;
- Fire safety and prevention; and
- Emergency response actions including facility evacuation, hazardous material spill clean-up, and fire prevention.

At the facility, the project owner will be required to designate an individual with the responsibility and authority to ensure a safe and healthful work place. The project health and safety official will oversee the health and safety program and have the authority to halt any action or modify any work practice to protect the workers, facility, and the surrounding community in the event of a violation of the health and safety program.

Staff's proposed Condition of Certification **HAZ-1** ensures that no hazardous material would be used at the facility except as listed in Tables 5.6-3 of the AFC (SM 2009a), which have been reviewed by staff to determined the need and appropriateness of their use. **HAZ-1** also requires changes to the allowed list of hazardous materials and their maximum amounts to be approved by the Compliance Project Manager. Only those that are needed and appropriate would be allowed to be used. If staff feels that a safer alternative chemical can be used, staff would recommend or require its use, depending upon the impacts posed.

Additional administrative controls are required by Conditions of Certification **HAZ-2**: preparation of a Hazardous Materials Business Plan, a Process Safety Management Plan, and a Spill Prevention, Control, and Countermeasure Plan) and **HAZ-3** (development of a Safety Management Plan).

On-Site Spill Response

In order to address the issue of spill response, the facility will prepare and implement an emergency response plan that includes information on hazardous materials contingency and emergency response procedures, spill containment and prevention systems, personnel training, spill notification, on-site spill containment, and prevention equipment and capabilities, as well as other elements. Emergency procedures will be established which include evacuation, spill cleanup, hazard prevention, and emergency response. The presence of oil in a quantity greater than 1,320 gallons might invoke a requirement

to prepare a Spill Prevention, Control, and Countermeasure (SPCC) Plan. The quantity of oil contained in any one of the planned 230/500 kV transformers would be in excess of the minimum quantity that requires such a plan. However, there are no known Waters of the United States and thus staff's position is that no SPCC Plan is required by 40 CFR 112. However, El Paso Wash is considered a Water of the State and pursuant to California HSC Sections 25270 through 25270.13, the PSPP will be required to prepare a SPCC because it will store 10,000 gallons or more of petroleum on-site. The above regulations would also require the immediate reporting of a spill or release of 42 gallons or more to the California Office of Emergency Services and the Certified Unified Program Authority (CUPA).

Plant personnel would be trained as a hazardous materials response team which would be the first responder to hazardous materials incidents. In the event of a large incident involving hazardous materials, backup support would be provided by the Kern County Fire Department which has a hazmat response unit capable of handling any incident at the proposed RSPP and would respond within about two hours (KCFD 2009).

Transportation of Hazardous Materials

Various containerized and bulk hazardous materials would be transported to the facility via truck. While many types of hazardous materials will be transported to the site, staff believes that transport of propane poses the predominant risk associated with hazardous materials transport. It should be noted that previous modeling of spills involving much larger quantities of more toxic materials such as aqueous and anhydrous ammonia (two hazardous materials that *would not* be used, stored, or transported to the proposed RSPP) has demonstrated that minimal airborne concentrations would occur at short distances from the spill.

The use of propane at the RSPP would require a total of two 5,000-gallon truck deliveries per week, which amounts to about 104 deliveries per year. Staff reviewed the applicant's proposed transportation routes for hazardous materials delivery. Trucks would travel on U.S. Highway 395 to Brown Road to the project site via an access road (SM 2009a, Section 5.6.3.3).

Propane transportation is highly regulated in the United States and staff believes it is appropriate to rely upon the extensive regulatory program that applies to the shipment of hazardous materials on California highways to ensure safe transportation of propane to the Ridgecrest site (see Federal Hazardous Materials Transportation Law 49 USC §5101 et seq, DOT regulations 49 CFR subpart H, §172–700, and California Department of Motor Vehicles (DMV) regulations on hazardous cargo). These regulations also address the issue of driver competence. DOT also requires that all shipping papers contain a 24-hour-a-day telephone number where emergency assistance and information can be obtained. This service must be able to provide information about any cargo that is classified by DOT as a hazardous material. The National Propane Gas Association (NPGA 2001) has reported that a 1981 U.S. Department of Energy examination of fatal accidents involving propane gas transportation and storage between 1971 and 1979 found that the risk of a fatality from an accident involving LPG transport or storage is 1 per 37,000,000 persons (which can be expressed in standard risk terms as a risk of 0.027×10^{-6}). Since staff often uses a

risk of 100 fatalities in 10,000 trips as an acceptable level of risk, the actual risk as reported by the U.S. DOE is very much less than staff's level of significance.

Staff therefore believes that the risk of exposure to significant concentrations of propane during transportation to the facility is insignificant (pursuant CEQA)because of the remote possibility that an accidental release of a sufficient quantity could be dangerous to the public. The transportation of similar volumes of hazardous materials on the nation's highways is neither unique nor infrequent. Based on the environmental mobility, toxicity, the quantities at the site, and frequency of delivery, it is staff's opinion that propane poses the predominate risk associated with both use and hazardous materials transportation. Staff concludes that the risk associated with the transportation of other hazardous materials to the proposed project does not significantly increase the risk of propane transportation.

Seismic Issues

It is possible that an earthquake could cause the failure of hazardous materials storage tanks and/or solar field piping. An earthquake could also cause failure of the secondary containment system (berms and dikes), as well as the failure of electrically controlled valves and pumps. The failure of all of these preventive control measures might then result in leaks of chemicals that may cause fires or impact the environment. The applicant stated that the piping in the solar array will be constructed to be flexible and to allow movement (necessary to accommodate thermal expansion). The piping will be attached with ball joints and won't be fixed to a rigid structure; therefore reducing the likelihood of failure during an earthquake (SM 2009a, Section 5.6.3.3).

Information obtained after the January 1994 Northridge earthquake showed that some damage was caused both to several large storage tanks and to smaller tanks associated with the water treatment system of a cogeneration facility. The tanks with the greatest damage, including seam leakage, were older tanks, while the newer tanks sustained displacements and failures of attached lines. Staff reviewed the impacts of the February 2001 Nisqually earthquake near Olympia, Washington, a state with similar seismic design codes as California. No hazardous materials storage tanks failed as a result of that earthquake. Staff also conducted an analysis of the codes and standards which should be followed when designing and building storage tanks and containment areas to withstand a large earthquake. Referring to the sections on **GEOLOGY, PALEONTOLOGY** and **MINERAL RESOURCES** and **FACILITY SAFETY DESIGN** in the AFC, staff notes that the proposed facility will be designed and constructed to the appropriate standards of the 2007 California Building Code for Seismic Risk Zone 4. Therefore, on the basis of what occurred in Northridge with older tanks and the lack of failures during the Nisqually earthquake (with newer tanks), staff determined that tank failures during seismic events are not probable and do not represent a significant risk to the public (pursuant CEQA).

Site Security

RSPP proposes to use hazardous materials in sufficient quantities that special site security measures should be developed and implemented to prevent unauthorized access. US EPA published a *Chemical Accident Prevention Alert* regarding site security (EPA 2000a), the U.S. Department of Justice published a special report on Chemical

Facility Vulnerability Assessment Methodology (US DOJ 2002), the North American Electric Reliability Corporation (NERC) published *Security Guidelines for the Electricity Sector* in 2002 (NERC 2002), and the U.S. Department of Energy published a draft *Vulnerability Assessment Methodology for Electric Power Infrastructure* in 2002 (DOE 2002). The energy generation sector is one of 14 areas of critical Infrastructure listed by the U.S. Department of Homeland Security. On April 9, 2007, the U.S Department of Homeland Security published, in the Federal Register (6 CFR Part 27), an Interim Final Rule requiring facilities that use or store certain hazardous materials to conduct vulnerability assessments and implement certain specified security measures. This rule was implemented with the publication of Appendix A, the list of chemicals, on November 2, 2007 and propane is listed as a Chemical of Interest with a threshold level of 60,000 lbs. The RSPP will store a maximum of 38,000 lbs of propane/LPG and therefore the CFATS regulation will not apply and the project owner will not need to submit a "Top Screen" assessment to the DHS. However, staff believes that all power plants under the jurisdiction of the Energy Commission should implement a minimum level of security consistent with the guidelines listed here.

Staff believes that all power plants under the jurisdiction of the Energy Commission should implement a minimum level of security consistent with the guidelines listed here.

In order to ensure that this facility (or a shipment of hazardous material) is not the target of unauthorized access, staff's proposed conditions of certification **HAZ-5** and **HAZ-6** address both construction security and operations security plans. These plans would require the implementation of site security measures that are consistent with both the above-referenced documents and Energy Commission guidelines.

The goal of these conditions of certification is to provide the minimum level of security for power plants needed to protect California's electrical infrastructure from malicious mischief, vandalism, or domestic/foreign terrorist attacks. The level of security needed for this power plant is dependent upon the threat imposed, the likelihood of an adversarial attack, the likelihood of success in causing a catastrophic event, and the severity of consequences of that event.

In order to determine the level of security, the Energy Commission staff used an internal vulnerability assessment decision matrix modeled after the U.S. Department of Justice Chemical Vulnerability Assessment Methodology (July 2002), the NERC 2002 guidelines, the U.S. Department of Energy VAM-CF model, and U.S. Department of Homeland Security regulations published in the Federal Register (Interim Final Rule 6 CFR Part 27). Staff determined that the RSPP would fall into the "low vulnerability" category, so staff proposes that certain security measures be implemented but does not propose that the project owner conduct its own vulnerability assessment.

These security measures include perimeter fencing and breach detectors, possibly guards, alarms, site access procedures for employees and vendors, site personnel background checks, and law enforcement contact in the event of a security breach. Site access for vendors would be strictly controlled. Consistent with current state and federal regulations governing the transport of hazardous materials, hazardous materials vendors would have to maintain their transport vehicle fleets and employ only drivers who are properly licensed and trained. The project owner would be required, through its

contractual language with vendors, to ensure that vendors supplying hazardous materials strictly adhere to the U.S. DOT requirements that hazardous materials vendors prepare and implement security plans per 49 CFR 172.800 and ensure that all hazardous materials drivers are in compliance with personnel background security checks per 49 CFR Part 1572, Subparts A and B. The compliance project manager (CPM) may authorize modifications to these measures, or may require additional measures in response to additional guidance provided by the U.S. Department of Homeland Security, the U.S. Department of Energy, or NERC, after consultation with appropriate law enforcement agencies and the applicant.

Closure and Decommissioning Impacts and Mitigation

Closure of the proposed RSPP (temporary or permanent) would follow a facility closure plan prepared by the applicant and designed to minimize public health and environmental impacts. Decommissioning procedures would be consistent with all applicable LORS and would include monitoring of hazardous materials storage vessels, safe cessation of processes which use hazardous materials, disposal of hazardous materials and hazardous wastes, and documentation of practices and inventory (SM 2009a, Section 5.6.3.4). Staff expects that impacts from the closure and decommissioning process would represent a fraction of the impacts associated with the construction or operation of the proposed RSPP. Therefore based on staff's analysis for the construction and operation phases of this project, staff concludes that hazardous materials-related impacts from closure and decommissioning of the RSPP would be insignificant (pursuant CEQA).

C.4.4.3 CEQA LEVEL OF SIGNIFICANCE

Staff's analysis of impacts associated with the storage, use, and handling of hazardous materials at the proposed RSPP has determined that impacts would be below the level of significance.

C.4.5 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because (1) it eliminates about 42 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources (desert tortoise and Mohave ground squirrel), cultural resources, and recreational uses, and (2) avoids constructing a solar facility in the Mohave Ground Squirrel Conservation Area (MGSCA).

Similar to the proposed project, the Northern Unit Alternative would transmit power to the grid through the planned SCE 230-kV substation to be located near the proposed project site. The power block covering approximately 18 acres, would remain north of Brown Road, as proposed by the project and would include all operational power facilities, structures, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system). The proposed transmission line alignment is 3,900 ft and would connect to the proposed switchyard (3.2 acres) adjacent to the existing SCE 230kV transmission line, west of the proposed project. In addition,

the site would require access roads, a parking lot, bio-remediation unit and main office building (3 acres) all of which are proposed north of Brown Road within the proposed project footprint. The proposed 16.3 acre water line would remain at the location as proposed by the project. The Northern Unit Alternative would not require the relocation of the two existing SCE transmission lines.

As stated above, the Northern Unit Alternative is evaluated in this SA/DPA/DEIS because it would reduce some impacts of the project. Additionally, the Northern Unit Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals, while minimizing impacts to the desert environment. A limited acreage alternative was suggested in scoping comments.

C.4.5.1 SETTING AND EXISTING CONDITIONS

The Northern Unit Alternative would consist of 167 solar collector array loops with a net generating capacity of approximately 146 MW. The total disturbance area would be approximately 1134 acres of land. This alternative would retain 58 percent of the proposed solar array loops and would affect 58 percent of the land of the proposed 250 MW project. The boundaries of the Northern Unit Alternative are shown in **Alternatives Figure 1**.

C.4.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Potential impacts associated with hazardous materials use during construction and operation of the Northern Unit Alternative would likely be slightly reduced compared to those estimated for the RSPP as proposed due to the somewhat smaller quantities of hazardous materials required. However, the differences in the measures to control the use, storage, and transportation of hazardous materials would be so minor as to not be quantifiable and staff's analysis has determined that no significant impacts (pursuant CEQA) are expected from the storage and use of hazardous materials at the RSPP as proposed.

C.4.5.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA level of significance for Hazardous Materials Management would not change with the Northern Unit Alternative, as both the project as proposed and the Northern Unit Alternative would have impacts below the level of significance. The same conditions of certification would be required for the Northern Unit Alternative and the project as proposed.

C.4.6 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would be a 104 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because it eliminates about 58 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources, and cultural resources

Similar to the proposed project, the Southern Unit Alternative would transmit power to the grid through the planned SCE 230-kV substation to be located near the proposed project site. The power block, spanning approximately 18 acres, would remain north of

Brown Road, as proposed by the project and would include all operational power facilities, structures, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system). The proposed transmission line alignment is 3,900 ft and would connect to the proposed switchyard (3.2 acres) adjacent to the existing SCE 230kV transmission line, west of the proposed project. In addition, the site would require access roads, a parking lot, bio-remediation unit and main office building (3 acres) all of which are proposed north of Brown Road. The proposed 16.3 acre water line would remain at the location as proposed by the project. Similar to the proposed project, the Southern Unit Alternative would require the relocation of the two existing SCE transmission lines; this realignment would require approximately 58.2 acres.

As stated above, the Southern Unit Alternative is evaluated in this SA/DPA/DEIS because it would reduce some impacts of the project. Additionally, the Southern Unit Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals, while minimizing impacts to the desert environment. A limited acreage alternative was suggested in scoping comments.

C.4.6.1 SETTING AND EXISTING CONDITIONS

The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of approximately 104 MW. The total disturbance area would be approximately 908 acres of land. This alternative would retain 42 percent of the proposed solar array loops and would affect 42 percent of the land of the proposed 250 MW project. The boundaries of the Southern Unit Alternative are shown in **Alternatives Figure 2**. This area was would avoid a large portion of the El Paso Wash and sensitive biological resources, including areas that were mapped as occupied tortoise and Mohave ground squirrel habitat (live tortoise and/or active burrows and sign).

C.4.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Potential impacts associated with hazardous materials use during construction and operation of the Southern Unit Alternative would likely be slightly reduced compared to those estimated for the RSPP as proposed due to the somewhat smaller quantities of hazardous materials required. However, the differences in the measures to control the use, storage, and transportation of hazardous materials would be so minor as to not be quantifiable and staff's analysis has determined that no significant impacts (pursuant CEQA) are expected from the storage and use of hazardous materials at the RSPP as proposed.

C.4.6.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA level of significance for Hazardous Materials Management would not change with the Southern Unit Alternative, as both the project as proposed and the Southern Unit Alternative would have impacts below the level of significance. The same conditions of certification would be required for the Southern Unit Alternative and the project as proposed.

C.4.7 ORIGINAL PROPOSED PROJECT ALTERNATIVE

The Original Proposed Project Alternative would be a 250 MW solar facility as originally proposed by Solar Millennium. This alternative is analyzed because it would reduce the amount of land developed within the Mojave Ground Squirrel Conservation Area and it could transmit the full 250 MW of power that Solar Millennium has requested.

Similar to the proposed project, the Original Proposed Project Alternative would transmit power to the grid through the planned SCE 230-kV substation located near the proposed project site and would require infrastructure including main office building (3 acres), power block, water line, transmission line, switch yard, access roads, parking area, bio-remediation unit and maintenance building. The 18-miles off-site water line route would follow the same route as the proposed project. The bioremediation unit would be located north of Brown Road, within the proposed project footprint; the power block and ancillary facilities would be located south of Brown Road on approximately 18 acres in addition to the transmission line and switch-yard (5.5 acres). The Original Proposed Project Alternative would require the relocation of the two existing SCE transmission lines.

As stated above, the Original Proposed Alternative is evaluated in this SA/DPA/DEIS because it reduces land developed with the MGSCA. Additionally, the Original Proposed Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals.

C.4.7.1 SETTING AND EXISTING CONDITIONS

The Original Proposed Project Alternative would consist of 278 solar array loops with a net generating capacity of approximately 250 MW. The total disturbance area would be approximately 1,794 acres of land A shorter transmission interconnection – 1,250 feet as compared to the proposed project interconnection of 3,900 feet – would be needed. The boundaries of the Original Proposed Project Alternative are shown in **Alternatives Figure 3**. This project footprint contains two desert ephemeral washes that would require redirection and smaller dry desert washes also traverse the site. In addition this site is the location of prime desert tortoise and Mojave ground squirrel habitat.

C.4.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Potential impacts associated with hazardous materials use during construction and operation of the Original Proposed Project Alternative would likely be similar to those estimated for the RSPP as proposed. However, any differences in the measures to control the use, storage, and transportation of hazardous materials would be so minor as to not be quantifiable and staff's analysis has determined that no significant impacts (pursuant CEQA) are expected from the storage and use of hazardous materials at the RSPP as proposed.

C.4.7.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA level of significance for Hazardous Materials Management would not change with the Original Proposed Project Alternative, as both the project as proposed and the

Original Proposed Project Alternative would have impacts below the level of significance. The same conditions of certification would be required for the Original Proposed Project Alternative and the project as proposed.

C.4.8 NO PROJECT/NO ACTION ALTERNATIVES

C.4.8.1 NO PROJECT/NO ACTION ALTERNATIVE #1:

No Action on Ridgecrest Solar Power Project application and on CDCA land use plan amendment

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, no hazardous materials would be used and no impacts related to the use of hazardous material would occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations

C.4.8.2 NO PROJECT/NO ACTION ALTERNATIVE #2

No Action on Ridgecrest Solar Power Project and amend the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with a different solar technology. As a result, construction and operation of the solar technology would likely result in use of hazardous materials. Different solar technologies require the use of different hazardous materials; however, it is expected that all solar technologies would require the use of hazardous materials. As such, this No Project/No Action Alternative could result impacts to hazardous material handling similar to under the proposed project.

C.4.8.3 NO PROJECT/NO ACTION ALTERNATIVE #3

No Action on Ridgecrest Solar Power Project application and amend the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site and no use of hazardous materials. As a result, this No Project/No Action Alternative would not result in impacts from the use of hazardous materials. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.4.9 COMPARISON OF ALTERNATIVES AND PROPOSED PROJECT

Hazardous Materials Management Table 2
Comparison of Proposed Project and Alternatives

	Proposed Project (250 MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250 MW)	No Project/No Action*
Risk of potential hazardous materials spill/release	Less than significant	Less than significant (differences in the measures to control the use, storage, and transportation of hazardous materials would be so minor as to not be quantifiable)	Less than significant (differences in the measures to control the use, storage, and transportation of hazardous materials would be so minor as to not be quantifiable)	Less than significant (differences in the measures to control the use, storage, and transportation of hazardous materials would be so minor as to not be quantifiable)	Less than significant

*All No Project/No Action alternatives assume that the RSPP project would not be built on the proposed site

C.4.10 CUMULATIVE IMPACT ANALYSIS

A project may result in a significant adverse cumulative impact (pursuant CEQA) where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection

with the effects of past projects, the effects of other current projects, and the effects of probable future projects (California Code Regulation, Title 14, section 15130). NEPA states that cumulative effects can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR §1508.7).

C.4.10.1 GEOGRAPHIC EXTENT

The geographic area considered for cumulative impacts on Hazardous Materials Management is only within the project boundaries.

C.4.10.2 EXISTING CUMULATIVE CONDITIONS

For this analysis, there are no projects or developments in the area or region that use, store, and/or transport hazardous materials that staff has found to have an impact on the region. The use of hazardous materials is neither frequent nor concentrated in this area.

Staff analyzed the potential for hazardous materials cumulative impacts at many other power plant projects. A significant cumulative hazardous materials impact (pursuant CEQA) is defined as the simultaneous uncontrolled release of hazardous materials from multiple locations in a form (gas or liquid) that could cause a significant impact where the release of one hazardous material alone would not cause a significant impact. Existing locations that use or store gaseous or liquid hazardous materials, or locations where such facilities might likely be built, were both considered. Staff believes that while cumulative impacts are theoretically possible, they are not probable because of the many safeguards implemented to both prevent and control an uncontrolled release. The chances of one uncontrolled release occurring are remote. The chance of two or more occurring simultaneously, with resulting airborne plumes mingling to create a significant impact, are even more remote. Staff believes the risk to the public is insignificant (pursuant CEQA).

The applicant will develop and implement a hazardous materials handling program for the RSPP independent of any other projects considered for potential cumulative impacts. Staff believes that the facility, as proposed by the applicant and with the additional mitigation measures proposed by staff, poses a minimal risk of accidental release that could result in off-site impacts. It is unlikely that an accidental release that has very low probability of occurrence would independently occur at this site and another facility at the same time. Therefore, staff concludes that the facility would not contribute to a significant hazardous materials-related cumulative impact pursuant CEQA).

C.4.10.3 FUTURE FORESEEABLE PROJECTS

Foreseeable Projects in the Project Area

Hazardous Materials Management at the proposed project are also not expected to be affected by any reasonably foreseeable future projects, including the proposed solar project and three wind projects. The reasons for staff's position are described above.

The construction of the RSPP is not expected to result in short term adverse impacts related to hazardous materials use. It is expected that some of the cumulative projects described above which are not yet built may be under construction the same time as the

RSPP, however, short term impacts related to Hazardous Materials Management during construction of those cumulative projects are not expected to occur.

The operation of the RSPP is not expected to result in long term adverse impacts related to Hazardous Materials Management even though it is expected that some of the cumulative projects described above may be operational at the same time as the RSPP.

Foreseeable Renewable Projects in the California Desert

As noted above, cumulative impacts in the area of Hazardous Materials Management can only occur in the immediate vicinity of the project and therefore impacts to the greater region are not plausible.

C.4.10.4 OVERALL CONCLUSIONS

The potential for off-site impacts resulting from the use, storage, and transportation of hazardous materials at the RSPP is insignificant (pursuant CEQA) due to the nature of the materials used and the engineering and administrative controls that would be implemented to prevent and control accidental releases of hazardous materials. Because of this determination, and the additional fact that there are no existing or future foreseeable facilities in the immediate proximity (less than one mile) using large amounts of hazardous chemicals, there is little (if any) possibility that vapor plumes would mingle (combine) to produce an airborne concentration that would present a significant risk should an accidental release occur.

C.4.11 COMPLIANCE WITH LORS

Staff concludes that construction and operation of the RSPP project would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS) regarding long-term and short-term project impacts in the area of hazardous materials management.

C.4.12 NOTEWORTHY PUBLIC BENEFITS

The construction and operation of a solar power plant such as the proposed RSPP requires in general smaller quantities of hazardous materials and materials that are less dangerous to the public than a natural-gas fired power plant. Building solar power plants to supply the required energy in California therefore benefits the public by reducing the risks otherwise associated with the use and transport of large quantities of more hazardous materials such as aqueous or anhydrous ammonia.

C.4.13 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

HAZ-1 The project owner shall not use any hazardous materials not listed in Appendix A, below, or in greater quantities or strengths than those identified by chemical name in Appendix A, below, unless approved in advance by the Compliance Project Manager (CPM).

Verification: The project owner shall provide to the CPM, in the Annual Compliance Report, a list of hazardous materials contained at the facility.

HAZ-2 The project owner shall concurrently provide a Hazardous Materials Business Plan (HMBP), a Spill Prevention, Control, and Countermeasure Plan (SPCC), and a Process Safety Management Plan (PSMP) to the Kern County Environmental Health Services Department (KCEHS) and the CPM for review. After receiving comments from the KCEHS and the CPM, the project owner shall reflect all recommendations in the final documents. Copies of the final HMBP, SPCC Plan, and PSMP shall then be provided to the KCEHS for information and to the CPM for approval.

Verification: At least 60 days prior to receiving any hazardous material on the site for commissioning or operations, the project owner shall provide a copy of a final Hazardous Materials Business Plan, Spill Prevention, Control, and Countermeasures Plan, and the Process Safety Management Plan to the CPM for approval.

HAZ-3 The project owner shall develop and implement a Safety Management Plan for the delivery and handling of liquid and gaseous hazardous materials. The plan shall include procedures, protective equipment requirements, training and a checklist. It shall also include a section describing all measures to be implemented to prevent mixing of incompatible hazardous materials. This plan shall be applicable during construction, commissioning, and operation of the power plant.

Verification: At least sixty (60) days prior to the delivery of any liquid or gaseous hazardous material to the facility, the project owner shall provide a Safety Management Plan as described above to the CPM for review and approval.

HAZ-4 The project owner shall place an adequate number of isolation valves in the Heat transfer Fluid (HTF) pipe loops so as to be able to isolate a solar panel loop in the event of a leak of fluid. These valves shall be actuated manually and remotely. The engineering design drawings showing the number, location, and type of isolation valves shall be provided to the CPM for review and approval prior to the commencement of the solar array construction.

Verification: At least sixty (60) days prior to the commencement of solar array construction, the project owner shall provide the design drawings as described above to the CPM for review and approval.

HAZ-5 Prior to commencing construction, a site-specific Construction Site Security Plan for the construction phase shall be prepared and made available to the CPM for review and approval. The Construction Security Plan shall include the following:

1. Perimeter security consisting of fencing enclosing the construction area;

2. Security guards;

3. Site access control consisting of a check-in procedure or tag system for construction personnel and visitors;

4. Written standard procedures for employees, contractors and vendors when encountering suspicious objects or packages on site or off site;

5. Protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency; and

6. Evacuation procedures.

Verification: At least thirty (30) days prior to commencing construction, the project owner shall notify the CPM that a site-specific Construction Security Plan is available for review and approval.

HAZ-6 The project owner shall also prepare a site-specific security plan for the commissioning and operational phases that will be available to the CPM for review and approval. The project owner shall implement site security measures that address physical site security and hazardous materials storage. The level of security to be implemented shall not be less than that described below (as per NERC 2002).

The Operation Security Plan shall include the following:

1. Permanent full perimeter fence or wall, at least eight feet high and topped with barbed wire or the equivalent (and with slats or other methods to restrict visibility if a fence is selected;

2. Main entrance security gate, either hand operated or motorized;

3. Evacuation procedures;

4. Protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency;

5. Written standard procedures for employees, contractors, and vendors when encountering suspicious objects or packages on site or off site;

   A. A statement (refer to sample, **ATTACHMENT A**), signed by the project owner certifying that background investigations have been conducted on all project personnel. Background investigations shall be restricted to determine the accuracy of employee identity and employment history and shall be conducted in accordance with state and federal laws regarding security and privacy;

   B. A statement(s) (refer to sample, **ATTACHMENT B**), signed by the contractor or authorized representative(s) for any permanent contractors or other technical contractors (as determined by the CPM after consultation with the project owner), that are present at any time on the site to repair, maintain, investigate, or conduct any other technical duties involving critical components (as determined by the CPM after consultation with the project owner) certifying that background investigations have been conducted on contractors who visit the project site;

6. Site access controls for employees, contractors, vendors, and visitors;

7. A statement(s) (refer to sample, **ATTACHMENT C**), signed by the owners or authorized representative of hazardous materials transport vendors, certifying that they have prepared and implemented security plans in compliance with 49 CFR 172.802, and that they have conducted employee background investigations in accordance with 49 CFR Part 1572, subparts A and B;

8. Closed circuit TV (CCTV) monitoring system, recordable, and viewable in the power plant control room and security station (if separate from the control room) with cameras able to pan, tilt, and zoom, have low-light capability, and are able to view the outside entrance to the control room, the propane/LPG tank, and the front gate; and

9. Additional measures to ensure adequate perimeter security consisting of either:

   A. Security guard(s) present 24 hours per day, 7 days per week; **or**

   B. Power plant personnel on site 24 hours per day, 7 days per week,

      and

      the CCTV able to view 100% of the entire solar array fenceline perimeter

      or breach detectors **or** on-site motion detectors along the entire solar array fenceline.

The project owner shall fully implement the security plans and obtain CPM approval of any substantive modifications to those security plans. The CPM may authorize modifications to these measures, or may require additional measures such as protective barriers for critical power plant components—transformers, gas lines, and compressors—depending upon circumstances unique to the facility or in response to industry-related standards, security concerns, or additional guidance provided by the U.S. Department of Homeland Security, the U.S. Department of Energy, or the North American Electrical Reliability Council, after consultation with both appropriate law enforcement agencies and the applicant.

Verification: At least thirty (30) days prior to the initial receipt of hazardous materials on site, the project owner shall notify the CPM that a site-specific operations site security plan is available for review and approval. In the annual compliance report, the project owner shall include a statement that all current project employee and appropriate contractor background investigations have been performed, and that updated certification statements have been appended to the operations security plan. In the annual compliance report, the project owner shall include a statement that the operations security plan includes all current hazardous materials transport vendor certifications for security plans and employee background investigations.

C.4.14 CONCLUSIONS

Staff's evaluation of the proposed project (with proposed mitigation measures) indicates that hazardous material use, storage, and transportation would not pose a significant impact on the public (pursuant CEQA). Staff's analysis also shows that there would be no significant cumulative impact (pursuant CEQA). With adoption of the proposed conditions of certification, the proposed project would comply with all applicable LORS. Other proposed conditions of certification address the issues of site security matters.

Staff recommends that the Energy Commission impose the proposed conditions of certification to ensure that the project is designed, constructed, and operated in compliance with applicable LORS, and would protect the public from significant risk of exposure to an accidental release of hazardous materials. If all mitigation proposed by the applicant and by staff are implemented, the use, storage, and transportation of hazardous materials would not present a significant risk to the public (pursuant CEQA).

Staff concludes that there is insignificant potential for hazardous materials release to have an impact beyond the facility boundary, and therefore concludes there is also insignificant potential for significant impacts to the environment (pursuant CEQA). For any other potential impacts upon the environment, including vegetation, wildlife, air, soils, and water resulting from hazardous materials usage and disposal at the proposed facility, the reader is referred to the **BIOLOGY**, the **AIR QUALITY**, the **SOIL AND WATER**, and the **WASTE MANAGEMENT** sections of this SA/DPA/DEIS.

Staff proposes six conditions of certification which are mentioned in the text above. **HAZ-1** ensures that no hazardous material would be used at the facility except as listed in **APPENDIX A** of this section, unless there is prior approval by the Energy Commission Compliance Project Manager. **HAZ-2** ensures that local emergency response services are notified of the amounts and locations of hazardous materials at the facility and that proper precautions are taken to avoid spills, **HAZ-3** requires the development of a Safety Management Plan that addresses the delivery of all liquid hazardous materials during the construction, commissioning, and operation of the project would further reduce the risk of any accidental release not specifically addressed by the proposed spill prevention mitigation measures, and further prevent the mixing of incompatible materials that could result in the generation of toxic vapors. **HAZ-4** addresses the use of HTF in the solar array. Site security during both the construction and operation phases is addressed in **HAZ-5** and **HAZ-6.**

SAMPLE CERTIFICATION (Attachment A)

Affidavit of Compliance for Project Owners

I,

_____

(Name of person signing affidavit)(Title)

do hereby certify that background investigations to ascertain the accuracy of the identity and employment history of all employees of

_____

(Company name)

for employment at

_____

(Project name and location)

have been conducted as required by the California Energy Commission Decision for the above-named project.

_____

(Signature of officer or agent)

Dated this _____ day of _____, 20 _____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

SAMPLE CERTIFICATION (Attachment B)

Affidavit of Compliance for Contractors

I,

_____

(Name of person signing affidavit)(Title)

do hereby certify that background investigations to ascertain the accuracy of the identity and employment history of all employees of

_____

(Company name)

for contract work at

_____

(Project name and location)

have been conducted as required by the California Energy Commission Decision for the above-named project.

_____

(Signature of officer or agent)

Dated this _____ day of _____, 20 _____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

SAMPLE CERTIFICATION (Attachment C)

Affidavit of Compliance for Hazardous Materials Transport Vendors

I,

_____

(Name of person signing affidavit)(Title)

do hereby certify that the below-named company has prepared and implemented security plans in conformity with 49 CFR 172.802 and has conducted employee background investigations in conformity with 49 CFR 172, subparts A and B,

_____

(Company name)

for hazardous materials delivery to

_____

(Project name and location)

as required by the California Energy Commission Decision for the above-named project.

_____

(Signature of officer or agent)

Dated this _____ day of _____, 20 _____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

C.4.15 REFERENCES

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HAZARDOUS MATERIALS
APPENDIX A

Hazardous Materials Proposed for Use at the RSPP

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Hazardous Materials Appendix A
Hazardous Materials Proposed for Use at the RSPP

Material	CAS No.	Application	Hazardous Characteristics	Maximum Quantity On Site	CERCLA SARA RQ[a]
Acetylene	74-86-2	Welding gas	Health: moderate toxicity Physical: combustible, flammable	800 cubic feet	10,000 pounds
Activated Carbon	7440-44-0	Control of emissions from HTF expansion tank	Health: non-toxic (when unsaturated), low to moderate toxicity (when saturated), depending on the absorbed material Physical: combustible solid	4,000 pounds	N/A
Argon	7440-37-1	Welding gas	Health: low toxicity Physical: non-flammable gas	800 cubic feet	N/A
Calcium Hypochlorite (100%)	7778-54-3	Water treatment	Health: moderate toxicity Physical: corrosive, irritant	50 pounds	10 pounds
Carbon Dioxide	124-38-9	Welding gas	Health: low toxicity Physical: nonflammable gas	15 tons	N/A
Diesel Fuel	68476-34-6	Fuel	Health: low toxicity Physical: Class IIIB Combustible Liquid	300 gallons	N/A
Herbicide Roundup® or equivalent	38641-94-0	Herbicide	Health: low toxicity Physical: irritant	No onsite storage, brought on site by licensed contractor, used immediately	N/A
Hydraulic Fluid	64741-89-5		Health: low to moderate toxicity Physical: Class IIIB Combustible Liquid	500 gallons in equipment; maintenance inventory of 110 gallons in 55-gallon steel drums	N/A
Lube Oil	64742-65-0		Health: low toxicity Physical: N/A	10,000 gallons in equipment and piping; additional maintenance inventory of up to 550 gallons in 55-gallons steel drums	N/A

Material	CAS No.	Application	Hazardous Characteristics	Maximum Quantity On Site	CERCLA SARA RQ[a]
Mineral Insulating Oil	8042-47-5		Health: low toxicity Physical: N/A	32,000 gallons	N/A
Nitrogen	7727-37-9		Health: low toxicity Physical: non-flammable gas	7,500 pounds	N/A
Oxygen	7782-44-7	Welding gas	Health: low toxicity Physical: oxidizer	800 cubic feet	N/A
Oxygen Scavenger Reagent Acetic Acid (60%) Iodine (20%) De-ionized Water (20%)	 64-19-7 7553-56-2 7732-18-5		Health: moderate toxicity Physical: corrosive, irritant	50 pounds	5,000 pounds
Propane	74-98-6	Fuel for auxiliary boilers	Health: low toxicity Physical: flammable gas	18,000 gallons	10,000 pounds
Soil Stabilizer Active Ingredient: acrylic or vinyl acetate polymer or equivalent	N/A		Health: non-toxic Physical: N/A	No onsite storage, supplied in 55-gallon drums or 400-gallon totes, used immediately	N/A
Sulfuric Acid (29.5%)	7664-93-9	Contained in batteries	Health: toxicity Physical: corrosive, water reactive	2,000 gallons	1,000 pounds
Therminol VP-1™ Biphenyl (26.5%) Diphenyl Ether (73.5%)	92-52-4 101-84-8	Heat transfer from solar array to steam turbine generator	Health: moderate toxicity Physical: irritant, combustible liquid (Class III-B)	1.3 million gallons	100 pounds N/A

Source: SM 2009a, Table 5.6-3
a. Reportable quantities for a pure chemical, per the Comprehensive Environmental Response, Compensation, and Liability Act.

C.5 LAND USE, RECREATION, AND WILDERNESS

Testimony of Shaelyn Strattan

C.5.1 SUMMARY OF CONCLUSIONS

The proposed Ridgecrest Solar Power Project would be located on land within the California Desert Conservation Area (CDCA) Plan area. The project area includes approximately 1,944 acres of Unclassified and "Multiple-Use Class L" public (federal) lands, managed by the U.S. Bureau of Land Management (BLM). The Unclassified land use category allows electrical generation plants in accordance with federal, state, and local laws subject to approval of a CDCA Plan Amendment by the U.S. Bureau of Land Management (BLM). Siting of electrical generation plants on Class L lands also requires compliance with the NEPA environmental review process.

The proposed project requires BLM approval of an Amendment to the California Desert Conservation Area Plan and issuance of a Right of Way (ROW) grant for use of the 1.944 acres of the proposed project footprint. The applicant has submitted an initial ROW application for 3,995 acres to the BLM. The applicant's ROW application would be modified to include only the final project footprint, prior to issuance.

The proposed project would not:

- Convert Farmland or forest land to non-agricultural uses, or conflict with any agricultural zoning or existing Williamson Act contracts;
- Impact any wilderness areas or neighborhood and regional parks or recreation areas, or conflict with any habitat or natural community conservation plan.

The proposed project would have a less than significant impact on:

- Access within an established community.
- Agricultural use (grazing) and access within an established federal rangeland area.
- Growth-inducing potential

The proposed project would have a less than significant impact, with full implementation of the applicable conditions of certification, on:

- Recreational use of and access to the proposed project site and surrounding BLM-managed federal lands;
- Hazards to aviation;
- Permanent loss of lands within the proposed project footprint for agriculture, natural resources, and recreation.

The proposed project would have the following significant and (possibly) immitigable impacts:

- Incompatibility with existing natural resource use (i.e., loss of Desert Tortoise habitat and Mojave Ground Squirrel Conservation Area acreage and migratory access).

- Loss of scenic character

The proposed project would not contribute to cumulative land use or recreational impacts with implementation of all applicable conditions of certification. However, the incremental effect of the proposed project, combined with the effects of the other projects within the geographic scope of the cumulative analysis, would substantially reduce a scenic and biological important resource of value.

C.5.2 INTRODUCTION

The California Energy Commission (hereafter referred to as "staff") have reviewed the proposed Ridgecrest Solar Power Project (RSPP or "proposed project"), in accordance with the requirements of the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA).

The Land Use section of this document addresses project compatibility with existing or reasonably foreseeable land uses; consistency with applicable laws, ordinances, regulations, and standards (LORS); and potential project-related direct, indirect, and cumulative environmental effects. It discusses land use issues, including concerns related to agriculture, mining, recreation, wilderness, wild horse and burro, and rangeland resources. It also recommends mitigation/conditions of certification intended to reduce or eliminate impacts associated with any potentially significant environmental effects.

In addition to the effects associated with the land use component of this document, an energy generating system and its related facilities generally has the potential to create environmental impacts to other natural and human resources. Issues related to these resource areas are discussed in detail in separate sections of this document.

BLM manages the land that would be used for the proposed generating facility and most of the land associated with transmission and utility corridors. The BLM California Desert Conservation Area (CDCA) Plan of 1980, as amended by the West Mojave Plan (WEMO) of 2006, establishes management guidelines, procedures, and policies for the public lands impacted by the Ridgecrest Solar Power Project (RSPP).

C.5.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

Given the respective power plant licensing and land jurisdictions of the California Energy Commission and U.S. Bureau of Land Management (BLM), analysis of potential project impacts must comply with both CEQA and NEPA requirements. Because this document is intended to meet the requirements of both NEPA and CEQA, the methodology used for determining environmental impacts of the proposed project includes a consideration of guidance provided by both laws.

Both CEQA and NEPA require the Lead Agency to determine potentially significant project-related impacts. That significance is determined as part of the CEQA analysis in the Environmental Impact Report (EIR) or equivalent document. With NEPA, the

potential environmental effects are analyzed in the EIS, not with regard to their significance, but rather in terms of the nature and degree of their potential impact.

CEQA requires a Lead Agency to identify the criteria used to determine the significance of potential project-related impacts. A significant impact is defined by CEQA as "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project". A social or economic change related to a physical change may be considered in determining whether the physical change is significant. However, an economic or social change by itself shall not be considered a significant effect on the environment. (CCR 2009, §15382).

In comparison, NEPA defines 'significance' as effects or issues of sufficient context and intensity that an EIS is required. 'Context' refers to the effect of the project on society as a whole (human, national), the affected region, the affected interests, and the locality. 'Intensity' addresses the severity of identified direct, indirect, and cumulative effects. The significance of an issue or effect under NEPA is not declared within the EIW. As with CEQA, economic or social effects are not intended, by themselves, to require preparation of an environmental impact statement (40 CFR 1508.14). By electing to prepare an EIS, the BLM (as the NEPA lead agency) has deemed that the project has the potential to result in a significant effect on the environment.

C.5.3.1 THRESHOLDS OF SIGNIFICANCE (CEQA) [1]

The determinations of significance under CEQA, as identified by the Energy Commission in this section, are based on scientific and factual data related to issues addressed in Appendix G of the CEQA Guidelines, performance standards, thresholds identified by the Energy Commission staff, and thresholds recommended by other public agencies or subject experts, as supported by substantial evidence. (CCR 2009)[2] Thresholds are quantified, where feasible, and supported by specific evidence.

C.5.3.2 ISSUES

Issues considered for impacts of significance, under CEQA and/or NEPA, include the following:

C.5.3.2.1 Agriculture, Forest, and Rangelands

Would the project:

- Convert Prime Farmland, Unique Farmland, Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, or Farmland of Local Importance to non-agricultural use[3]. (CEQA)

[1] A threshold of significance is an identifiable quantitative, qualitative, or performance level of a particular environmental effect. Effects exceeding that threshold would be considered significant. (CCR 2009, §15064.7)

[2] Pursuant to CEQA Guideline Amendments, adopted December 30, 2009; effective March 18, 2010.

[3] FMMP defines "land committed to non-agricultural use" as land that is permanently committed by local elected officials to nonagricultural development by virtue of decisions which cannot be reversed simply by a majority vote of a city council or county board of supervisors.

- Conflict with existing zoning for agricultural use or a Williamson Act contract. (CEQA)
- Conflict with existing zoning for, or cause rezoning of, forest land [as defined in PRC §12220(g)], timberland (as defined by PRC §4526), or timberland zoned Timberland Production [as defined by GC §51104(g)]. (CEQA)
- Result in the loss of forest land or conversion of forest land to non-forest use. (CEQA)
- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural uses[4] or forest land to non-forest use. (CEQA)
- Disrupt activities or substantially reduce the agricultural resource value of established federal rangelands within the California Desert Conservation Area. (NEPA)

C.5.3.2.2 Wilderness and Recreation

Would the project:

- Increase the use of existing neighborhood and regional parks or other recreational facilities, such that substantial physical deterioration of the facility would occur or be accelerated. (CEQA)
- Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment. (CEQA)
- Directly or indirectly disrupt activities in established federal, state, or local recreation and/or wilderness areas. (NEPA)
- Substantially reduce the scenic, biological, cultural, geologic, or other important resource value of federal, state, local, or private recreational facilities or wilderness areas. (NEPA)
- Directly, indirectly, or cumulatively affect the wilderness qualities of size, naturalness, or outstanding opportunities for solitude or primitive and unconfined recreation of a wilderness area or wilderness study area; or change the characteristics of a wilderness study area, such that it would not contain the qualities necessary for it to be considered for future designation as wilderness? (NEPA)

C.5.3.2.3 Land Use Compatibility and LORS Compliance

Would the project:

- Directly or indirectly divide an established community or disrupt an existing or approved land use. (CEQA & NEPA)
- Induce substantial population growth in an area, either directly or indirectly? (CEQA)

[4] Non-agricultural uses in this context refers to land where agriculture (the production of food and fiber) does not constitute a substantial commercial use.

- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction, or that would normally have jurisdiction, over the project adopted for the purpose of avoiding or mitigating environmental effects. (CEQA & NEPA)
- Conflict with any applicable habitat conservation plan, natural community conservation plan, or biological opinion? (CEQA & NEPA)

C.5.3.2.4 Cumulative Land Use Effects

Would the project:

- Result in incremental impacts that, although individually limited, are cumulatively considerable when viewed in connection with other project-related effects or the effects of past projects, other current projects, and probable future projects.[5] (CEQA & NEPA)

C.5.4 PROPOSED PROJECT (ALTERNATIVE 1)

C.5.4.1 SETTING/AFFECTED ENVIRONMENT

The proposed project is a utility-scale, solar thermal electric power-generating facility. It would be located on approximately 1,944 acres of public, BLM-managed land, about 4.5 miles west-southwest of the City of Ridgecrest, California. The land is relatively undisturbed high desert. The site is generally flat, with elevations ranging from about 2,630 feet above sea level (ASL) at the western limits of the northern solar field to approximately 2,770 feet ASL along the southern and eastern site boundaries. Native vegetation is well-established and supports a diverse plant and animal ecosystem, providing habitat for a number of special status species. There are two large ephemeral washes and several smaller dry desert washes that traverse the project area, generally from south to north. There are no structures on the site, except for towers along the existing SCE transmission line corridor.

The northern portion of the proposed project footprint is bounded on the southwest by Brown Road and partially bounded on the east by Hwy 395. The southern solar field has Brown Road to the northeast and the SCE 230 kV transmission line roughly parallels both portions of the site from northeast to southwest. A former Southern Pacific railroad ROW extends north-south, just beyond the western transmission line boundary. Now part of the public lands managed by BLM, the decommissioned railbed remains, including raised berms, bridges, and culverts, but the railroad ties and tracks have been removed. The railbed currently serves as a non-motorized, casual use trail.

The applicant has initially applied for a right-of-way (ROW) grant of approximately 3,995 acres from BLM (#CACA 049016). However, the actual ROW would approximate the footprint and surrounding disturbed lands necessary for the operation of the project

[5] Cumulative impacts refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. The individual effects may be changes resulting from a single project or a number of separate projects and can result from individually minor, but collectively significant actions taking place over a period of time (CEQA Guidelines §15355; 40 CFR 1508.7).

(≤ 2,000 acres), once construction is complete. The final project footprint is not expected to extend east of Hwy 395. The property includes the following parcels, as described in **Land Use Table 1** below:

Land Use Table 1
ROW Property Description

Township	Range	Section	Assessors Parcel Number (APN)
27 South	39 East	Portion of the southwest ¼ of the southwest ¼ of Section 13	Portion of APN 341-091-09
		Portion of the south ½ of Section 14	Portion of APN 341-091-08
		23	341-091-10
		24	341-091-11
		25	341-110-03
		26	341-110-02
		Portion of the eastern half of Section 27	Portion of APN 341-110-01
		Portion of the eastern half of Section 34	Portion of APN 341-110-06
		35	341-110-05
28 South	39 East	Portion of the north ½ of Section 2	Portion of APN 097-070-02 (Govt. Lots 1-4)

Source: SM 2010(c), p.16; Kern County Online Public Mapping System. http://maps.co.kern.ca.us/imf/imf.jsp?site=kern_pub (February 13, 2010).

Generating Facilities

The facility would have a nominal output of 250 megawatts (MW) and would consist of a power block facility, occupying approximately 3.5 acres, and two fields of solar parabolic mirrors, a northern field occupying approximately 894 acres and a southern field of roughly 554 acres. Brown Road, a paved, two-lane county road, bisects the project from southeast to northwest and provides access to the site. In addition to the main power generating facility, the site would include a main office building and parking lot, main warehouse with laydown area, onsite access roads, a tie-in switchyard, transmission lines, and a land treatment unit (LTU) for bioremediation or land farming of heat transfer fluid (HTF)-contaminated soil. The tallest facilities would be the cooling and transmission towers, approximately 120 feet in height. Buildout coverage on the site (final footprint, not the initial ROW) would be nearly 100%, including mirror fields, access roads, and buffer areas outside the fenceline.

Both solar fields and the power block would be completely enclosed by a combination of chain link and wind fencing. Chain link metal-fabric security fencing, eight feet tall, with one-foot barbed wire or razor wire on top, would be installed along the north and south sides of the facilities. Thirty-foot tall wind fencing, composed of A-frames and wire mesh, would be installed along the east and west sides of each solar field. Tortoise exclusion fencing would also be included. Controlled access gates would be located at the site entrances.

The main facility footprint would be graded to remove all existing vegetation, terraced, and fully fenced. Access to the power block and main plant office would be from Brown Road, via a new 550-foot long, 24-foot wide paved road, to be located approximately 1.75 miles west of the intersection of Brown Road and Hwy. 395. A second 650-foot long, 24-foot wide road for access to the south solar field would be located approximately 0.6 miles farther west along Brown Road. To provide safe ingress and egress at the new access roads, 1,500-ft. long acceleration and 1,000-ft. long deceleration lanes would be constructed in both directions at both access roads.

Transmission Lines and Infrastructure

A new 3,900-foot 230-kilovolt (kV) transmission line, from the turbine generator (power block) to a new nearby switchyard (3.2 acres within the project footprint), would interconnect with Southern California Edison's (SCE) existing 230 kV Inyokern/Kramer Junction transmission line that passes west of the Project site. Approximately 9,060 feet of the existing SCE kV lines would be relocated west of the current location, along the western limits of the south solar field and within the requested BLM project ROW. Ground disturbance for the transmission line relocation would occur within a 280-foot wide construction corridor. [SM 2010(c)]

Supporting infrastructure for the facilities would include a new five-mile water pipeline from the Indian Wells Valley Water District (IWVWD) storage facilities in Ridgecrest. The line would be constructed entirely within the existing IWVWD/City of Ridgecrest ROW, from the storage tank to South China Lake Boulevard (Blvd.); then along the South China Lake Blvd. and Brown Road ROWs to the project site. The Kern County ROWs for South China Lake Blvd. and Brown Road are 100 feet wide (50 feet either side of the centerline). A franchise agreement with Kern County would be required for use of this ROW. A ROW from Caltrans would also be required for the pipeline to run beneath Hwy 395, at the South China Lake Blvd./Brown Road intersection. The waterline would require a total of 16.3 acres (a five-mile long, 30-foot wide linear alignment within the existing road ROWs). The line would be 12"-16" in diameter. The 12" line would be sufficient to supply the estimated water needs for the proposed project. However, IWVWD has indicated an intent, with applicant approval, to install a 16" line as part of a concurrent expansion of services to property owners along the waterline route and annexation of the area from the current district boundary, along South China Lake Blvd., to the beginning of BLM land.

Project Closure and Decommissioning

According to the AFC Chapter 3, the solar generating facility is expected to have an operational lifespan of 30 years. If economically and technologically viable, it may continue to operate beyond that time. However, at any point during operation,

temporary or permanent closure of the solar facility could occur. Temporary closure might be a result of necessary maintenance, hazardous weather conditions, or damage due to a natural or manmade disaster. Permanent closure could result from damage that is beyond repair, adverse economic conditions, or other significant reasons. Both temporary and permanent closures would require the project owner to submit a contingency plan or decommissioning plan to the BLM and Energy Commission for review and approval, prior to implementing any closure (except for emergency response). Either plan would include measures to ensure compliance with applicable LORS and protection of public health and safety requirements and the environment. These would include shutdown/restart procedures, removal/ storage of equipment and materials, site restoration, and potential decommissioning alternatives. (See **GENERAL CONDITIONS, INCLUDING COMPLIANCE MONITORING AND CLOSURE PLAN,** Section E.)

C.5.4.2 SURROUNDING AREA

The proposed project site is located in the northeastern part of Kern County, at the southern end of the Indian Wells Valley, a portion of the high northern Mojave Desert. The area is surrounded by four mountain ranges; the Sierra Nevada on the west, the Coso Range on the north, the Argus Range to the east, and the El Paso Mountains to the south. It is approximately an hour and 30 minutes from the Lancaster/Palmdale area and about two hours from both Bakersfield and San Bernardino. California City is about 32 miles to the south. Regional access to the project site is provided from Hwy 395, then west on Brown Road. Undeveloped, publicly-owned desert lands surrounds the project site and extend outward toward Ridgecrest and Inyokern, sparsely interspersed with privately-owned small ranches and large-parcel rural residences.

The site for the proposed project is an ancient alluvial plain, situated between the foothills of the El Paso Mountains. The areas immediately adjacent to the project site are an extension of the same high desert environment: relatively flat terrain; sparse, drought-tolerant native vegetation; and an abundance of dry washes that channel storm runoff from the infrequent thunderstorms. However, elevations begin to rise fairly rapidly within three miles of the site, especially to the south and west, in the foothills of the El Paso Peaks and Black Hills. Much of the land is managed for multi-use by BLM, allowing livestock grazing and a variety of recreational activities.

The closest urbanized area is the City of Ridgecrest, approximately 4.5 miles east of the project site, with larger residential parcels extending from the Ridgecrest city limits west to Hwy 395. Ridgecrest is a small incorporated city of just over 27,000 people. The Naval Air Weapons Station (NAWS) China Lake is located immediately adjacent to Ridgecrest, to the north and east, with military air operations extending over and to the west of the city. SR 178 runs east-west, along the northern edge of Ridgecrest and intersects Hwy 395 approximately seven miles north of the project site. It divides much of Ridgecrest from the China Lake Naval facilities. Two other military areas, Fort Irwin Military Reserve and Edwards Air Force Base, are located at some distance to the east and south, respectively. Ridgecrest is the support community for the Navy, federal employees, and contractors, and provides services, such as shopping, medical care, and transient accommodations, for over 40,000 people from throughout the Indian Wells Valley. Development is a balanced mix of commercial, local industrial, and residential,

with most older, established commercial and industrial operations along SR 178 and newer commercial clustered along South China Lake Blvd. Both commercial and residential development is expanding south along South China Lake Blvd (Business 395).

Inyokern, a small, unincorporated community of about 1,000 people, is located approximately six miles north of the project site. It was a railroad town established along the historic Lone Pine Branch of the Southern Pacific Railroad, which is no longer in operation. The main part of town is approximately one mile west of the intersection of Hwy 395 and SR 178 (which bisects the town). Development in the community is primarily residential, with a limited number of commercial and light industrial establishments along the SR 178 corridor. The Kern/Inyo county line is about 10 miles north of Inyokern and the San Bernardino county line is approximately eight miles to the east.

To the west, south, and southeast, public lands dominate the sparsely settled high desert environment. The El Paso Mountain Wilderness begins approximately 2.5 miles from the western edge of the project site. Weather in the area is extremely variable, characterized by hot summer temperatures, with average daily highs above 100 degrees Fahrenheit (F) and low precipitation (approximately five inches per year). Ridgecrest has recorded temperatures as high as 118 degrees F and as low as 0 degrees F. Daily temperature ranges of 40 degrees can occur. Annual precipitation can vary by as much as 80%, meaning that normal precipitation can range from a low of 2.02 inches to 10.10 inches on any given year. Summer thunderstorms can drop more precipitation on a site in one event than the mean precipitation for that location. Snow can occur during the winter. High winds are common. Wind gusts in excess of 80 miles per hour (MPH) occur regularly in the Mojave and along the western edge of the Indian Wells Valley. Gusts over 100 MPH are not unusual and a gust of 174 MPH was recorded in the Indian Wells Valley in December 1996.

Water for the surrounding area, for drinking, irrigation, and commercial/industrial uses, comes from groundwater wells that tap the Indian Wells Valley Groundwater Basin (IWV Groundwater Basin), which is part of the South Lahontan Hydrologic Region. Water for the project, whether from on-site wells or, as proposed, purchased from the IWVWD, would come from the same source. As indicated in the AFC (SM 2009a, p.5.17-23), the Basin is in overdraft, with groundwater pumping at double to triple the inflow/recharge annually. However, groundwater has not been adjudicated; developers are still able to obtain will-serve letters from IWVWD, within its existing district boundaries; and permits to establish new wells are still being issued on lands under Kern County jurisdiction.

C.5.4.3 AGRICULTURAL LANDS AND RANGELANDS

The proposed project site is located entirely on vacant, BLM-managed, multiple use class L and unclassified public lands. With the exception of limited grazing for domestic livestock, there is no current or historical use of the property for agricultural purposes. Livestock grazing has occurred in and around the project site for nearly 150 years.

The project location, and surrounding 203,567 acres of BLM-managed lands, is part of the Cantil Common Rangeland Grazing Allotment #05005 (see Figure C.5-1).

Allotments identified as “Common” (e.g. Cantil Common) are so-named because multiple lessees have grazing rights on those allotments. The current Cantil Common allotment was established in March 1983 and allows intermittent grazing of sheep for seven permittees on the ephemeral rangeland within the allotment boundaries, including the project site and surrounding acreage, between March 1 – June 1 of each year. Sheep are only allowed to graze/move through an area once during the grazing season and ranchers generally allow the sheep to graze in any one area for only a few days at a time. As of March 1999, approximately 8,435 sheep use the Cantil Commons acreage for part or all of their annual forage requirements. The project site would represent less than 1% of the allotment. The current allotment is effective through February 28, 2018.

Because of the ease of access to the allotment area via Brown Road, there are several areas within the project boundaries that have been repeatedly used for loading/unloading, supplemental feeding, and watering of livestock. Temporary corrals have been erected in these areas, but no permanent structures or improved access roads or pullouts exist. The current contract does not address, specify, or regulate these casual access locations, except for the length of time that can be spent in any one area and the distance between staging areas. The boundaries and conditions of use for this allotment are subject to periodic adjustment to avoid wildlife conflicts, due to the presence of desert tortoise habitat at various locations throughout the allotment. In years of adequate ephemeral forage production, sheep grazing is authorized in non-critical habitat. According to the West Mojave Plan (WEMO), this allotment contains 240,913 acres of non-critical desert tortoise habitat and 78,035 acres of desert tortoise critical habitat; none of the project site has been designated as critical habitat. (WEMO, Appendix O)

There are no wild horses or burros in the project area and it is not within a Wild Horse and Burro Herd Management area.

Privately held lands that adjoin or are in the immediate vicinity of the project site, or along the proposed waterline corridor, consist primarily of large residential parcels of 5-20 acres or more. Some agricultural activities occur on these parcels, generally limited to the production of crops for family consumption, small farming operations (pistachio orchards), and the raising of livestock and horses for sale or personal use. There are no large scale agricultural operations in the project vicinity.

C.5.4.4 RECREATION AND WILDERNESS

The proposed project site is located in the western part of the Mojave Desert. This area, including the project site, is part of the West Mojave Plan (WEMO), an amendment to the CDCA, which includes 3,263,874 acres of BLM-administered public lands in Inyo, Kern, Los Angeles, and San Bernardino counties (over 500,000 acres in Kern County alone). It is within five miles of the City of Ridgecrest and NAWS China Lake, and within a two-hour drive of many larger, urbanized areas in southern California, including San Bernardino, Bakersfield, Ontario, and other cities in the San Fernando Valley.

The lands within and around the proposed project site are frequently used for recreation by Indian Wells Valley residents, as well as regional visitors to the area. The area is easily accessed on Hwy 395 from the north or south. SR 178, SR 58, and Interstate (I)15 provide connections to Hwy 395 from the east and west. Hwy 14 joins Hwy 395

north of Inyokern and provides direct access to Los Angeles. Attractions such as the Red Rock Canyon State Park; Trona Pinnacles Natural Monument; Fossil Falls, the site of ancient Native American petroglyphs; 20 Mule Team Museum and U. S. Navy Museum of Armament & Technology; **Maturango Museum**, emphasizing the cultural history, natural history and geology of the Northern Mojave Desert; Randsburg "living ghost town"; four wilderness areas, including the El Paso Mountain Wilderness; Death Valley National Park, with the lowest point in the contiguous U.S.; and Mt. Whitney, the highest point in the contiguous U.S., are within a day's drive of the project site. The area is a favorite with many film companies, with several using locations within and immediately adjacent to the project site as venues for commercials and motion pictures.

C.5.4.4.1 Recreation

Land Use Table 2 describes recreation areas and facilities in the project vicinity, beginning with the area closest to the proposed project site.

Land Use Table 2
Recreation Areas and Facilities

Recreation Area	Jurisdiction	Distance from Project Site	Approximate Acreage	Allowed Uses
CDCA El Paso OHV Subregion Planning Area	BLM; Class L, M, and Unclassified	Surrounding project site	83,474 acres [92% (76,998 acres) federal land managed by BLM; 8% (6,475 acres) private and state land	Multiple Use; 465 miles of Open & Limited Use OHV trails; non-motorized recreational uses
CDCA Ridgecrest OHV Subregion Planning Area	BLM; Class L, M, and Unclassified	Approx. 1 mile, adjacent to Hwy 395, south and east of Ridgecrest	22,465 acres [94% (21,115 acres) federal land managed by the BLM and 6% (1,350 acres) private land]	Multiple Use; 328 miles of Open & Limited Use OHV trails; non-motorized recreational uses
Rademacher Hills Trail System	BLM	Approx. 2 miles east	8.5-mile network of non-motorized trails. Variety of motorcycle and 4-wheel drive routes open for recreational riding inside the Rademacher Hills Viewshed	Multiple Use; open to hiking, jogging, horseback riding and mountain biking; casual OHV use
Spangler Hills OHV Area	BLM	Approx. 2.5 miles east	57,000 acres	Open OHV use (no restrictions); Multiple Use – primitive camping, hiking, competition sports
Sequoia National Forest	U.S. Forest Service/BLM	Starts 12 miles east	1,787.87 square miles; 1,500 miles of maintained roads, 1000 miles of abandoned roads, and 850 miles of forest trails	Multiple Use; camping, hiking, horseback riding, mountain biking; trails and roads open to OHV use

Recreation Area	Jurisdiction	Distance from Project Site	Approximate Acreage	Allowed Uses
City of Ridgecrest (see Figure C.5-2)				
Freedom Park	Ridgecrest Parks & Recreation Department	5-8 miles	19.8	Picnic Area, Gazebo. Open turf
Hellmers Park			5.0	Frisbee Golf, Picnic Areas & Horseshoe Pits
James M. Pearson Memorial Park			4.5	Picnic Areas, Basketball Court, Playground
Moyer Park			0.5	Greenbelt
Upjohn Park			6.0	Picnic Areas & Horseshoe Pits, lighted Basketball Ct, 2 playgrounds
Kerr McGee Youth Sports Complex			11.7	Lighted Football/Soccer Field and 5 lighted baseball diamonds
Kerr McGee Community Center			0.7	Fitness Room & Aerobics Room, 7 meeting rooms, Basketball court, Volleyball court, 2 racquetball courts, gym, playground
Leroy Jackson Park Sports Complex			56.0	3 ball diamonds, 6 tennis courts, 3 soccer/football fields, skate park, playground, picnic area; all areas lighted
Ridgecrest Senior Center			~ 0.1 acre	Activity Center
Ridgecrest Skate Park			0.5	
Sgt. John Pinney Memorial Pool			4.0	Public pool, picnic areas
Bowman Linear Park*			25.4	Class I Bicycle Path (under development)

Source: COR 2009(a) Open Space & Conservation Element; COR 2010(c)

The Sequoia National Forest, a 1,787.87 square mile area starting about 15 miles northwest of the project site, has over 1,500 miles of maintained roads, 1000 miles of abandoned roads, and 850 miles of trails in the forest available for the use and

enjoyment of hikers, off-highway vehicle (OHV[6]) users, and horseback riders. Forest elevations range from 1,000 feet in the foothills of the Sierra Nevada to over 12,000 feet. The Pacific Crest National Scenic Trail, which stretches 2,600 miles from Canada to Mexico, crosses the Sequoia National Forest for approximately 78 miles, and is only one of four National Trails within the forest boundaries. The Sequoia National Forest also contains portions of six designated wilderness areas: Kiavah, Monarch, South Sierra, Dome Land, Jennie Lakes, and Golden Trout.

The City of Ridgecrest is the closest developed area to the project site and the most likely residential area for anyone relocating to the area. It also serves as the support community for most of the Indian Wells Valley. As noted in **Land Use Table 2**, there are approximately 187 acres of recreational lands within the Ridgecrest Planning Area, with over 103 acres in twelve parks and recreational facilities, including a variety of sports complexes, with about 68 acres of baseball fields, football fields, tennis courts, and soccer fields (see Figure C.5-2). In addition, the City operates two special purpose facilities - a skate park and community pool, and a senior center. (The Leroy Jackson Park Sports Complex is owned by Kern County, but is operated by the City.) There are also five museums and seven cultural venues serving the Ridgecrest community. Based on a 2007 population of 27,944, the City maintains and manages 3.7 acres of parkland per 1,000 residents. [COR 2010(c), Open Space & Conservation Element]

Recreational activities most common to the project site and immediate vicinity include walking/running/hiking, mountain biking, astronomical observations (star parties), photography, birdwatching and wildlife viewing, horseback riding, rockhounding and mineral collection, picnicking, casual camping, and OHV use, including 4X4s and dirt bikes. The site's close proximity to Ridgecrest and Inyokern, as well as easy access from Hwy 395, encourages the use of this area for day trips.

Many of the trails through the project site accommodate both motorized and non-motorized traffic and serve as destination access for local attractions, within and outside the project boundaries. Specific uses of locations within the project site include star parties, conducted by the China Lake Astronomical Society. Their site, approximately one-half mile south of Brown Road, just west of the South El Paso Wash, has been used continuously for over 20 years, and is easily accessed from Brown Road (see Figures C.5-3 and C.5-4). Lands within the proposed ROW boundaries are also regularly used by equestrian groups and individual riders, due, in part, to the easy access and availability of staging locations along Brown Road. The buttes, immediately outside and adjacent to the eastern edge of the northern solar field site boundary (within the proposed ROW), and the highest point in the immediate project area, is also a frequent destination for riders, joggers, and picnickers. The Indian Wells Gem & Mineral Society regularly uses existing trails through the southern portion of the project footprint to access their established sites. The Sagebrush Sam's Camping Club of Ridgecrest uses the project area as a group campsite and partners with the Kerncrest Audubon Society for birdwatching and annual bird counts in the area.

[6] Off-Highway Vehicle (OHV) – Any motorized track or wheeled vehicle designed for cross-country travel over natural terrain, as defined by the BLM.

The area within and surrounding the project site is identified by BLM as the El Paso subregion of the WEMO Motorized Vehicle Access Planning Area (see Figure C.5-5) and consists of volcanic peaks, broad valleys, rolling foothills, badlands with multiple washes, and narrow canyons. Elevations range from 2,000 feet in the south to 5,244 feet above sea level on top of Black Mountain. Creosote bush scrub and saltbush scrub are the predominant plant communities in the lowlands, with numerous desert washes, remnant stands of native perennial bunchgrasses on the mountain tops, scattered Joshua tree woodland, and small riparian plant communities at a few of the widely spaced springs. The subregion abuts the Last Chance Canyon Area of Critical Environmental Concern (ACEC) and the El Paso Mountains. As of 2001, it contained over 465 miles of OHV trails, with 324 miles officially designated as “open” in the 1985-87 CDCA Inventory. BLM’s CDCA Plan also identified four sites within the El Paso subregion with excellent potential for interpretation and education: Burro Schmidt’s Tunnel; the El Paso Mountains; the Garlock Fault; and the Goler Grabben. The area is universally popular with visitors for a variety of activities, including OHV jeepers, motorcyclists/dirt bikes, and 4-wheelers; miners, campers; hikers, rock hounds; horseback riders; historical explorers, and upland game hunters. (WEMO, §3.5 and Appendix R)

As many of the local and regional attractions are easier to reach by motorcycle or all-terrain vehicle, the area is a magnet for OHV enthusiasts. There are large expanses of public land in the project vicinity available for casual riding or specifically designated for OHV use, such as the Spangler Hills Open Area and Rademacher Hills Trail System, just southeast of Ridgecrest (about two miles east of the project site).The Dove Springs OHV open area starts about 12 miles to the southwest of the project site.

Motorized vehicle access to public lands in the planning area supports a variety of activities. These include OHV touring, motorcycle events (e.g., challenges, speed, and other competitive events), trailheads and staging areas (for hiking, camping, equestrian riding, gem collecting and rock hounding, hunting, etc.), private land access, utility maintenance, and mineral production. Campers and hikers use OHVs to reach trailheads and staging areas that are often quite remote. Equestrians use motorized vehicles to pull their horse trailers, and other equipment and supplies, to staging areas where they unload their horses, saddle up, and otherwise prepare for rides.

OHV travel is allowed on all BLM-designated open trails in both the northern and southern portions of the proposed project site. The project site is located within the El Paso Collaborative Access Planning Area (CAPA). Because OHV route designations have not been completed for the El Paso subregion, established, non-designated trails, especially destination trails or established trails that connect to designated trails will also remain "open" as a courtesy, provided vehicles are operated responsibly and in accordance with any existing regulations, until the El Paso CAPA is finalized, These are not open OHV areas; vehicles must remain on established trails or designated routes.

Six BLM-designated OHV routes [EP0222, 0223, 0234, and 0235, and two unnamed trails (A and C)] and numerous casual trails provide access into or through the proposed project site, with most connecting to established trails in the south and east (Figure C.5-6). All designated routes intersect or cross Brown Road. According to the Ridgecrest Offroad Business Association (PUBLIC 2010hh), these trails are used regularly by

Ridgecrest residents and community groups for access to camping/ picnicking areas and offsite designations; general trail riding, and as an alternative off-highway access to Rademacher Hills and Spangler Hills for vehicles that cannot legally travel on city or county roads and state highways[7]. They also provide off-road access to Red Rock and Jawbone Canyon riding areas, and several Wilderness areas. Parking and staging areas within the project site are concentrated along and within 300 feet of Brown Road, on unclassified public lands.

The area containing the southern solar field is designated by BLM as "Multiple Use Class Limited (MUC L)", consistent with its inclusion within the Mojave Ground Squirrel Conservation Area (MGSCA) boundaries. The Class L designation is intended to protect sensitive, natural, scenic, ecological, and cultural resource values. These lands are to be managed to provide for generally lower-intensity and carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished. This class is suitable for recreation which generally involves low to moderate user densities. Recreational opportunities include, but are not limited to, backpacking, primitive, unimproved site camping, hiking, horseback riding, rockhounding, nature study and observation, photography and painting, rock climbing, spelunking, and hunting. Permanent or temporary facilities for resource protection and public health and safety are allowed. New roads and ways may be developed under right-of-way grants or pursuant to regulations or approved plans of operation. As with the unclassified lands, motorized vehicle use is allowed on existing established routes of travel until the El Paso Motorized Vehicle Access Planning process and designation of routes is completed. Off-trail OHV use is prohibited. Four of the OHV trails that have been designated as open by BLM (EP0222, 223, 234, and 235) criss-cross this Class L area, within the proposed ROW and project site (Figure C.5-6). EP0421, just beyond the project's southwest corner, crosses a portion of the original ROW boundary, but should not be impacted if the project remains within the proposed siting footprint. These are primary access routes that receive regular use or that link desert attractions for the general public and provide secondary access to meet specific user needs.

C.5.4.4.2 Wilderness

The California Desert Protection Act of 1994 designated 69 wilderness areas in southern California and directed that they be administered by the BLM, pursuant to the Wilderness Act of 1964. There are five wilderness areas within a 25-mile radius of the proposed project site. The wilderness areas closest to the proposed project site are the El Paso Mountain Wilderness, approximately 2.5 miles to the southwest, and the Owens Peak Wilderness, located approximately eight miles northwest of the project site. The Golden Valley Wilderness is approximately 15 miles southeast and the Kiavah and Bright Star Wilderness areas are about 12 miles east and 25 miles west, respectively.

Wilderness land in Kern County is administered by the BLM and the U.S. Forest Service (USFS). According to the federal Wilderness Act, a designated Wilderness Area is defined as an area of undeveloped Federal land which is protected and managed to

[7] OHVs need not be licensed for travel on city, county, state, or federal roads and highways to be used on BLM trails or open areas, provided they are trailered to the trailhead or staging area, or are only crossing public roads. However, they must have a California "green sticker" or "red sticker" to operate on BLM lands.

preserve its natural conditions; retaining its primeval character and influence, without permanent improvements or human habitation; and having four primary characteristics:

- Generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable;
- Contains outstanding opportunities for solitude or a primitive and unconfined type of recreation;
- Includes at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and
- Has ecological, geological, or other features of scientific, educational, scenic, or historical value. (US Code 1964).

The El Paso Mountain Wilderness, closest to the project site, is a collection of reddish-colored buttes and dark, uplifted volcanic mesas dissected by narrow canyons distinguish this area. Badlands topography surrounds Black Mountain, its central feature and sacred to many local Native American tribes. The most spectacular attribute of this area is the abundance of cultural sites. The southern portion of the wilderness is included in the Last Chance Archaeological District and is listed on the National Register of Historic Places. Wildlife includes abundant game birds (chuckar and quail), a significant concentration of nesting raptors, and the desert tortoise. Vegetation primarily consists of creosote bush scrub with Joshua Trees on the western side of the mountain. (WEMO, Appendix E) Local Native American tribes have used several sites and trails within the ROW as the starting point for sacred pilgrimages to the nearby El Paso Mountains for hundreds of years. (See **CULTURAL RESOURCES AND NATIVE AMERICAN VALUES** section for further discussion.)

Land Use Table 3 describes wilderness areas, areas of critical environmental concern, and natural resource areas easily accessible from the project area, beginning with the area closest to the proposed project site.

Land Use Table 3
Wilderness Areas

Wilderness Area	Jurisdiction/ Mgmt	Approximate Distance from Project Site	Acreage*	Allowed Uses**
El Paso Mountain Wilderness	BLM	2.5 miles southwest	23,669	Hiking, backpacking, climbing, kayaking, canoeing, rafting, horse packing, primitive camping
Owens Peak Wilderness	BLM	8 miles northwest	73,797	Hiking, backpacking, climbing, kayaking, canoeing, rafting, horse packing, primitive camping
Kiavah Wilderness	BLM	12 miles east	81,247	Hiking, backpacking, climbing, kayaking, canoeing, rafting, horse packing, primitive camping
Golden Valley Wilderness	BLM	15 miles southeast	36,478	Hiking, backpacking, climbing, kayaking, canoeing, rafting, horse packing, primitive camping
Desert Tortoise Natural Area	BLM	17.5 miles south	25,000+	Vehicle use prohibited; travel on marked trails only; pets on leash at all times
Bright Star Wilderness	BLM; ACEC	25 miles west	8,190	No designated trails for backpackers. Includes Jawbone-Butterbredt Area of Critical Environmental Concern

Source: WILD; BLM 2010(d)
* Approximate
** No motorized equipment or mechanical transport allowed, except wheelchairs

C.5.4.5 ASSESSMENT OF IMPACTS/ENVIRONMENTAL EFFECTS AND DISCUSSION OF MITIGATION

C.5.4.5.1 Agricultural Lands and Rangelands

C.5.4.5.1.1 Would the proposed project result in the conversion of Farmland[8] to non-agricultural uses?

As noted in the AFC Land Use Section (SM 2009(a), p.5.7-18), none of the lands within the proposed project site, including solar fields, generating facility, or linears, have been designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance by the California Department of Conservation, Farmland Mapping and Monitoring Program (FMMP). FMMP has designated the project site as Non-Agricultural and Natural Vegetation. This designation is applied to existing farmland, grazing land, and

[8] Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or Farmland of Local Importance, as defined in FMMP 2004, p.6.

vacant areas that have a permanent commitment for development[9]. Kern County has over two million acres of land within this category. (FMMP 2008) Additionally, according to the FMMP, Kern County does not recognize any lands within the county, including the project site, as Farmland of Local Importance (FMMP 2010). Therefore, the project would not result in the conversion of Prime Farmland, Unique Farmland, Farmland of Statewide Importance (as shown on the maps prepared pursuant to FMMP), or Farmland of Local Importance to non-agricultural use. No impact during any phase of the project.

C.5.4.5.1.2 Would the proposed project conflict with existing zoning for agricultural use or a Williamson Act contract?

The proposed project site is entirely on public lands, managed by BLM, with the southern portion of the proposed project footprint (including most of the southern solar field) designated as BLM MUC L. The remainder of the project site, to the north, is identified as unclassified (U) BLM-managed lands. Agricultural uses, except for livestock grazing and uses grandfathered in at the time of adoption of CDCA and WEMO amendment, are not allowed on any of the MUC lands (CDCA, Table 1, Multiple Use Class Guidelines, p.15). Agricultural uses are permitted on unclassified lands, unless specifically prohibited on a site-specific basis (CDCA, p.147). Electric generation plants may also be allowed on land with these classifications after NEPA requirements are met. Although the project would prevent agricultural use within its boundaries, thereby temporarily or permanently removing a portion of the existing Cantil Commons Grazing Allotment, the project is still consistent with the BLM land use designations (equivalent zoning), which would allow either or both uses on the project site. As the project site is entirely on BLM lands, the Kern County general plan land use and zoning designations do not apply. Kern County has acknowledged, through its General Plan land use designation of the project site as Non-Jurisdictional (Map Code 1.1; see Figure C.5-7), that it does not have jurisdiction over the land uses of this property.

Private lands adjacent to the proposed project site are, for the most part, zoned Estate, Residential Suburban Combining District, 20-acre minimum parcel size (E/RS-20) under the Kern County Zoning Code. The purpose of the RS designation is to expand the number and type of permitted domestic agricultural uses within rural residential areas. Consistent with the intent of this zoning code, limited agricultural production occurs on some of the surrounding privately-owned parcels, but no large scale operations exist in the immediate project vicinity. This project is not requesting and would not result in a change of zoning designation for these privately held parcels or agricultural uses permitted by the existing zoning code and would have no effect on any existing agriculture uses on these adjacent parcels. Utility and communication facilities are permitted under the E and E/RS zoning districts, including transmission lines and supporting, towers, poles, and underground facilities for gas, water, electricity, telephone, or telegraph service owned and operated by a public utility company, under the jurisdiction of the California Public Utilities Commission (CPUC). Installation of the

[9] Alternative definition for rural lands that do not qualify as Important Farmland under the standard FMMP definition, but are used for agricultural purposes. (DOC 2008, p.5)

waterline and connection to the infrastructure of other utility providers would occur within existing ROWs and any inconvenience to existing agricultural operations would be extremely transitory. Less than significant impact under CEQA.

Lands under BLM management are not eligible for inclusion under the Williamson Act and none of the privately held parcels surrounding the project site or along the waterline route are subject to a Williamson Act contract. No impact under CEQA.

Therefore, there is no conflict with a Williamson Act contract (no impact); and a less than significant impact to existing Kern County agriculturally- related zoning designations or permitted uses.

C.5.4.5.1.3 Would the proposed project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural uses or forest land to non-forest use? (CEQA)

As noted in C.5.4.5.1.2 above, the project site, including the proposed ROW, waterline, and linears, does not contain and would not result in the conversion of designated Farmland to non-agricultural uses. Likewise, there is no forest land in the project vicinity. No Impact under CEQA.

C.5.4.5.1.4 Would the project disrupt activities or substantially reduce the agricultural resource value of established federal rangelands within the California Desert Conservation Area. (NEPA)

Agriculture, excluding grazing, is not a permitted use within any BLM lands designated for multiple use (CDCA, Table 1, p.15). However, livestock grazing has been and continues to be a significant use of renewable resources on public land in the California Desert. The Federal Land Policy and Management Act (FLPMA) and the Public Rangelands Improvement Act of 1978 recognize livestock grazing as a principal use for the production of food and fiber. The only agriculturally-related activity that currently occurs on the project site and proposed project site is the grazing of sheep, consistent with the Cantil Commons Allotment permit, contract, and BLM land use designations (U and MUC L). The project facilities would permanently convert close to 2,000 acres of the Cantil Commons Allotment from agricultural (grazing) to non-agricultural use; and impact an existing contract designed to facilitate continued agricultural use. However, the allotment encompasses over 200,000 acres. Removal of all lands potentially impacted by the project within the allotment boundaries, including exclusion of the entire BLM ROW, would only result in a little over 1% reduction in the available forage area. This would equate to a negligible impact.

Some permittees may also be inconvenienced by the loss of access for loading, unloading, and watering of sheep along the Brown Road project frontage and within the project area. However, there is sufficient road access throughout the remaining allotment acreage so that none of these activities would be seriously jeopardized by siting the project in the proposed location. There is also sufficient land to the east, south, and west of the site to allow the sheep to graze unimpeded on the remaining allotment acreage in the project vicinity. The project would not substantially reduce the agricultural resources of the public lands or their use in its vicinity.

Therefore, the project would not substantially disrupt agricultural activities or substantially reduce the agricultural resource value of established rangelands within the CDCA.

C.5.4.5.2 Recreation and Wilderness

C.5.4.5.2.1 Would the proposed project increase the use of existing neighborhood and regional parks or other recreational facilities, such that substantial physical deterioration of the facility would occur or be accelerated, or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?

There are approximately 250,000 acres of publicly-accessible wilderness lands, 3,350 miles of open roads and trails on national forest land within a 25-mile radius of the project site. There are also over 800 miles of open and limited use trails, nearly 83,500 acres of multiple use public lands, and approximately 57,000 acres of open OHV area within 15 miles of the project site. In addition, the city of Ridgecrest, less than five miles east of the project site, maintains 12 parks and other recreational facilities, including over 103 acres of parkland; five museums; and seven cultural venues. (**Land Use Tables 2, 3; Figure C.5-2**) This equates to approximately 3.7 acres for each 1,000 residents living in Ridgecrest [COR 2010(c), Open Space & Conservation Element]. Finally, as noted in §C.5.4.4.1 above, there is a plethora of recreational opportunities within a day's drive of the project location.

Project construction would require an average workforce of 405 persons, with a peak construction workforce of 633 persons during the 11th month of construction. Approximately 75% of the workers are expected to commute to the project site daily or already reside in the local area. The impact of these workers on the area's recreational facilities would be negligible or already factored into due to their current place of residence. Of the remaining 25% (up to 101 workers), these would generally establish transient residence in the area during the work week and return to their permanent place of residency during their days off. While these workers may make some use of the recreational facilities in Ridgecrest or visit nearby recreation areas, an increase of 101 workers to a population pool of over 40,000 residents in the Indian Wells Valley area over slightly more than two years, averaged over all the recreational facilities available in the project area, would have little, if any, measureable impact on the existing facilities or result in the need for expansion or new facility construction.

The project would employ a permanent operational workforce of 84 people. Assuming that all employees relocate from outside the area with an average of three people per family, approximately 252 people would be added to population of the Indian Wells Valley. If all resided in Ridgecrest, this would equate to less than a one percent increase in the population. A permanent population increase of less than one percent is not considered a substantial amount of growth. Spread over the surrounding communities the potential impact to any single recreational facility, or cumulatively to multiple facilities within the area, would be further reduced.

Therefore, the project would not substantially affect existing neighborhood and regional recreational facilities or result in the need for new or expanded facilities. Less than

significant impact under CEQA. (Please refer to refer to the **SOCIOECONOMIC & ENVIRONMENTAL JUSTICE** section for further discussion.)

C.5.4.5.2.2 Would the proposed project directly or indirectly disrupt activities in established federal, state, or local recreation and/or wilderness areas? (NEPA)

According to the Recreation Element of the CDCA Plan, "…lands managed by the Bureau are especially significant to recreationists" (BLM 1980). The project, if approved, would result in the temporary loss of access to nearly 4,000 acres and, once the final footprint of the project is defined and fenced, a permanent loss of the recreational use of approximately 2,000 acres of publicly-owned, BLM-managed, unclassified and limited multiple use land. "MUC L" lands include recreation as part of their mandated use and would, therefore, be considered "established federal recreation areas". When establishing the CDCA, Congress stated that "the use of all California desert resources can and should be provided for in a multiple use and sustained yield management plan to conserve these resources for future generations and to provide present and future use and enjoyment, particularly outdoor recreation uses, including the use, where appropriate, of off-road recreational vehicles. (*underline added for emphasis*)" (FLPMA, Section 601). This direction was intended to apply to all desert lands under BLM management and jurisdiction within the CDCA boundaries, including unclassified lands, until such time as they pass out of federal control. For this reason, the CDCA, as a whole, must be considered an established federal recreation area, although the recreational activities allowed within each land classification may vary. The CDCA also authorized OHV route designations for unclassified lands (BLM 1999, p.78) and indicated that existing routes of travel may be used in unclassified lands until other limitations are placed in effect (BLM 1999, p.81), further verifying the intent of recreational use. From a public perspective, Indian Wells Valley residents have used the lands including and surrounding the project area for recreational purposes for decades and, in public comment, have expressed their opinion that this is an established local recreation area. For the purposes of CEQA and NEPA compliance, it is reasonable to consider all lands within the project footprint to be part of an "established federal recreation area."

General Recreational Use

As noted above, the areas within and immediately adjacent to the project site are regularly used by local residents and visitors alike. The location serves both as a destination for local recreationists and as a staging and access point for surrounding recreational opportunities. Relatively pristine desert conditions; trail connectivity to nearby recreational areas and private inholdings; easy access from Hwy 395 and Brown Road; and close proximity to the City of Ridgecrest and surrounding small Indian Wells Valley communities add to the site's significance. Its current uses define the breadth of multiple use, including both motorized and non-motorized recreation, agriculture, resource conservation, scenic attractions, urban buffer, and open space protection. Although it does not contain or immediately abut a wilderness area, it does provide connectivity to multiple wilderness sites. No use statistics are available; the applicant observed the site use for only one day and noted that use of the access routes ranged from low to high, depending on a variety of factors, including timing and weather. (TN55625, Data Response 260)

Permanent loss of the land within the final project footprint would directly disrupt certain site-specific recreational uses within the project boundaries, such as use of the Star Party location, trails to destinations within the proposed project site; staging areas and trailheads along Brown Road project frontage; and on-site camping and hiking locations. Sites and some access routes would no longer exist and replacement sites or alternative routings, if available, have not been proposed or compared for equivalency or possible use-related impacts. This is particularly true for the Star Party site and gem and mineral sites and access. This would constitute a loss of access to an area of local historic recreational importance.

The Star Party site, off Brown Road in the proposed southern solar field, was chosen for its unimpeded views and, except for the ambient light from Ridgecrest and China Lake, dark sky conditions[10]. This location would no longer be available for public use (Figures C.5-3, C.5-4). Additionally, lights from the project would increase the ambient light levels in the surrounding valley above those conducive to astronomical viewing, precluding the use of nearby areas in the general vicinity. However, there are other locations that fulfill a similar purpose, although they may not be as conveniently located or available year-round. There is an existing established astronomical viewing area at Walker Pass campground, approximately 28 miles northwest of Ridgecrest that has very good to excellent sky transparency and good to very good air stability. At an elevation of approximately 5,000 feet, it is generally above the atmospheric dust and haze, with calmer winds than on the desert floor, but may be inaccessible due to snow for short periods in the winter. While not as close to the Ridgecrest area as the Star Party site at the Brown Road location, it does have easy public access, parking, and no fee for public use. [INFO 2010(a); BLM 2009(d)] These amenities are important to the China Lake Astronomical Society (CLAS) and are present at the current site. There may also be alternative locations to the south, on public lands along Garlock and Redrock Randsburg Roads. Elimination of the current Star Party site would directly disrupt the Society's activities at an established federal recreation area.

Continued access to most gem and mineral sites would be preserved with protection of existing trails outside the project footprint and public access to the existing and rerouted SCE transmission line access road (see **LAND-1** and **LAND-3**). Access may be temporarily disrupted during site construction and rerouting of the transmission line corridor. The disruption would be temporary, with other existing access trails providing usable, if not equivalent, alternative access. Staff is not aware of any gem and mineral sites within the proposed project footprint or that would be damaged or eliminated during construction or operation of the project.

Four miles of public land frontage currently exists along both sides of Brown Road; over 1.59 miles of this access would be eliminated by the project and an additional 1.25 miles would be temporarily restricted during project construction. This constitutes nearly three-quarters of public land access along Brown Road, a substantial loss of land and trail access in an area close to nearby communities. Use of Brown road for non-motorized recreation would also be temporarily disrupted by the significant increase in automobiles and heavy trucks using Brown Road during construction. Public comments

[10] An area possessing exceptional starry night skies and natural nocturnal habitat where light pollution is mitigated and natural darkness predominates.

received consistently mention that Brown Road is a favorite route for walkers and bicyclists because it has little vehicle traffic (see **TRAFFIC AND TRANSPORTATION** for further discussion of traffic impacts). Bicycle and other non-motorized trail use is discussed in the Non-Motorized Trail section below. Conditions of certification **LAND-5** and **LAND-6** would substantially reduce the impacts to bicyclists and pedestrians.

Activities that are not tied to a specific location would not be as seriously impacted by the project. Because of the availability of surrounding public lands for primitive camping, hiking, picnicking, birdwatching, and other non-site-specific activities and sufficient remaining public land frontage on Brown Road and other area highways to accommodate alternative staging areas, conditions of certification that minimize impacts to many existing access routes (**LAND-1 thru LAND-6**) would avoid the majority of the project-related disruption to general recreational use**.**

Sailplane use is the final general recreational use that occurs in the project area. Gliders use the areas between and along the mountain ranges because of the excellent lift provided by the rising thermals off the desert's valley floor and because there are fewer restrictions in undeveloped areas. As noted in C.5.4.5.3.1.1 below, many national and world sailplane altitude, distance, and speed records have been set in the airspace around and above the Inyokern airport, less than 10 miles north of the project site. However, the project could create a safety hazard for those who overfly the project's cooling towers and encounter a thermal plume. As a result, those using this area would need to maintain a safe distance from the airspace above the facility's power block, up to 1,000 feet above ground level (agl), complicating flight in the project area. The degree of impact related to the loss of this area is reduced, to some extent, by the overlying military restricted airspace, which requires prior approval to enter the area and coordination with local air traffic controllers. This is often difficult for glider pilots, who may not have a radio in their aircraft, and pilots prefer to fly in other areas if weather conditions allow. Although the recreation is not occurring on public lands, the use of public lands for the proposed project would preclude glider flight over a small portion of this recreational area. The impact on this recreational use would be minimal, as areas along the eastern Sierra Nevada Mountains offer similar opportunities. (See C.5.4.5.3.1.1 below, **TRAFFIC AND TRANSPORTATION,** and Condition of Certification **TRANS-12** for further discussion of aviation impacts.)

The remaining residual impacts to general recreational use of the federal recreational lands within and around the proposed project site would be:

- Loss of specific established recreational sites within the project footprint.
- Degradation of the "dark sky" conditions surrounding the project site with installation of on-site security and operational lighting.
- Loss of approximately four miles of established routes and casual use trails throughout the project footprint.
- Temporary loss of or interference with access to public lands for parking and staging areas along 1.25 miles of Brown Road, east and west of the project footprint, during project construction.

- Permanent loss of access to public lands for parking and staging areas along 1.59 miles of Brown Road, within the project footprint and outside of the Kern County Brown Road ROW.
- Temporary loss of public access along EP0222, to the south, during construction of the transmission line realignment and new road segment.
- Temporary loss of or interference with access to approximately four miles of Brown Road and remaining routes/trails that require access from Brown Road, during project construction.

Motorized Access

The motorized vehicle access network, as adopted by BLM on June 30, 2003 and modified by the West Mojave Plan, was intended to meet recreational and commercial needs throughout WEMO's 30- year term. The public lands within the El Paso Mountains CAPA subregion, which contains the project site, and the adjoining Ridgecrest subregion (see Figure C.5-5) possess many unique recreational attractions, and are located immediately adjacent to the City of Ridgecrest. As a result, these two subregions are very popular with the recreating public.

The project, if approved, would result in the temporary or permanent loss of use of part or all of six BLM-designated OHV routes [EP0222, 0223, 0234, 0235, and unnamed routes (A) and (C)] and numerous casual trails within the project footprint. OHV travel within the MUC L and unclassified project lands is allowed on all BLM-designated open routes and established, non-designated trails in both the northern and southern portions of the proposed project site. Regular motorized use of these routes/trails include general OHV trail riding; transport of people and equipment to gem collecting, mining, rock hounding, camping, and event sites; private land access; alternative off-highway access for vehicles that cannot legally travel on city or county roads and state highways; private property access; and utility maintenance. There is one wash with a box culvert that passes under U.S. Highway 395 that is used by OHVs on (undesignated) routes that connects private properties on the south side of Ridgecrest to OHV riding areas south of the highway (Spangler and Rademacher Hills, south of Ridgecrest). There are approximately six miles of designated OHV routes within or adjacent to the proposed project footprint that would be permanently closed to recreational use. (SM 2010i)

As noted above, four miles of public land frontage currently exists along both sides of Brown Road. Over 1.59 miles of this access would be eliminated by the project and an additional 1.25 miles would be temporarily restricted during project construction. Areas along and immediately adjacent to Brown Road are frequently used as parking for hikers, event participants, and group excursions, and as staging areas for ranchers and riders who transport their OHVs, horses, sheep, and other equipment/supplies to the departure site. Without trailhead access, ranchers and equestrians would be unable to reach these staging areas, where watering holes are commonly present and temporary corrals and related facilities are permitted.

Neither the proposed project nor conditions of certification would create any new designated OHV routes, although a section of the existing EP0222 would be rerouted. The BLM-designated OHV route (EP0222) is also the transmission line ROW and

currently follows the existing SCE transmission line corridor from Brown Road south, through the project site and crosses several other designated trails approximately one-half mile beyond the project's southern boundary. Although intended to facilitate maintenance along the transmission line corridor, the existing road is heavily used for both motorized and non-motorized access to local destinations and routes further south, toward the El Paso Mountain Wilderness, including BLM-designated OHV routes and published mountain bike routes. A portion of this access road would be rerouted to follow the new SCE transmission line alignment and would be required to remain open for continued public use along its entire route (see **LAND-1**). However, use of this route would be periodically disrupted during various phases of project construction. The proposed realignment of OHV route EP0222 would only constitute a minor modification to the motorized vehicle access network and, therefore, would not require a formal amendment of the CDCA Plan, but will be documented in the official record. (WEMO, §2.2.6.11)

The proposed project would completely disrupt motorized access to and through this recreation area and use of project lands that front along Brown Road, outside of the Kern County road ROW. Six BLM-designated OHV routes and numerous casual trails would be directly impacted during construction and use of five additional designated routes adjacent to the project footprint [EP0222, EP0236, EP02265, that portion of route (A) north of Brown Road, and route (B)] could also be blocked or damaged. Portions of EP0223 and EP0235 and all of EP0234 (on public lands), along with a number of casual use trails would be eliminated. Routes designated as open are those that provide the best public access through public lands, access to significant points of interest and have inherit value for recreational driving (WEMO, Chapter 2, p.2-140). Loss of this access to established recreational sites and locations to the south and east would be a substantial detriment to motorized recreational use in the local area.

Condition of Certification **LAND-1** would ensure continued public access on EP0222, following completion of construction. It also ensures rehabilitation of that portion of the existing roadbed that would be decommissioned following completion of the route realignment. BLM designated open routes (EP0218 and EP0237), to the west and east respectively, would provide alternative connections from Brown Road to other routes outside the project site. However, although construction disturbance, other than the waterline installation and bicycle/pedestrian trails, should not impact routes and trails beyond the project boundaries and Land Use Figure C.5-8 identifies the specific routes and trails to be avoided, there is still the possibility to damage to existing routes and trails outside the project footprint. Condition of certification **LAND-3** would ensure that any OHV route or trail damage outside the project footprint would be repaired to conditions existing prior to the start of construction.

Construction of exclusion fencing around the entire project site would cause a number of existing designated routes and casual trails to dead-end at the fenceline. In order to discourage vehicles from leaving the established routes and following the fenceline to skirt the project area, Condition of Certification **LAND-2** would require closure and rehabilitation of that portion of these dead-end routes and trails from the fenceline to the nearest intersection with an established route or trail.

The only remaining residual impacts to motorized vehicle access would be:

- Temporary loss of public access along EP0222, to the south, during construction of the transmission line realignment and new road segment.
- Loss of approximately four miles of casual use trails throughout the project footprint.
- Temporary loss of or interference with access to public lands for parking and staging areas along 1.25 miles of Brown Road, east and west of the project footprint, during project construction.
- Permanent loss of access to public lands for parking and staging areas along 1.59 miles of Brown Road, within the project footprint and outside of the Kern County Brown Road ROW.
- Continued unauthorized (casual) use of the decommissioned portion of EP0222 and other decommissioned routes/trails, following rehabilitation, until the area is reclaimed by the desert.

Non-motorized access

The Ridgecrest project site is a favorite location for local non-motorized recreation. As noted in the General Recreation section above, there are numerous sites that have been used for decades within and immediately adjacent to the proposed project footprint. Hikers, joggers, and bicyclists regularly use the existing routes and trails on a daily or weekly basis. Equestrians, including endurance race riders, use the existing routes for regular weekly rides and as the staging points for travel into the El Paso Mountains and Golden Wilderness areas. As noted in Motorized Access above, OHVs are often used to transport horses and equipment to the staging points, with riders continuing on by horseback. According to the West Mojave Plan, this use weighed prominently in keeping some of the routes that parallel equestrian endurance courses and established trail rides open (WEMO, Chapter 4, p.4-121). The routes and trails most frequently used by bicyclists are south of Brown Road, but hikers and joggers use both sides of the site, and all bicyclists/pedestrians use Brown Road for access.

Bicyclists would be the most severely affected by the loss of the project site route and trail access. In addition to the temporary loss of unimpeded travel along Brown Road, due to the substantial increase of vehicle and heavy truck traffic during construction, and loss of access to EP0222 during realignment and transmission line construction, bicyclists would permanently lose several trails that connect to published road rides (HSC). For example, the El Paso Mountains Time Trial Loop, which begins off Randsburg Inyokern Rd (aka Brown Rd, Old 395) south of Ridgecrest and continues to Sheep Springs. It runs along the powerline road (EP0222) and is considered usable for all ages and experience levels. Some riders use the abandoned railroad bed, but its the loose bed surface of crushed stone is not a stable surface for cyclists. The El Paso Mountains trail also continues on to the El Paso Mountains Wilderness and Last Chance Canyon, via the Sheep Springs/Mesquite Canyon Trail, and connects with Garlock Road for the return ride. This trail ride offers scenic views of the northeast slope of Black Mountain and opportunities for rock hounding, wildlife viewing and is known for its many prehistoric and archeological sites. Without access from Brown Road, through the project site, cyclists would need to travel Hwy 395 on unimproved shoulders. As shown on Figure C.5-6, five of the primary connector routes and trails [EP0222,

EP0223, EP0234, and unnamed (A) and (C)] would be temporarily or permanently unavailable for cyclists following the start of project construction.

Brown Road is also an integral part of the non-motorized use of the proposed project site. As noted in numerous public comments, both pedestrians and cyclists use this route as a connector between Inyokern and Ridgecrest because it has a well-maintained, all-weather surface and normally has little vehicle traffic. However, about four miles of Brown Road would be impacted by construction of the proposed project. A significant increase in vehicle and heavy truck traffic would occur over a period of approximately 28 months, seriously affecting the safe use of the road for pedestrians and cyclists. Delays related to the construction of access roads, waterline installation, and a widening of Brown Road to accommodate the acceleration/deceleration lands for those access roads would also occur.

As a result of the identified loss of use and access, the proposed project would substantially disrupt use of this federal recreational area by pedestrians and cyclists during all phases of project construction and operation. To reduce issues of access to routes/trails south of the project site, staff proposes Condition of Certification **LAND-4**, which would require the project owner to improve the existing trail along the former Southern Pacific Railroad ROW south, from its intersection with Brown Road, for approximately three miles, to the intersection with BLM-designated OHV routes EP0421, EP0429, and EP0440, as necessary to accommodate year-round non-motorized use. This would provide viable alternative access to existing hiking and bicycle road ride trails. Construction of this trail would be required to be completed within 30 days following closure of public access to EP0222 for realignment and transmission line construction.

In addition, the designated and casual routes/trails lost within the project site would be further offset by Condition of Certification **LAND-5**, which would require construction of a bicycle lane connecting to the existing bicycle path at the S. China Lake Blvd./Downs Road intersection and continuing south to the S. China Lake Blvd/Hwy 395 intersection. The path would be constructed concurrent with, and along the same ROW as, the proposed waterline alignment along S. China Lake Blvd. This would provide safe pedestrian and bicycle travel along the heavily traveled S. China Lake Blvd., assist the City of Ridgecrest and Kern County in the development of their bicycle master plans, and replace some of the recreational mileage lost with development of the proposed project site. (See **TRAFFIC & TRANSPORTATION** for additional discussion of this condition's contribution to applicable alternative transportation goals.)

The increase in traffic along Brown Road during construction would also substantially disrupt the safe use of this thoroughfare by cyclists and pedestrians. To reduce the safety hazard associated with this construction impact, staff recommends Condition of Certification **LAND-6**, which would require the project owner to construct a temporary bicycle/pedestrian path along and parallel to the south side of Brown Road, from the Hwy 395/Brown Road intersection to ¼-mile beyond the farthest construction access point on Brown Road. The path would provide a safe, stable, all-weather, pedestrian/bicycle-friendly surface, but would not be paved. The path would be available at least 10 days prior to the start of site preparation and construction and

would be removed following the start of plant operations. This would provide reasonable avoidance of the potential safety and recreation impacts from construction traffic along Brown Road.

The only remaining residual impacts to non-motorized access would be:

- Temporary loss of public access along EP0222, to the south, during construction of the transmission line realignment and new road segment (reduced significantly by implementation of **LAND-4**).
- Loss of approximately four miles of casual use trails throughout the project footprint (partially compensated for with implementation of **LAND-6**).
- Possible temporary interference with access to EP0236, EP02265, and unnamed routes (A) and (B).

Closure

Construction of the proposed project in any configuration, at the preferred or any alternative location, would result in the complete destruction of the existing ecosystem and habitat within the facility footprint, an area of approximately 2,000 acres. Rehabilitation of the site during the decommissioning process would involve steps to dismantle and remove equipment, stabilize soil and drainages, and regrade and reshape features. This would return the area to open space, usable for some, if not all, of the current recreational uses. However, as revegetation of native plants is not proposed and is questionably effective in desert environments, under the best of circumstances, it must be assumed that the plant and animal habitat and population would be left to natural secondary succession. As a result, restoration of the grazing potential and some recreational uses, such as wildflower and bird watching, may never be successfully re-established. Other recreational activities, such as OHV use, may also be curtailed, due to increased erosion potential. Therefore, the loss of these uses should be considered substantial interference with the eventual return of these federal public lands for recreational use. However, conditions of certification recommended above would reduce the loss of existing recreational trails and access and provide reasonable alternatives to limit the long-term impact from the proposed project.

C.5.4.5.2.3 Would the proposed project substantially reduce the scenic, biological, cultural, geologic, or other important resource value of federal, state, local, or private recreational facilities or wilderness area? (NEPA)

The proposed project has the potential to substantially reduce the biological resource values of the area, particularly for the existing desert tortoise population and its habitat and wildlife habitat connectivity for the Mohave ground squirrel genetic diversity. The project site contains part of the Sierra Foothills Habitat Connector, a particularly significant migration corridor linking MGS habitats in the northern and southern desert areas, including the El Paso Mountains and Owens Peak Wilderness areas. Staff believes that the impacts may not be mitigable. (See **BIOLOGICAL RESOURCES** section for further discussion, proposed conditions of certification, and determination of residual impact.)

The proposed project would substantially reduce the visual quality and character of the existing landscape, a federal recreation (multiple use) area (see §C.5.4.5.2.2 above).

Additionally, it is not known if the project would ultimately prove to be consistent with the applicable BLM Visual Resources Management (VRM) Class(es), as BLM has yet to establish the VRM Class(es) for the project area. (See **VISUAL RESOURCES** section for further discussion, proposed conditions of certification, and determination of residual impact.)

Although there are no state or wilderness areas within the proposed project, part of the wilderness experience is the scenic quality and undeveloped nature of the views within and from the wilderness areas. There are four wilderness areas within 20 miles of the project site. The project would be especially visible from the El Paso Mountains and Owens Peak Wilderness areas, only 2.5 and 8 miles from the project site, respectively. The views currently encompass relatively pristine desert between the wilderness areas and the developed areas of Ridgecrest and Inyokern. Construction of the project facilities in the proposed location would move the developed landscape closer to the wilderness. However, BLM does not require a visual buffer or scenic easement around its wilderness lands. Also, from a distance, simulations predict the solar fields would appear as a reflective body of water, with the power block as the only obviously developed structure (see Figure DR-CUL-109; SM 2010i) Therefore, while the project would adversely affect the wilderness experience, the scenic resource value of the wilderness areas would not be substantially reduced.

The agricultural resources of the affected public recreation lands would not be substantially affected (see C.5.4.5.1 above), no wilderness areas would be directly impacted, and a similar level of recreational access to wilderness lands would be maintained (see C.5.4.5.2.2 and conditions of certification **LAND-1, 3, 4** and **6**). No other important recreational resource value, except as discussed in C.5.4.5.2.2 above, would be substantially affected.

Based on staff conclusions, the project would substantially reduce the scenic and biological resources value of federal recreational facilities.

C.5.4.5.2.4 Would the proposed project directly, indirectly, or cumulatively affect the wilderness qualities of size, naturalness, or outstanding opportunities for solitude or primitive and unconfined recreation of a wilderness area or wilderness study area; or change the characteristics of a wilderness study area, such that it would not contain the qualities necessary for it to be considered for future designation as wilderness?

The project site does not contain or abut any wilderness area or wilderness study area and is not close enough to any wilderness area or study area to affect its wilderness qualities, except as noted in C.5.4.5.2.3 above.

C.5.4.5.3 Land Use Compatibility and LORS Compliance

As required by California Code of Regulations (20 CCR 1744), Energy Commission staff must evaluate the proposed project in its entirety, including information provided by the project owner in the AFC (and any amendments), project design, site location, and operational components, to determine if it would conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project, or that would normally have jurisdiction over the project except for the Energy Commission's

exclusive authority. The Energy Commission must also determine whether the project is consistent with all applicable federal, state, regional, and local laws, ordinances, regulations, and standards (LORS) [PRC §25523(d)(1)] or make specific findings that a project's approval is justified despite its nonconformity (PRC §25525).

Consistent with the requirements of CEQA and NEPA, staff also evaluates the compatibility with and impacts of the proposed project on existing and approved uses and surrounding communities. The land use compatibility of a project is also intrinsically tied to its effects on historic land uses and environment of the surrounding area. While mentioned in this section, these issues are addressed in detail in the **AIR QUALITY; BIOLOGICAL RESOURCES; CULTURAL RESOURCES AND NATIVE AMERICAN VALUES; GEOLOGY, PALEONTOLOGY AND MINERALS; HAZARDOUS MATERIALS MANAGEMENT; NOISE AND VIBRATION; PUBLIC HEALTH AND SAFETY; SOIL AND WATER RESOURCES; SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE; TRAFFIC AND TRANSPORTATION; TRANSMISSION LINE SAFETY AND NUISANCE**; and **VISUAL RESOURCES** sections of this document.

C.5.4.5.3.1 Land Use Compatibility

The project would be sited entirely on BLM-managed public lands, within the proposed ROW, except for the proposed waterline, which would be constructed along S. China Lake Rd., beneath Hwy 395, and along Brown Road, entirely within the existing IWVWD and Kern County ROWs, and proposed Caltrans ROW. The project site is under federal (BLM) jurisdiction and subject to the CDCA and WEMO area plans. Kern County and the city of Ridgecrest jurisdictional authority would only apply to any off-site infrastructure installation and maintenance activities, outside the BLM boundaries. However, both BLM and the Energy Commission consider the general plan land use designations, zoning, other plan/policy restrictions, and existing uses on surrounding properties to evaluate the compatibility of the project and incorporate conditions and restrictions to ensure the project would not result in a significant adverse impact to land uses in the area. (See LORS Compliance below for further discussion.)

The lands within and around the project site are primarily undeveloped high desert, and are currently used for recreation, limited grazing, and wildlife habitat. There are also scattered private residences outside BLM boundaries that increase in density to the east, approaching the city of Ridgecrest. The proposed project would initially affect nearly 4,000 acres of this limited multiple use and unclassified land. The project footprint would eventually be reduced to approximately 2,000 acres, following completion of construction. All existing vegetation, landforms, and drainage, would be permanently disrupted[11], and all public use of the land for agriculture, recreation, or other purposes would be prohibited within the final project footprint, other than within the Brown Road ROW that bisects the site. An eight feet tall fence, with one-foot barbed wire or razor wire on top, would be constructed along the north and south sides of the

[11] Restoration or rehabilitation of existing landforms and habitat, and suitability/availability for uses equivalent to current conditions, would not occur during the life of the project (estimated at 30 years or longer) and cannot be guaranteed as completely feasible, even if provided for in an approved closure and rehabilitation plan. Changes to habitat and suitability for specific uses should be considered permanent.

facilities, with thirty-foot tall wind fencing, composed of A-frames and wire mesh, along the east and west sides of each solar field, excluding both people and wildlife from the entire project site. The project would also include two vast mirror fields, north and south of Brown Road, and 120-foot-high cooling and transmission towers.

C.5.4.5.3.1.1 Would the proposed project directly or indirectly divide an established community or disrupt an existing or approved land use?

Divide an Established Community

The proposed project site is located approximately 4.5 miles southwest of Ridgecrest and 8 miles south of Inyokern. It is surrounded by BLM-managed public lands, interspersed with a few, large privately-owned properties. Although the newly adopted Ridgecrest General Plan [COR 2009(a)] expands the City's Planning Area[12] westward to the eastern edge of the proposed project ROW, it does not impinge on the project boundaries. Once constructed, it is expected that Hwy 395 would provide a definitive boundary between Ridgecrest development to the east and the project site to the west. Access to Hwy 395 would not be altered or impeded. Brown Road, which provides the primary site access and an access alternative for Hwy 395 or SR 178 from Inyokern to Ridgecrest, would only be temporarily affected during construction of the acceleration/deceleration lanes and project access roads, deliver of materials, and arrival/departure of workers during the construction process. Proposed conditions of certification would reduce any potential impacts to a less than significant level. (See **TRAFFIC & TRANSPORTATION** section for additional discussion.)

Private lands in the project vicinity are surrounded by public lands or abut public land in a checkerboard type fashion. Existing designated and established trails/roads provide access from Brown Road to inholdings and adjacent properties, and off-road access from developed properties to the north and east into and across the project site to BLM multiple use areas, OHV open areas, and wilderness areas to south, west, and east. The surrounding public lands lack developed roads and highways and have rough terrain on which street vehicles cannot travel. All-terrain vehicles are often required to access these private inholdings. However, a number of existing routings would remain unobstructed and full implementation of conditions of certification **LAND-1, 3, 4, 5,** and **6** would repair any project-related construction damage to remaining routes/trails and provide alternative routes/trails that would be eliminated by the project. As a result, connectivity would be maintained and impacts to community access would be less than significant (see C.5.4.5.2.2 above).

[12] Planning Area: A general plan must "cover the territory within the boundaries of the adopting city or county as well as 'any land outside its boundaries which in the planning agency's judgment bears relation to its planning' (CCR 2009 §65300)." The Planning Area established for the Ridgecrest General Plan covers a land area of approximately 40 square miles and incorporates lands managed by BLM, lands held by the Department of Defense as part of China Lake, and property within Kern County jurisdiction.

Compatibility with Existing or Approved Land Uses

Agricultural Use

Implementation of this project would permanently remove up to 2,000 acres of grazing land and access to several staging areas by ranchers using the Cantil Commons allotment. However, the project would not jeopardize the continued use or viability of the Cantil Commons sheep grazing allotment. Impacts to this existing permitted agricultural uses would be less than significant (see C.5.4.5.1.2 and C.5.4.5.1.4 above). The project would not disrupt the existing use.

Residential Use

Privately-owned properties surrounding the project site are, for the most part, established residences on parcels of 5-20 acres or larger. The project would not physically intrude onto, block access to, or interfere with any existing or permitted use, nor would it prevent future residential development in the area. The proposed project would, however, be visually intrusive, especially to those residences closest to the project boundaries, resulting in significant and unavoidable adverse impacts on visual resources and existing landscape character. Additionally, it is not known if the project would ultimately prove to be consistent with the applicable BLM Visual Resources Management (VRM) Class(es), as BLM has yet to establish the VRM Class(es) for the project area. (See **VISUAL RESOURCES** section for further discussion.) This would not, however, substantially disrupt use of the adjacent lands for residential purposes.

Sensitive Receptors

A proposed siting location may be considered inappropriate if a new source of pollution or hazard is located within close proximity to a sensitive receptor. From a land use perspective, sensitive receptor sites are those locations where people who would be more adversely affected by pollutants, toxins, noise, dust, or other project-related health or safety issue are likely to live or gather. Children, those who are ill or immune-compromised, or the elderly are generally considered more at risk from environmental pollutants. Therefore, schools, along with day-care facilities, hospitals, nursing homes, and residential areas, are considered to be sensitive receptor sites for the purposes of determining a potentially significant environmental impact. Depending on the applicable code, close proximity is defined as “within 1000 feet” of a school (California Health & Safety Code §§42301.6-9) or within 0.25 miles of a sensitive receptor, under CEQA. Proximity is not necessarily the deciding factor for a potentially significant impact, but is the threshold generally used to require further evaluation.

There are several residences within one mile of the project site, but none are located within ¼-mile of the proposed project footprint. A number of residences are located east of Hwy 395, across S. Jacks Ranch Road, the proposed eastern boundary of the project ROW, at the outskirts of Ridgecrest. The proposed facility location, on and generally surrounded by BLM-managed public lands, is approximately one-half mile from most areas zoned for residential use or existing residences. There are no schools or other sensitive receptors, other than residences, within a one-mile radius of the project site (TN55289, Fig.5.8-1). There are individual isolated residences on large parcels of 20 acres or more abutting or in the general vicinity, with the closest single family residence located approximately 2,500 feet east of the project footprint.

Therefore, the proposed project, if built and operated in conformance with the proposed conditions of certification contained in this SA/EIS, would not introduce a new source of pollution or hazard within close proximity to a sensitive receptor or have a significant health- or safety-related impact at any sensitive receptor location. The project would not disrupt the existing use.

Natural Resource Uses

For the proposed project (Alternative 1), there are significant biological project-specific resource impacts that relate directly to existing and permitted land uses. The project site is within the boundaries of WEMO, a habitat conservation and land use plan that amended the CDCA in 2006. WEMO is intended to conserve and protect the desert tortoise, Mojave ground squirrel, and over 100 other sensitive plants and animals throughout the western Mojave Desert. Consistent with the CDCA, there are also undeveloped lands that are designated for multiple use, including recreation, energy production, and mining. WEMO was intended to avoid significant impacts to special status species by providing adequate conservation within the Habitat Conservation Areas (HCAs), with undeveloped lands outside the HCAs available for future recreational needs and development of mining and energy production that can be pursued in remote areas. However, development and use of these areas is putting increasing pressure on the conserved lands. (WEMO, p.ES-4) Activities that would result in a significant impact or substantial change to the population or viability of a protected species within the HCAs would be considered incompatible with an existing land use and WEMO.

As noted above, construction of the proposed project would result in the complete elimination and exclusion of species and habitat within the project footprint and continued disruption and degradation of the areas beneath the transmission corridors for the life of the project. The northern two-thirds of the proposed project ROW consists of unclassified BLM lands. While it is not designated as a habitat conservation area or critical habitat, it has been found to support a high population of Desert Tortoise, a federal and state listed species. In addition, the lower one-third of the property is within the Mojave Ground Squirrel Conservation Area (MGSCA), a BLM Wildlife Habitat Management Area (WEMO, p.2-14). While the project ROW is only a small part of the 1,280,106 acres of public lands set aside for MGS conservation (approximately 809 acres), it contains part of the Sierra Foothills Habitat Connector, a particularly significant migration corridor linking MGS habitats in the northern and southern desert areas. The proposed project has the potential to substantially reduce the biological resource values of the project area, particularly for the existing desert tortoise population and its habitat and wildlife habitat connectivity for the Mohave ground squirrel genetic diversity. Staff believes that the impacts may not be mitigable. The project has the potential to disrupt and, therefore, must be considered inconsistent with an existing land use. (See **BIOLOGICAL RESOURCES** section for further discussion.)

Cultural/Historic Uses

The area surrounding the project site is a particularly rich cultural area. The El Paso Mountains, especially Black Mountain, are sacred to many local Native American tribes. Consultations with tribal representatives indicates that sites and trails within the proposed project footprint have historically served as meeting points and conduits for

pilgrimages into the El Paso Mountains, with actual locations varying by tribe. Use of the location as the project site would disrupt that historic existing use. However, information provided by Kawaiisu elders suggests that the tribes also accessed the ceremonial sites along several ridgeline routes, areas that would still be accessible and would remain outside the proposed ROW. Implementation of **LAND-4** would also provide a potential alternative pedestrian route to the south and west that may prove acceptable to native peoples. (SM 2010l, DR261) This condition of certification, combined with the BLM/State Historic Preservation Officer (SHPO)/Energy Commission Programmatic Agreement (see **CULTURAL RESOURCES AND NATIVE AMERICAN VALUES** section), would limit the disruption of access, although not necessarily its spiritual significance to the affected Native American tribes, and reduce any potential cultural land use impacts to a less than significant level.

Aviation and Military Use

The project site is located approximately seven miles south of the Inyokern Airport (IYK) and eight miles south-southwest of the China Lake Naval Air Weapons Station Armitage Field (NID). All published arrival and departure procedures for both airports either avoid the project site completely or have minimums that place aircraft above any potential project-related impacts. [ARPT(a),(c),(e)] None of the project's physical structures would exceed 120 feet in height and are, therefore, well below the 200-foot maximums for structures within the affected operational airspace of either airport.

The project site is overlain by military restricted area R-2506, which places limitations on the use of airspace above the project site from the surface to 6,000 feet above mean sea level (approximately 1,900 feet above ground level at the project site) and provides notification that military operations may occur at any time within the designated airspace. It is also within the Isabella Military Operating Area (MOA). The Isabella MOA is used for military flight activities, including acrobatic or abrupt flight maneuvers, intercepts, air combat maneuvering, aerial refueling, and training areas for student pilots. It has a minimum altitude of 200 feet above ground level (agl), but the project site's proximity to the Ridgecrest and Inyokern communities and El Paso Wilderness generally precludes extremely low altitude flights in the project area. Consistent with the Kern County ALUCP, FAR 77, and the Joint Land Use Study (JLUS), development within the R-2506 corridor and Isabella MOA requires consultation with the R-2508 Complex Sustainability Office, China Lake NAWS, and Edwards AFB, to identify any potential impacts to military overflights and operations.

The applicant has consulted with the R-2508 Complex Sustainability Office regarding military airspace use in the project vicinity. The R-2508 Office has confirmed that RSPP structures would comply with military air space requirements. However, radio transmissions that may be required for facility operation could produce interference that would disrupt military testing and training operations conducted in the project vicinity and on the military ranges (SM 2009a, Appendix K). However, full implementation of Condition of Certification **LAND-5** would eliminate potential mission impacts. (See **TRAFFIC & TRANSPORTATION** section for further discussion.)

Use of the R-2505 and R2506 restricted areas for local flight operations[13] is not precluded, so long as approval is received in advance and does not interfere with the military mission. It does, however, require realtime coordination and approval, on a case-by-case basis. [KERN 2008(b)] The area surrounding Inyokern Airport, including the project site, is an internationally known soaring site. The reliable thermal and mountain lift provided by the surrounding ranges, including the El Paso Mountains, make this a perfect soaring location for the beginner and expert alike. Many national and world sailplane altitude, distance, and speed records have been set in the airspace around and above the Inyokern airport. [ARPT(b)] Non-motorized aircraft generally fly by visual flight rules (see and avoid)[14] and have less ability to react to or recover from unexpected flight conditions. The uplift from the RSPP thermal plume is generally invisible and may present a hazard to gliders, as well as an attractive nuisance to sailplane enthusiasts, intent on improving their soaring records. Full implementation of **TRANS-12** would reduce any potential impacts to a less than significant level. (See **TRAFFIC & TRANSPORTATION** section for further discussion.) Although the potential hazard would still remain, pilots would receive adequate warning to avoid or compensate for the unexpected lift.

Recreational Use

See C.5.4.5.2.2 above.

Land Uses following Closure and Decommissioning

Once constructed and in operation, the proposed project has an estimated life of at least 30 years. The industrial use currently proposed would then be considered an existing use in an area that will probably be bounded by public recreation and natural resource lands to the south and west and increased residential encroachment from Ridgecrest to the east. Large parcel residential and limited agriculture are likely to remain to the north, with some increased residential development. BLM lands to the north and east are unclassified and may be subject to sale to the county, city, or private ownership as part of the El Paso and Ridgecrest subregion assessment process. The expansion of the Ridgecrest Planning Area toward the project area signals an intention for the city to expand in that direction. While alternative trails established as mitigation to provide access to BLM recreation and wilderness lands to the west, south, and east are likely to remain, northerly connectors would probably be replaced with county-maintained paved roads or private drives. It is also unlikely that closure of the proposed generating facility would result in any change to the transmission line corridor, except for disconnection and removal of the connecting transmission lines and, possibly, the substation.

Construction of the proposed project in any configuration, at the preferred or any alternative location, would have resulted in the complete destruction of the existing

[13] Aircraft operating in the traffic pattern or within sight of a tower, or aircraft known to be departing or arriving from flight in local practice areas (within a 20-mile radius of the airport), or aircraft executing practice instrument approaches at the airport (FAA 2009a).

[14] Visual flight rules (VFR)**.** Flight rules adopted by the FAA that governing aircraft flight using visual references. VFR operations specify the amount of ceiling and the visibility the pilot must have in order to operate according to these rules. When the weather conditions are such that the pilot cannot operate VFR, the pilot must be certified to fly by Instrument Flight Rules (IFR) before taking off. [ARPT(f)]

ecosystem and habitat within the facility footprint, an area of approximately 2,000 acres, and would have maintained that exclusion for the life of the project. Appropriate rehabilitation of the site would need to be revisited to determine consistency with land uses existing at the time of closure. A return to the drainages and topography that existed at the time of construction may not be appropriate and could, in fact, result in unacceptable impacts to surrounding properties. Additionally, the microbiotic crusts would be destroyed during construction and operational maintenance would prevent reestablishment, precluding rapid revegetation and grazing potential on the land for many years following closure. However, the required Closure and Decommissioning Plan includes a provision for rehabilitation of the site to be consistent with land uses existing at the time of closure. This would reduce any land use consistency issues to a minimum and would not substantially disrupt land uses in the surrounding area.

C.5.4.5.3.2 Would the proposed project directly or indirectly induce substantial population growth in an area?

Water is a defining growth factor in the Indian Wells Valley. As indicated in the AFC (SM 2009a, p.5.17-23), the Basin is in overdraft, with groundwater pumping at double to triple the inflow/recharge annually. Many existing properties outside the IWVWD have wells that have failed or are no longer reliable, have potability issues, or are no longer economically feasible. As a result, they purchase water from IWVWD or other providers and store trucked water on-site for personal use. They may also be unable to develop their property because water is not available. Introduction of a waterline along S. China Lake Blvd. provides an opportunity for the IWVWD to annex lands into the district and offer public water connection to homes and businesses along that alignment. Information provided by the applicant (SM 2010a, DR-LURW-249, 250,251 and Figs. DR-LURW-249-1 through -3 and 253) indicates that 52 existing dwellings and 47 potential dwelling units (not including potential second units) could obtain access to IWVWD water through annexation of lands along the proposed waterline alignment. (See **SOIL AND WATER** for further discussion.)

It is impossible to know how much the development of homes along this corridor has been affected by the lack of public water or how quickly additional homes would be built once public water becomes available. It is also unknown whether those residing in these homes would be new to the Ridgecrest area or existing renters or homeowners in other portions of the city or county. The availability of water in this limited area of Kern County is not likely to serve as the catalyst for measureable population growth. However, it may indirectly serve a need for additional housing, in conjunction with forecast job growth due to the BRAC expansion at China Lake NAWS. Continued major commercial expansion to the southwest, along the southern portion of S. China Lake Blvd., and existing utility infrastructure to these parcels, would also increase the suitability of development in this area. Expansion of the Ridgecrest Planning Area, in the 2010-2030 General Plan, to encompass this area also points to the City's encouragement of expansion in this direction. The EIR for the General Plan Update [COR 2009(c), p.3.1-12)] also identified this portion of S. China Lake Blvd. as a scenic corridor for its scenic qualities and a potential "gateway(s) to the City". Expansion of housing construction and development of individual parcels along the proposed annexation area may increase disproportionally to other areas in and around Ridgecrest, even though the total number of new housing units needed may not change.

However, most of the land that would be subject to the IWVWD proposed annexation is already divided to the minimum parcel size allowed by current or proposed land use designations and zoning, with potential environmental impacts related to permitted uses addressed when the parcels were zoned. Approximately half of the existing parcels already contain the single residence permitted under current zoning, although not necessarily the ministerially allowed second dwelling unit (GC 2003). Even if all potential primary dwelling units are constructed and occupied by new residents to the area, at an average household size of 3.13 persons per dwelling unit, in a single year, the increase to the Ridgecrest/Kern County area would only be approximately 150 people. With a current population of over 28,000 in Ridgecrest, that would equate to an increase of only one-half of one percent, if based on the Ridgecrest population alone. As this rate of buildout is unrealistic, the potential increase in population would be substantially less.

Therefore, the availability of public water to parcels along the proposed waterline alignment and subsequent availability of additional housing would not result in substantial population growth for the area, significantly impact existing public facilities, or require the construction of new public facilities or additional public services. (See **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE** section for additional discussion.) No other land use aspect of the project would contribute to or induce substantial population growth in the Indian Wells Valley.

C.5.4.5.3.2 LORS COMPLIANCE

Land Use Table 4 provides a general description of the land use LORS applicable to the proposed project, alternatives, and surrounding lands.

Land Use Table 4
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
Federal	
California Desert Conservation Area (CDCA) Plan,1980 as Amended; 1999.	The CDCA Plan is a comprehensive, long-range plan for over 12 million acres of public California Desert lands, including the Mojave, Sonoran Desert, and a small portion of the Great Basin, with goals and specific actions for management, use, development, and protection of the lands and their resources. The Plan is administered by the BLM and is based on the concepts of multiple use, sustained yield, and maintenance of environmental quality. All project sites are located within the CDCA boundaries and all but one site are on public lands, and are, therefore, subject to the CDCA Plan.
West Mojave Habitat Conservation Plan (WEMO); 2006	Amendment to CDCA in 2006, with an amended Biological Opinion in December 2007. The West Mojave Plan (Plan) is a habitat conservation plan and federal land use plan amendment that (1) presents a comprehensive strategy to conserve and protect the desert tortoise, the Mohave ground squirrel (MGS) and nearly 100 other sensitive plants and animals and the natural communities of which they are a part, and (2) provides a streamlined program for complying with the requirements of the California and federal Endangered Species Acts (CESA and FESA, respectively).

Applicable LORS	Description
China Lake Air Installation Compatibility Use Zone (AICUZ)	Identifies the noise and safety considerations associated with military operations at China Lake Naval Air Weapons Station (NAWS) Armitage Airfield and establishes a compatibility zone to protect military operations from incompatible land uses. The AICUZ program identifies the Military Influence Area (MIA) for Armitage Airfield and Accident Potential Zones (areas where an aircraft-related mishap is most likely to occur).
State	
Government Code §§65940 and 65944	Requires identification of military installations within 1,000 feet of the project site, low-level flight paths, special use airspace, and urbanized areas in the project area, and requires consultation among the project applicant, public agency, and the affected military branch to reduce the potential for impacts to military operations.
Local	
Kern County General Plan (2004), as amended through March 2007 (KERN 2004)	The General Plan is a policy document with planned land use maps and related information that are designed to give long-range guidance to those County officials making decisions affecting the growth and resources of the unincorporated Kern County jurisdiction, excluding the metropolitan Bakersfield planning area.
Kern County Building & Construction Code, Title 17	Identifies minimum building standards for the unincorporated territory of Kern County. The Code applies to new building construction; installation of new mechanical, plumbing, and electrical systems; and existing construction, including mechanical, plumbing, and electrical systems. It also applies to all construction in the unincorporated Kern County whether owned by private persons, firms, corporations or organizations; the United States or any of its agencies; any county or city, including the county of Kern; and any authority or public entity organized under the laws of the state of California, except where exempted by existing LORS.
Kern County Municipal Code, Chapter 12.16 Highway Encroachments	Establishes permitting requirement for changes or disturbance to any part of or obstruction to the county roads, including undeveloped rights-of-way.
Kern County Zoning Ordinance, Title 19	This title is adopted to promote and protect the public health, safety, and welfare through the orderly regulation of land uses throughout the unincorporated area of Kern County; provide economic and social advantages resulting from an orderly planned use of land resources; and encourage and guide development consistent with the Kern County General Plan.
Chapter 19.14 Limited Agriculture (A-1) Zoning District	The purpose of the Limited Agriculture (A-1) District is to designate areas suitable for a combination of estate-type residential development, agricultural uses, and other compatible uses. Final map residential subdivisions are not allowed in the A-1 District.
Chapter 19.16 Estate (E) Zoning District	The purpose of the Estate (E) District is to designate areas suitable for larger lot residential living environments. Uses are limited to those typical of and compatible with quiet residential neighborhoods. Agricultural uses permitted in the E District are accessory uses and shall not be established until a primary use is established.

Applicable LORS	Description
Kern County 2008 Airport Land Use Compatibility Plan	Provides guidance to the County of Kern and incorporated cities of Bakersfield, California City, Delano, Shafter, Taft, Tehachapi, and Wasco for regulation of land uses around the various public use and military airports within the county boundaries.
Kern County Bicycle Facilities Plan	A guide to developing bicycle transportation facilities, in conjunction with land use development, within Kern County.
City of Ridgecrest General Plan (2010-2030 (2009)	The Ridgecrest General Plan contains six elements, consolidating the seven topics required under state law. These elements include: Land Use, Military Sustainability, Community Design, Circulation, Open Space and Conservation, and Health & Safety. Each element contains the goals and policies that will be used by the City to guide future land use decisions. The Planning Area for the City incorporates private lands, lands managed by the Bureau of Land Management (BLM), and lands held by the Department of Defense as part of China Lake, although the City has no formal jurisdiction in those areas. The Planning Area covers a land area of approximately 40 square miles.
Circulation Element (Chapter 6)	This Element analyzes the City's overall circulation system, identifies relevant issues to forecast conditions, and recommends a framework of goals and policies to achieve the efficient movement of people and goods within the City and surrounding area, including motorized and non-motorized transportation options.
City of Ridgecrest Zoning Ordinance (Chapter XX)	The purpose of this ordinance is to provide a specific plan to progressively achieve the general arrangement of land uses depicted in the General Plan; foster a wholesome, serviceable, and attractive living environment beneficial development of areas that exhibit conflicting patterns of use, and stability of existing land uses, consistent with the objectives and policies of the General Plan; prevent excessive population densities and overcrowding of land with structures; promote a safe, effective traffic circulation system, provisions for adequate off-street parking and truck-loading facilities, and appropriate location of community facilities; protect and promote appropriately-located commercial and industrial activities, in order to preserve and strengthen the City's economic base, and protect and enhance real property values and the City's natural assets; and to ensure unimpeded development of such new urban expansion that is logical and desirable, in conformance with the General Plan.
§20-3.18 Public Utility Distribution and Transmission Lines	Public utility distribution and transmission lines, both overhead and underground, are permitted in all zoning districts without a use permit, provided a permit for construction is obtained from the Ridgecrest Department of Public Works prior to any new construction or installation of such facilities. (Ord. 84-08, A3, § 318)

C.5.4.5.3.2.1 Would the proposed project conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction, or that would normally have jurisdiction, over the project adopted for the purpose of avoiding or mitigating environmental effects?

Federal

California Desert Conservation Area (CDCA) Plan, as amended by the West Mojave Habitat Conservation Plan (WEMO)

The CDCA Plan is a comprehensive, long-range plan for public California Desert lands, including the project site. All project sites and alternatives are located within the CDCA boundaries. All but one site [Alternatives 6(a,b)] are on public lands, and are, therefore, subject to the CDCA Plan. The West Mojave Plan amended CDCA by adding a habitat conservation plan component to the land use planning requirements. From a federal (NEPA) perspective and in accordance with federal regulations relating to Public Lands (CFR 2001 & 2008), FLPMA, Public Rangelands Improvement Act; Farmland Protection Policy Act (FPPA); and National Management Strategy for Motorized Off-Highway Vehicle Use on Public Lands, all project actions must be in conformance with applicable land use plans for public lands administered by BLM. CEQA also requires projects be consistent with all applicable federal, state, and local LORS. These include the CDCA Plan, as amended by the West Mojave Habitat Conservation Plan (WEMO). Any proposals or actions determined not to be in conformance with these plans would require a land use plan amendment.

The project site is located on unclassified and limited multiple use lands. Although the CDCA Plan allows the construction of solar power plant projects and electric transmission facilities within Multiple-Use Class L, it also requires that new projects, not currently included within the plan, be added to the Plan through the Plan Amendment process. Therefore, this SA/EIS also acts as the mechanism for analyzing a Plan Amendment that adds the RSPP facility to the Plan. The Plan Amendment decision would be part of the BLM Record of Decision for the issuance of a right-of-way grant, and would occur after publication of the Final EIS.

The CDCA Plan also requires that new transmission facilities be located within appropriately designated corridors. An approximately one-mile wide utility corridor, designated by the CDCA Plan and Section 368 of the Energy Policy Act of 2005, runs north-south across the western portion of the Project site. The Project's gen-tie line and switchyard would be located entirely within the designated utility corridor. On December 16, 2009, BLM reviewed the Corridor Conflict Analysis provided by the applicant and determined there would be ample room to accommodate existing and future utility sitings through the corridors. In addition, the applicant has submitted an application to the BLM requesting a ROW to construct the proposed project and its related facilities (SM 2010c).

As noted in §C.5.4.5.2.2 above, the Recreation Element of the CDCA Plan specifies that "…lands managed by the Bureau are especially significant to recreationists" (BLM 1980). Congress also specified, when the CDCA was adopted, that "the use of all California desert resources can and should … provide present and future use and enjoyment, particularly outdoor recreation uses..." (FLPMA, Section 601). The proposed

project would significantly impact the availability of and access to BLM-managed, publicly-owned recreational lands. However, full implementation of conditions of certification **LAND-1, 3, 4, 5,** and **6** would substantially reduce the loss of recreational use and access (to a less than significant level under CEQA). Given the unclassified status of a portion of the project site and multiple use priorities of the remainder of the ROW and the CDCA amendment, the project would then be considered consistent with the recreational requirements of CDCA.

Impacts to agricultural uses and rangeland would be less than significant (see §C.5.4.5.1) and there would be no impact to Wilderness resources, although there would be some minor residual impact to Wilderness recreational access (see C.5.4.5.2.2).

The BLM's approval of an amendment for the project; balance of multiple use priorities, combined with mitigation provided by the proposed conditions of certification listed above; and siting of the transmission line and switchyard within the existing designated utility corridor, would make the project consistent with the CDCA Plan, absent the restrictions of the WEMO amendment (see below).

West Mojave Habitat Conservation Plan

The West Mojave Plan (WEMO) is a habitat conservation plan and federal land use plan amendment to the CDCA that (1) presents a comprehensive strategy to conserve and protect the desert tortoise, the Mohave ground squirrel (MGS) and nearly 100 other sensitive plants and animals and the natural communities of which they are a part, and (2) provides a streamlined program for complying with the requirements of the California and federal Endangered Species Acts (CESA and FESA, respectively). For this reason, any proposed land use that exceeds the Plan's thresholds of significance (WEMO, Vol. 1, Chapter 4, pp. 4-2,3) or that would interfere with the conservation and protection of these sensitive species would be inconsistent with WEMO. As noted in § C.5.4.5.2.3, the proposed project has the potential to substantially reduce the biological resource values of the project area, particularly for the existing desert tortoise population and its habitat and wildlife habitat connectivity for the Mohave ground squirrel genetic diversity. Staff believes that the impacts may not be mitigable. (See **BIOLOGICAL RESOURCES** section for further discussion, proposed conditions of certification, and determination of residual impact.) The proposed project is not consistent with this element of the WEMO plan.

Because of the multiple use mandate for public lands, the thresholds of significance for impacts to recreational uses must also be considered (see §C.5.4.5.2.2). The proposed project would exceed the WEMO thresholds of significance in the following areas:

- Loss of access to an area of historic recreational importance (Recreation).
- Loss of access to historically important recreation access point or staging areas (Motorized Vehicle Access).

However, full implementation of **LAND-1, 3, 4, 5,** and **6** would provide similar or generally equivalent alternative sites and access, reducing the potential impacts to a less than significant level. Therefore, the project would be considered consistent with the recreational aspects of WEMO.

China Lake Air Installation Compatibility Use Zone (AICUZ)

The China Lake AICUZ was established to protect military operations in and around Armitage Field from incompatible land uses. According to the AFC (Figure 5.7-4), the project footprint is not located within any Accident Potential Zone. A small portion of the proposed project ROW is located within the AICUZ footprint and the MIA. This area is located in Noise Zone 1, which includes areas where Community Noise Exposure Level (CNEL) is between 60 to 65 CNEL. However, no structures are proposed in this area. The project is consistent with the avoidance requirements of this plan. (See the **NOISE AND VIBRATION** for further discussion.)

State

Government Code §§65940 and 65944

The proposed project and all alternative sites are within the boundaries of the R-2508 Complex, a special use airspace, specifically the R-2506 restricted area and Isabella MOA. Consistent with GC §§65940 and 65944, the applicant has consulted with the R-2508 Complex Military Sustainability Office and provided a letter from the Sustainability Office to the lead agencies, identifying those actions necessary to avoid any impact to military operations (SM 2009a, Appendix K). Staff has proposed Condition of Certification **LAND-7** in response to that information, which, when implemented, would eliminate potential mission impacts. The project is consistent with the requirements of this portion of the California Government Code.

Local

The project would be sited entirely on BLM-managed public lands, within the proposed ROW, except for the proposed waterline, which would be constructed entirely within the existing IWVWD and Kern County ROWs, and proposed Caltrans ROW. The project site is under federal (BLM) jurisdiction and subject to the CDCA and WEMO area plans. Kern County and the city of Ridgecrest jurisdictional authority would only apply to any off-site infrastructure installation and maintenance activities, outside the BLM boundaries. The proposed project and all alternatives are consistent with the applicable Kern County and City of Ridgecrest LORS, as discussed below.

Kern County General Plan (2004), as amended through March 2007

The Kern County General Plan designates the project site and surrounding BLM lands as State and Federal Non-Jurisdictional Lands (Figure C.5-7). Privately owned properties surrounding the project site have General Plan land use designations (GP LUDs) for Resource Management (8.5) and Residential (5-20 acre minimum parcel size). The county ROW for the proposed waterline along S. China Lake and Brown Roads does not appear to have a separate LUD from surrounding properties. Kern County GP policies related to the project site and Non-Jurisdictional Lands include the following:

- Policy 1: Coordination and cooperation will be promoted among the County, the incorporated cities, military bases, and the various special districts where their planning decisions and actions affect more than a single jurisdiction.

- Policy 5: The County land use regulations do not apply to property administered by the State or federal Government in the absence of Memorandums of Understanding indicating otherwise. However, County land use regulations may apply to other public entities subject to provisions of State law.

Actions consistent with these policies have been followed throughout the project's licensing process.

Kern County Building & Construction Code, Title 17

Kern County Building Code would apply to all construction outside federal lands and to construction on federal lands, to the extent that the standards do not conflict or override state and federal requirements. As noted in the AFC (SM2009a, §5.7), the project is designed to meet all required building and construction standards and would meet or exceed all standard applicable building permit requirements. Federal public lands pursuant to a ROW grant under FLPMA Section 501, 43 USC 1761, are required to comply with State "siting, construction, operation, and maintenance" standards that are more stringent than equivalent Federal standards. However, the U.S. Court of Appeals for the Ninth Circuit has held that the Federal government has the right to exercise its authority to grant ROWs for facilities, consistent with FLPMA, free of any regulatory interference by local agencies. No county building permit would be required for any construction on federally managed public lands.

Kern County Municipal Code

Chapter 12.16 Highway Encroachments

The project proposes to install a water pipeline to supply water to the project site. Portions of this pipeline alignment would be within the Kern County ROWs for S. China Lake Blvd. and Brown Rd. This section of the Kern County Municipal Code requires an encroachment permit and, in some cases, a franchise agreement for any disturbance within established Kern County rights-of-way. In a letter from the Kern County Planning Department (KPCD 2010a), the county indicates that a franchise agreement would be required before the project could install the waterline within these ROWs; staff concurs (see **LAND-5**).

This same Condition of Certification would act as partial mitigation for the loss of recreational access into and through the proposed project site (see §C.5.4.5.2.2). Construction of this bicycle path would require an encroachment permit for that portion of S. China Lake Blvd ROW from the Ridgecrest city limits to the S. China Lake Blvd/Hwy 395 intersection.

Finally, the project proposes to construct acceleration/deceleration lanes and two site access roads on Brown Rd. (see **TRAFFIC AND TRANSPORTATION).** These would also require encroachment permits from Kern County prior to the start of any construction.

Full implementation of conditions of certification **LAND-5** and related conditions of certification in the **WATER AND SOIL** and **TRAFFIC AND TRANSPORTATION** sections would ensure consistency with Chapter 12.16 of the Kern County Municipal Code.

Title 19 Kern County Zoning Code

Kern County zoning regulations only apply to those portions of the project that would occur on private lands within the jurisdiction of Kern County. There are no private lands within the proposed project footprint, although the waterline would be installed within the existing Kern County road ROWs for Brown Road and S. China Lake Blvd (see Chapter 12.16 above). Properties adjoining the proposed project site have zoning designations of A-1 (Limited Agriculture) and E (Estate) zoning. The proposed project footprint would provide a sufficient buffer between the facilities and adjacent privately-owned properties to preclude any significant impact to uses permitted by current zoning.

Kern County 2008 Airport Land Use Compatibility Plan (KCALUCP)

The KCALUCP is intended to establish criteria and procedures to ensure the compatibility of surrounding land uses with airport operations. The proposed project is outside the airport planning area for the Inyokern Airport and is, therefore, not subject to the Inyokern Airport land use restrictions.

The proposed project site is also outside the Airport Influence Area (AIA) for the China Lake Naval Air Weapons Station Armitage Field (NID). However, it is within the R-2808 Complex and the R-2806 restricted area, which require heightened scrutiny to avoid uses that may conflict with military operations (see **TRAFFIC & TRANSPORTATION** for complete discussion). These include stricter requirements for structures over 50 feet tall, equipment that may emit radio and communication frequencies, and review of environmental documents. The proposed project has equipment with the potential to interfere with military electronics, as noted in the *Aviation and Military Use* discussion of § C.5.4.5.3.1 above. It also has structures that exceed 50 feet in height and is within the R-2806 restricted area. (KERN 2008(b), pp.154-156) Condition of Certification **LAND-7** addresses potential electronic interference and conditions of certification in **TRAFFIC & TRANSPORTATION** impose requirements for military reporting and lighting requirements. The proposed project would be consistent with the KCALUCP with full implementation of these conditions of certification.

Kern County Bicycle Facilities Plan

This plan consolidates bicycle plans from throughout the county, and identifies existing, funded, and proposed routes. Staff is proposing a condition of certification that would require the project owner to construct a multi-use bicycle/pedestrian path from the end of the existing path at the intersection of Down's Street and S. China Lake Blvd. in Ridgecrest to the intersection of S. China Lake Blvd. and Hwy 395. This is a heavily traveled portion of the regional transportation system and a primary access route into and out of Ridgecrest. The existing bike path ends at Down's Street in Ridgecrest, with only a paved shoulder along the remainder of S. China Lake Blvd. to Hwy 395. This route is used regularly by local residents for bicycle commuting and recreation; 2.9 percent of Ridgecrest residents commute to work by bicycle. It is also part of several

local road ride routes and a primary access route to several published time trial routes and recreation trails (see §C.5.4.5.2.2 *Non-Motorized Access* above).

The proposed condition of certification would: (1) provide a safe, accessible, and convenient bicycling facility along a major arterial circulation route; (2) support and encourage increased levels of bicycling and walking; and (3) promote the use of bicycles as an integral component of the regional multi-modal transportation network. This is consistent with all the goals of the Plan. It would also facilitate the Plan's objectives by: (1) providing an essential link in the development of a continuous and easily accessible bike path system within the region; (2) provide a means to minimize bicycle/automobile/pedestrian conflicts along S. China Lake Blvd.; and (3) facilitate the development of non-motorized transport in the Ridgecrest area, thereby contributing to a reduction of motor vehicle use and reduced air emissions. Finally, it is consistent with the Plan's policies that require all development to evaluate and limit its impacts on the city/county transportation system, including bicycle system; would require the facility to be constructed consistent with the Highway Design Manual (Chapter 1000 – Bikeway Planning and Design); and would be constructed in conjunction with installation of the proposed project waterline within the existing ROW. The segment of bike path proposed in **LAND-5** is currently listed as a proposed project in the Plan. (KERN 2001, p.28). Therefore, implementation of **LAND-5** would be consistent with the Kern County Bicycle Facilities Plan.

City of Ridgecrest 2010-2030 General Plan

The Planning Area for the Ridgecrest General Plan incorporates lands within the Ridgecrest city limits, as well as private lands, lands managed by the Bureau of Land Management (BLM), and lands held by the Department of Defense as part of China Lake in the area surrounding the City. However, the City has no formal jurisdiction outside its city limits or over federal or state lands. The proposed project would be constructed entirely within a BLM-issued ROW that abuts the Ridgecrest Planning Area along S. Jacks Ranch Rd. It would also include off-site construction of a water line along the existing IWVWD ROW, at its water storage facility, and continuing along the ROWs for S. China Lake Blvd. and Brown Rd., to the project site. Although the proposed BLM ROW abuts S. Jacks Ranch Rd., the actual project footprint is expected to remain west of Hwy 395. There should be no impact to the existing land use designations within the Planning Area. Aside from consistency with road ROW requirements of Ridgecrest and Kern County, the City of Ridgecrest has no jurisdiction over this project.

Circulation Element (Chapter 6)

The Circulation Element of the Ridgecrest General Plan addresses current and future motorized and non-motorized transportation issues within the Ridgecrest Planning Area. The footprint for the proposed project is outside Ridgecrest jurisdiction. However, staff has proposed Condition of Certification **LAND-5**, which, if implemented, would construct a bicycle path along S. China Lake Blvd., a portion of which would be within the Ridgecrest city limits and Planning Area. Construction of the bicycle path along the proposed alignment would require consultation with the City of Ridgecrest and would be consistent with the non-motorized circulation plan (COR 2009(a) Figure 6-3).

City of Ridgecrest Zoning Ordinance (Chapter XX)

§20-3.18 Public Utility Distribution and Transmission Lines

As noted above, the proposed project footprint would be entirely on public lands, except for the proposed waterline along S. China Lake Blvd. and Brown Rd. As part of this alignment is within Ridgecrest city limits, it would be subject to any restrictions placed on it by City zoning regulations. However, public utility distribution and transmission lines, both overhead and underground, are permitted in all zoning districts without a use permit, provided a permit for construction is obtained from the Ridgecrest Department of Public Works prior to any new construction or installation of such facilities. Condition of Certification **LAND-5** requires the project owner to submit construction design plans for review by the City of Ridgecrest, Kern County, and Energy Commission Compliance Project Manager (CPM) and obtain any applicable permits prior to the start of any construction.

C.5.4.5.3.4 Would the proposed project conflict with any applicable habitat conservation plan, natural community conservation plan, or biological opinion?

The proposed project is subject to the West Mojave Habitat Conservation Plan (WEMO), including restrictions associated with the Mojave Ground Squirrel Conservation Area in the southern portion of the project ROW and actions required to protect special status species from significant project-related impacts throughout the proposed ROW and on surrounding lands. There are no Areas of Critical Environmental Concern (ACEC) within the proposed ROW or affected by the proposed project.

The land use proposed by the project would conflict with the intent of the MGSCA to limit impacts to MGS habitat and preserve critical migration corridors for genetic diversity. The proposed project is on the northern boundary of the MGSCA. Therefore, although it would reduce the total acreage in the MGSCA, it would not result in extensive new fragmentation of the area. It would, however, result in take and adverse effects on the species through impacts to the Sierra Foothills Habitat Connector that may not be mitigable. This constitutes a significant effect on biological resources and conflicts with WEMO. (See **BIOLOGICAL RESOURCES** section for further discussion.) The Biological Opinion (B.O.) for this project has not been completed and is, therefore, unavailable for review. The most recent B.O. for this area was completed in conjunction with the WEMO amendment to the CDCA in 2006, and is reflected in the consistency analysis of the project under WEMO (see §C.5.4.5.3.3 above).

Additionally, the proposed project would result in impacts to recreation that would exceed the WEMO thresholds of significance in the following areas (see §C.5.4.5.2.2):

- Loss of access to an area of historic recreational importance (Recreation).
- Loss of access to historically important recreation access point or staging areas (Motorized Vehicle Access).

However, full implementation of **LAND-1, 3, 4, 5, & 6** would provide similar or generally equivalent alternative sites and access, reducing the potential impacts to a less than significant level. Therefore, the project would not conflict with the recreational aspects of WEMO.

Land Use Table 5
Project Compliance with Applicable Land Use LORS

Applicable LORS	Basis for Consistency	Consistent with LORS?					
		Alt. 1 Preferred Project	Alt. 2	Alt. 3	Alt. 4	Alt. 5 No Project	Alt. 6 (a,b)*
Federal							
California Desert Conservation Area (CDCA) Plan,1980 as Amended; 1999. West Mojave Habitat Conservation Plan (WEMO); 2006	Proposed project is consistent with the CDCA multiple use mandates; and conservation and protection requirements for sensitive species, agricultural, rangeland, and recreation. Potential impacts would not exceed WEMO thresholds of significance or would be mitigated to avoid or substantially reduce any potential impacts to a less than significant level.	No	Yes	No	No	N/A	Yes
China Lake Air Installation Compatibility Use Zone (AICUZ)	No structures are proposed in the AICUZ. The project is consistent with the avoidance requirements of this plan.	Yes	Yes	N/A	Yes	N/A	N/A
State							
Government Code §§65940 and 65944	Consultation has occurred between applicant, military liaison, and staff. Staff has proposed mitigation to avoid impacts to military operations in special use airspace.	Yes	Yes	Yes	Yes	N/A	Yes
Local							
Kern County General Plan (2004), as amended through March 2007	Applicable only to non-federal lands. All project-related actions off-site would conform with GP LUD restrictions and requirements. Lead agency actions consistent with applicable policies throughout the project's licensing process.	Yes	Yes	Yes	Yes	N/A	Yes

Applicable LORS	Basis for Consistency	Consistent with LORS?					
		Alt. 1 Preferred Project	**Alt. 2**	**Alt. 3**	**Alt. 4**	**Alt. 5 No Project**	**Alt. 6 (a,b)***
Kern County Building & Construction Code, Title 17	Applicable only to the extent that standards are no stricter than state and national building codes for construction on public lands. All off-site construction is consistent with Kern County requirements.	Yes	Yes	Yes	Yes	N/A	Yes
Kern County Municipal Code, Chapter 12.16 Highway Encroachments	Consistent with permitting requirements for encroachment into Kern County road ROWs, with implementation of **LAND-5, 6**.	Yes	Yes	Yes	Yes	N/A	Yes
Kern County Zoning Ordinance, Title 19 Chapter 19.14 Limited Agriculture (A-1) Zoning District and Chapter 19.16 Estate (E) Zoning District	Applicable only to non-federal lands. All project-related actions off-site, including waterline installation within Kern County Public Works ROW would conform with zoning restrictions and requirements. Proposed land uses are consistent with or would not impede permitted uses of adjacent lands.	Yes Yes	Yes Yes	Yes Yes	Yes Yes	N/A N/A	Yes
Kern County 2008 Airport Land Use Compatibility Plan	Consistent with the requirements concerning airport operations at Inyokern and Armitage Airports, with implementation of **LAND-7** and **TRANS-12.**	Yes	Yes	Yes	Yes	N/A	Yes
Kern County Bicycle Facilities Plan	Construction of the bicycle/pedestrian path proposed in Condition of Certification **LAND-5** would be consistent with the route alignment, and the goals, policies, and implementation measures of the Bicycle Facilities Plan.	Yes	Yes	Yes	Yes	N/A	N/A

Applicable LORS	Basis for Consistency	Consistent with LORS?					
		Alt. 1 Preferred Project	Alt. 2	Alt. 3	Alt. 4	Alt. 5 No Project	Alt. 6 (a,b)*
City of Ridgecrest General Plan (2010-2030) - Circulation Element (Chapter 6)	Project is outside City of Ridgecrest jurisdiction, except for the off-site waterline alignment. Construction of the bicycle/pedestrian path proposed in Condition of Certification **LAND-5** would be consistent with the route alignment, and the goals, policies, and implementation measures of the General Plan Circulation Element.	Yes	Yes	Yes	Yes	N/A	N/A
City of Ridgecrest Zoning Ordinance §20-3.18 Public Utility Distribution and Transmission Lines	Only a portion of the proposed project waterline alignment is within Ridgecrest jurisdiction. The project would meet all permitting and notification requirements for this project element, as required in Condition of Certification **LAND-5**.	Yes	Yes	Yes	Yes	N/A	N/A

***** See ALTERNATIVES Section B.2.7.1 of this document for analysis of Alternates 6a and 6b (Garlock site).

C.5.4.5.4 Cumulative Land Use Effects

As noted in other sections, the impacts of a project are not analyzed in a vacuum, either individually within a project or without consideration of other land use changes that have or may occur in the same vicinity. Incremental, project-specific impacts that may not be substantial on their own may, when combined with other project-related impacts or similar impacts from other projects, result in a substantial and cumulatively significant effect on current and future land use in the project vicinity.

Under the CDCA and WEMO land use plans, development and conservation are both priorities for public lands surrounding the project area and management for multiple use and sustained yield is emphasized. Projects proposed throughout these areas encompass a wide range of uses, including energy production and transmission, livestock grazing, mineral extraction, recreation, and conservation of special status species and their habitats. As a result, the consequences of these uses may overlap, resulting in impacts that cumulatively exceed the effects of individual projects.

C.5.4.5.4.1 Geographic Scope of Analysis

The geographic scope of the project's land use and recreational cumulative impact is divided into three areas:

A. Incremental, project-specific impacts analyzed within this document that contribute to or result in a substantial change or significant impact to land use and/or recreation in the project area.

B. Local area, defined as within a radius of approximately 20 miles of the proposed project site and the general confines of the Indian Wells Valley.

C. Regional area, defined as within the California Desert District (CDD), primarily in the area managed by the BLM's Ridgecrest office.

There are no Wilderness Areas that would be measurably affected by the proposed project.

Local Area

The project site is in the Indian Wells Valley, a high-desert area encompassing Brown, Salt Wells, and Inyokern Valleys. Bounded by four mountain ranges, five designated wilderness areas, and the China Lake Military Operations range, the lands surrounding the project area are geologically isolated from other portions of the CDD and present a relatively distinct land area for the purposes of analyzing local CEQA and NEPA cumulative impacts.

There are a total of six renewable energy projects proposed or in progress within a radius of approximately 20 miles from the project site. These include two solar projects (including the proposed project) on approximately 11,395 acres; and seven wind

projects, on a total of about 66,215 acres[15]. (See **Land Use Table 6** below.) In addition, there are five major projects that are not energy-related, but have the potential to impact current and future land uses. (See **Land Use Table 7** below.)

Regional Area

From a regional perspective, the project area is located in the northwestern portion of the California Desert District (CDD), an area containing approximately 11 million acres of public lands that includes portions of Kern, Inyo, Los Angeles, Riverside, San Bernardino, Orange, Imperial and San Diego counties. While the geology of the area generally isolates the Ridgecrest site, project impacts to the overall availability of conservation areas, individual species, availability of undeveloped lands and resources, wilderness access, and recreational use within the larger CDD must be considered. In addition to the projects identified within the local area, there are four additional solar projects proposed over 18,747 acres of public lands and 22 wind projects on 143,937 acres of public lands (as of March 14, 2010), within a radius of 90 miles from the project site (see **Land Use Table 8**), roughly corresponding to the CDCA boundaries of the Ridgecrest Field Office jurisdiction in Kern, Inyo, and San Bernardino counties.

Even more renewable energy projects are proposed on public lands in surrounding counties from Los Angeles and Bakersfield to the Arizona and Nevada borders (see **Cumulative Analysis Tables 1A & 1B**). While the Ridgecrest project would add acreage to the projected one million acres of renewable energy projects expected in the California desert, its location and surrounding topography would limit its potential contribution to desert-wide cumulative effects.

[15] Acreage reflects the total ROW requested in the current applications submitted to BLM. The final acreage totals should be at least ⅓ to ½ less, consistent with the final project footprint following completion of construction.

Land Use Table 6
Current and Foreseeable Renewable Energy Projects – Local Area

Type of Project	BLM Serial Number	Applicant/Holder	Acres	MW	Geographic Area	Status of Application
Solar Thermal	CACA49016	Solar Millennium, LLC (Proposed Project)	3,995	250	Near Ridgecrest, on Brown Rd., west of Hwy 395 intersection	POD received (revised 2/2/10)
Solar PV	CACA49511	First Solar (formerly OptiSolar, Inc.)	7,400	600	E of Ridgecrest, along boundary of China Lake NWC thru Poison Canyon in Hwy 178/Trona corridor	Re-established application; Obsidian site
Wind	CACA48948	Renewergy, LLC	7,645	Pending testing	Rand Mountain area – Laurel & El Paso Peaks	Initial application incomplete. EA required. Biological & cultural surveys pending.
Wind	CACA49394	Wind Power Partners LLC	2,258	Pending testing	Short Canyon, immediately W of the Hwy 14/395 intersection	Application rcvd.; mapping in progress
Wind	CACA49547	Competitive Power Ventures, LLC	38,347	Pending testing	Bird Springs / Inyokern	MOA for cost recovery
Wind	CACA49581	Little Lake South Renewables, LLC (Applicant) RES American Development (holder)	4,120	Pending testing	Along Hwy 395, 15 mi N of the Hwy 14/395 intersection	Split out of south part of CACA45386, to be processed separately, but simultaneously;
Wind	CACA50020	Brewer Energy Co.	4,502	Pending testing	El Paso Mountains (Black Hills), west side of Hwy 395; immediately S and W of proposed project	New application; 3 met towers; Native American consultation
Wind	CACA50319	Debenham Energy, LLC	7,943	Pending testing	Summit Range; crosses Hwy 395 (Searles Hills); near Fremont Valley	New application; up to 8 met towers/2 right away; Native American consultation
Wind	CACA51386	LH Renewable, LLC	1,400	Pending testing	WNW of project site, along and on both sides of Hwy 14.	6 met towers; resource conflict; pending GIS review; Sequoia Forest site
		TOTAL ACREAGE	77,610			

Source: BLM 2009 (b,c); BLM 2010(b); SM 2010c

Land Use Table 7
Other Current and Foreseeable Projects – Local Area

Type of Project	Project Name	Applicant/ Agency	Project Description	Location	Status of Application
Public Utility Expansion	Wastewater Treatment Plant (new construction)	City of Ridgecrest	Construct new WWTP to accommodate foreseeable growth	TBD, within Ridgecrest city limits. Estimated completion 2011	Request for Qualifications issued October 2009
Federal	Base Realignment and Closure (BRAC)	U.S. Navy	Expansion of NAWS China Lake to accommodate increased testing and training operations. Expected to create 2000-4000 new jobs and a need for up to 2,700 new homes in the Ridgecrest area.	China Lake Naval Weapons Center	Final EIR published 2004; BRAC procedures in process
Private/ Commercial	Ridgecrest Wal-Mart and Retail Center	Wal-Mart	Use of 28.5 undeveloped acres for a 205,000 sq. ft. retail center and fueling station; widening of Bowman Rd. from S. China Lake Blvd to Sunland St., two new access roads.	Near the intersection of S. China Lake Blvd and E. Bowman Rd.; 5 mi NE of project site; within Ridgecrest city limits	Final EIR published September 2009
Highway Improvements	Freeman Gulch Four-Lane Project	Caltrans	Conversion of a portion of SR 14 from two lane conventional highway to a four-lane, divided, controlled-access expressway	SR 14, from 0.8 mi N or Redrock/Inyokern Rd to 2.2 mi S of junction w/Hwy 395	Construction scheduled for 2012-2015
Highway Improvements	Inyokern Four-Lane Project	Caltrans	Widen approximately 15.5 miles of Hwy 395 from two-lane highway to a four-lane expressway	Hwy 395 from 1.1 mi S of S. China Lake Blvd to 1 mi N of SR 14	Approval of MND/EA expected by October 2010. No start date has been established.

Source: COR 2009(d), NWS-CL; COR 2008; Caltrans 2007, 2008, & 2010

Land Use Table 8
Renewable Energy Projects – Regional Area

Type of Project	BLM Serial Number	Applicant	Acres (approx.)	MW	Geographic Area	Status of Application (All projects "pending" unless otherwise noted)
Solar PV	CACA48820	First Solar Development Inc.	5,300	279	NW of the Hwy 14/58 intersection	POD received; land check underway Name: Desert Sapphire
Solar PV	CACA48948	First Solar Development Inc.	6,495	745	W of Hwy 395, approx. 4-8 mi N of Hwy 58/395 intersection	Revised POD (2/9/10); land check in progress; Name: Garnet
Solar Thermal	CACA49576	Power Partners Southwest, LLC	1,920	300	W of Hwy 14, approx.8-14 mi N of the Hwy 14/58 intersection	Application rcvd; outside MGS Conservation Area
Solar Thermal	CACA50103	Power Partners Southwest, LLC	5,032	300	Harper area, near Hinkley; N of Hwy 58	2/2/10 – 1st in line; POD requested
		Total Solar Acreage	18,747			
Wind	CACA09501	Cameron Ridge LLC	640	Unknown	Immediately S of Hwy 58, approx. 10 miles W of the Hwy 14/58 intersection	NEPA Analysis approved; Authorized for wind Energy facilities (type and size unknown); ROW lease expires 12/31/2028
Wind	CACA13528	Alta Wind1 LLC	160	1,500	Tehachapi Wind Resource Area, about 100 miles N of Los Angeles; S of Hwy 58, approx. 13 miles SW of the Hwy 14/58 intersection	Authorized ROW for Oak Creek repower + 80 acres; expires 12/31/2038
Wind	CACA13768	Cameron Ridge LLC	250+	Unknown	Immediately S of Hwy 58, approx. 8 miles W of the Hwy 14/58 intersection	NEPA Analysis Approved; Authorized for Wind Energy facilities (type and size unknown); ROW lease expires 12/31/2028
Wind	CACA44611	Alta Windpower Development, LLC	1,546	Pending testing	Along and on either side of Hwy 58, beginning approx. 6 mi west of the Hwy 14/58 intersection	4 met towers; Authorized 2/2010; ROW expires 12/2012

Type of Project	BLM Serial Number	Applicant	Acres (approx.)	MW	Geographic Area	Status of Application (All projects "pending" unless otherwise noted)
Wind	CACA45220	Los Angeles Dept. of Water and Power	25,000	N/A	Extending approx. 10 miles along a corridor approx. 2 mi W and parallel to Hwy 14, beginning ~6 miles north of the Hwy 14/58 intersection	Authorized; Pine Tree Canyon Transmission Line; ROW expires 2036
Wind	CACA45386	Little Lake South Renewables, LLC (Applicant) RES American Development (holder)	13,989	Pending testing	Along Hwy 395, 28 mi N of the Hwy 14/395 intersection	Rose Valley/Little Lake site; Northern part of CACA045981 (see Land Use Table 6 above)
Wind	CACA46805	Horizon Wind Energy	10,073+	Pending testing	S of Hwy 58,12 mi west of Barstow	Authorized; Iron Mountain project; 3 met towers; expires 12/31/10
Wind	CACA46844	Horizon Wind Energy	720	Pending testing	6 mi north of Barstow & I15/Hwy 58/40 intersection	Authorized; Waterman Hills project; 2 met towers; expires 12/31/10
Wind	CACA46978	Renewable Management Corporation	536	Pending testing	Approx. 2 miles S of Hwy 58, about 8 miles W of the Hwy 14/58 intersection	2 met towers; several isolated lots
Wind	CACA47847	Boulevard Associates, LLC	9,706	Pending testing	~12 mi NW of the Hwy 14/58 intersection	North Sky River Project; 4 met towers; land status checked
Wind	CACA47848	Alta Windpower Development, LLC	7,245	Pending testing	Tehachapi Wind Resource Area, about 100 miles N of Los Angeles; S of Hwy 58, approx. 13 miles SW of the Hwy 14/58 intersection	10 met towers; mix of public/private lands; acreage is for public lands only
Wind	CACA48471	Power Partners Southwest, LLC	10,240	Pending testing	12 mi N of Barstow	Lone Mountain project; 1 met tower
Wind	CACA48536	Alta Windpower Development, LLC	1,228	Pending testing	10 mi SW of Mojave, W of Hwy 14/138	Soledad Mountain project: 7 met towers
Wind	CACA48537	Alta Windpower Development, LLC	9,279	Pending testing	W of Hwy 395, approx. 15 mi S of Ridgecrest	Met tower project

Type of Project	BLM Serial Number	Applicant	Acres (approx.)	MW	Geographic Area	Status of Application (All projects "pending" unless otherwise noted)
Wind	CACA49112	AES Seawest, Inc.	8,592	Pending testing	~15 mi NW of the Hwy 14/58 intersection	6 sites; met tower project; Bio survey pending
Wind	CACA49577	Power Partners Southwest, LLC	276	Pending testing	6 mi S of Hwy 58, 10 mi SW of Mojave	Avalon site; 1-3 met towers
Wind	CACA50170	Debenham Energy, LLC	19,023	Pending testing	Along Hwy 395, 28 mi N of the Hwy 14/395 intersection	North Haiwee area; Type II wind application
Wind	CACA50171	AES Seawest, Inc.	120	Pending testing	Immediately N of Hwy 58, approx. 6 miles W of the Hwy 14/58 intersection	Type II Met tower project
Wind	CACA51016	Riverside Wind Energy, LLC	11,174	Pending testing	Approx. 10 miles N or the Hwy 14/58 intersection	Met tower project
Wind	CACA51335	Alta Wind 1 LLC	584+	Pending testing	Immediately S of Hwy 58, approx. 8 miles W of the Hwy 14/58 intersection	Golden Square Project; 2-60 meter met towers
Wind	CACA51454	Jawbone Canyon Power Partners, LLC	12,356	Pending testing	Approx. 15 mi W of Hwy 14 and Red Rock Canyon State Recreation Area	4 met towers
Wind	CACA51561	Power Partners Southwest, LLC	1,200+	Pending testing	Tylerhorse Canyon area; S of Hwy 58, approx. 15 miles SW of the Hwy 14/58 intersection and E of Tehachapi Willow Springs Rd.	Tylerhorse Wind Project; 36 wind turbines
		Total Wind Acreage	143,937+			
		TOTAL ACREAGE	162,684+			

Source: BLM 2009 (b,c), as of 3/10/10

C.5.4.5.4.1 AGRICULTURE LANDS AND RANGELANDS

Local Area

The term “agricultural lands” in the western Mojave generally refers to irrigated grazing lands, field crops of alfalfa, or orchards. Water usage for agricultural purposes indicates a decrease in irrigated crops in the Indian Wells Valley of over 50% since 1985 (IWVWD 2003, pp.3-30, 5-4). Alfalfa and oat fields for fodder have virtually disappeared from farms along the Hwy 395 corridor and pistachio production declined from over 235 acres in 2003 to a little more than 85 acres in 2005. There is no irrigated farmland within the project boundaries or surrounding properties. However, water for the proposed project would come from the same basin as water for the remaining agricultural uses. As noted in the **SOILS AND WATER** section of this document, the Indian Wells Valley Groundwater Basis is already significantly overdrafted and the project’s water needs will exacerbate that condition. As a result, increased cost of and controls on water use is making it prohibitive for farmers to continue production. Although staff has recommended a condition of certification (**SOIL & WATER-3**) that is intended to reduce project impacts on groundwater levels to a less than significant impact, not all impacts would be mitigated and the project’s contribution to the existing overdraft would be cumulatively considerable. Therefore, project water usage, unless fully mitigated, may also indirectly impact those farmers seeking to maintain agricultural uses in the Indian Wells Valley. However, given the ongoing decrease in agricultural production in the Valley since the mid-1980s, there is no way to quantify how much of an indirect impact, if any, would be related to the project.

The BLM Ridgecrest District office manages approximately 2,500,000 acres of rangeland for the grazing of sheep and cattle. The Cantil Common Rangeland Grazing Allotment, which surrounds the project site, is only one of more than 35 grazing allotments in the Indian Wells Valley and surrounding foothills, although it is the largest at over 300,000 acres. Loss of grazing acreage due to project placement is not expected to significantly impact the viability of the Cantil Common allotment (see §C.8.4.5.1.4). However, the proposed placement of four proposed wind projects (CACA050020, 048948, 050319 and 051386), along with the proposed project, when considered with the topography of the area, could substantially disrupt access of the flocks to the southern and northeastern portions of the allotment. Also, a loss of use on nearly 20,000 acres in the northern third of the allotment could severely limit access to and usability of the remaining acreage in the area, especially when combined with the quality of forage (generally only fair) and limitations related to desert tortoise habitat within that portion of the allotment’s boundaries. This would result in a cumulative loss of reasonable access to more than 80,000 acres of ephemeral sheep foraging area, a threshold of significance under WEMO, in the local project area. The final BLM ROW acreage would conform with the final project footprint, which would allow continued access to all remaining parts of the grazing allotment. Although this would prevent the project from contributing to a cumulative reduction of access, that concession would not, by itself, be sufficient to avoid a substantial cumulative disruption of access and use if the wind projects are built on the acreage and footprint currently proposed.

Regional Area

There is very little agricultural activity within the regional area identified for this project. However, as noted above, the BLM Ridgecrest District office manages approximately 2,500,000 acres of rangeland for the grazing of sheep and cattle, with more than 35 grazing allotments in the Indian Wells Valley and surrounding foothills (see **Land Use Figure C.5-1**). Although the proposed project would not contribute to a significant loss of acreage or access to existing grazing allotments, it does not mean that significant loss will not occur. However, information regarding realistic loss of acreage due to actual construction of the proposed regional wind and solar project is not available at this time.

C.5.4.5.4.2 RECREATION AND WILDERNESS

Project-specific recreational use and access impacts, if mitigated as proposed in the conditions of certification, would not significantly contribute to any cumulative local or regional recreational impact that could result when considered with other proposed wind and solar projects proposed in the southern portion of the El Paso subregion. However, it is possible that development of all other proposed projects would result in a cumulative and immitigable impact to recreational access from the project area south and west to the El Paso Mountain Wilderness area.

C.5.4.5.5 CEQA Level of Significance

Under the proposed project (Alternative 1):

- Impacts to agriculture area would be less than significant.
- Impacts to recreation would be less than significant with the implementation of **LAND-1** through **LAND-6**.
- Consistency with federal, state, and local LORS would be ensured with implementation of **LAND-5**, **7,** and **8**.
- Project-specific loss of grazing land use and access would not significantly contribute to any cumulative agricultural or rangeland impact.
- Project-specific recreational access impacts, if mitigated as proposed in the conditions of certification, would not significantly contribute to any cumulative recreational impact that could result when combined with other proposed wind and solar projects proposed in the southern portion of the El Paso subregion. However, that does not preclude the possibility that cumulative impacts to recreational access from other projects could be significant.

C.5.4.5.6 NEPA Compliance

Under Alternative 1:

- The effects on the agricultural resource value of established federal rangelands within the California Desert Conservation Area are minor, both locally and regionally and do not exceed the significance thresholds for livestock grazing (WEMO, p.4-3). No further analysis is required.
- The effects on recreational activities and resources would be locally substantial, but relatively minor from a regional perspective. The project would result in a loss of

access to an area of historic local recreational importance. This would constitute a significant impact under WEMO (WEMO, p.4-3). Staff has proposed Conditions of Certification **LAND-1** through **LAND-6** that, if fully implemented, would substantially reduce potential impacts to recreational resources and their use.

- The effects on recreational resources within the established Wilderness areas and public access to those resources would be minor and does not exceed any established threshold of significance. No further analysis is required.
- Project activities at all phases of construction, operation, and closure would conform with BLM plans, policies, and procedures, through implementation of the NEPA and CDCA Amendment process. Staff has also proposed Conditions of Certification **LAND-7** and **8** that, if fully implemented, would ensure consistency with applicable local and state land use LORS.
- If all proposed solar and wind projects currently licensed or pending on BLM lands in the Indian Wells Valley are actually constructed, along with the attendant loss of recreational access, the loss, in conjunction with the impact from this project, would be substantial and, possibly, immitigable., especially in the southern and western portions of the El Paso subregion. However, with implementation of the proposed Conditions of Certification, the project would not substantially contribute to these potential cumulative impacts.

C.5.4.5.7 PROJECT ALTERNATIVES

The setting and existing conditions detailed in Section C.5.4.1 above apply to the proposed project (Alternative 1) and all other project alternatives, except Alternative 5 (No Project) and Alternatives 6a and 6b (see the **ALTERNATIVES** section for evaluation of Alternative 6a and 6b). Project differences are noted in the general description of the alternative. The Setting and Existing Conditions section is not repeated for each alternative.

Agricultural and Rangeland impacts, as well as those to Wilderness, are less than significant and would not be significantly reduced by any of the alternatives, except Alternative 5 (No Project). Alternatives 6a and 6b have differing agricultural issues, as they are not sited on public lands, but those alternatives are not addressed in this section. The Assessment of Impacts for Agriculture and Rangelands and Wilderness sections are not repeated for each alternative. Any differences are noted in the general description of the alternative.

Staff's analysis of the proposed project's consistency with applicable federal, state, and local land use LORS is presented in C.5.4.5.3.2 and **LAND USE Table 4,** and applies to the proposed project and all other alternatives. The Land Use compatibility discussion as presented in C.5.4 above also applies to the proposed project and all project alternatives, except Alternative 5 (No Project) and Alternatives 6a and 6b. As with the setting and existing conditions, project differences are noted in the general description of the alternative and the Land Use Compatibility and LORS Compliance section is not repeated for each alternative.

Land use alternatives to the proposed project (Alternative 1), as identified in the following table, are analyzed below:

Land Use Table 6
Project Alternatives

	Proposed Alternative	Acres	MW	Federal Nexus
1	Reconfigured Proposed Project (Reconfigure existing fields to avoid El Paso Wash, add additional fields north and south; move power block to north, adjust transmission interconnection)	1944	250	Yes
2	Northern Unit only	1118 + 16.3 acres for water line	~146	Yes
3	Southern Unit only	809 + 16.3 acres for water line + 58.2 acres for power line realignment	~104	Yes
4	Original Proposed Project	1742 + 18 acres for water line + 33.7 acres for power line realignment	250	Yes
5	No Project/No Action	0	0	Yes
6a	Garlock Rd Private Land Alternative	2000	250	No
6b	PV Technology	2000	250	No

C.5.4.5.7.1 Alternative 2

Alternative 2 contains the same elements as the proposed/preferred project, but would only develop the northern solar field and associated power block. The transmission corridor, T-line realignment, off-site waterline alignment, and impacts to Brown Road and S. China Lake Blvd. would remain unchanged (see applicable sections of C.5.4 above).

Alternative 2 would consist of 167 solar collector array loops, with a net generating capacity of approximately 146 MW, occupying approximately 1,135 acres of public land north of Brown Road. This alternative would retain 58 percent of the proposed solar array loops of the proposed 250 MW project. The boundaries of Alternative 5 are shown in **Alternatives Figure 1**.

Alternative 2 would be located within the proposed ROW, north of Brown Road, depicted as the northern solar field and power block in the proposed project. This alternative is analyzed because it would (1) eliminate about 42 percent of the proposed project area, reducing substantial impacts created by the proposed project, especially those related to biological resources (desert tortoise and Mohave ground squirrel), cultural resources, and recreational uses, and (2) completely avoid construction impacts in the Mohave Ground Squirrel Conservation Area (MGSCA).

Similar to the proposed project, Alternative 2 would transmit power to the grid through the planned SCE 230-kV substation. The power block, covering approximately 18 acres, would remain north of Brown Road, as proposed by Alternative 1, and would include all operational power facilities, structures, transmission lines, and related electrical

systems; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system). However, Alternative 2 would not require the relocation of the two existing SCE transmission lines.

C.5.4.2.2 Assessment of Impacts and Discussion of Mitigation

Agriculture and Rangeland

Alternative 2 would limit the loss of grazing land within the Cantil Commons allotment to approximately 825 acres. It would also allow access to and use of staging areas and routes/trails along the south side of Brown Road.

Wilderness and Recreation

Elimination of the southern solar field would allow access to and use of trail routes leading to the El Paso Wilderness area and connecting routes to the Golden Valley Wilderness, south of Ridgecrest. It would also allow use of staging areas along the south side of Brown Road. However, although the historic star party site would be available, light from the proposed project would make it unusable for astronomical observations.

Recreational impacts discussed in Alternative 1 (see C.5.4.5.2.2) apply to this alternative only as they relate to the area north of Brown Road and restrictions to access related to increased traffic and construction impacts along Brown Road. Conditions of certification **LAND-2** through **LAND-8** would still apply and would substantially reduce any potential impacts to recreational use and access.

The remaining residual impacts to recreational access to and use of the federal recreational lands within and around the proposed project site would be:

- Loss of specific established recreational sites within the northern project footprint.
- Degradation of the “dark sky” conditions surrounding the project site with installation of on-site security and operational lighting.
- Loss of approximately 1-1/2 miles of casual use trails throughout the project footprint.
- Temporary loss of or interference with access to public lands for parking and staging areas along 1.25 miles of Brown Road, east and west of the project footprint, during project construction.
- Permanent loss of access to public lands for parking and staging areas along 1.59 miles of the northern side of Brown Road, within the project footprint and outside of the Kern County Brown Road ROW.
- Temporary loss of or interference with access to approximately four miles of Brown Road and routes/trails that require access from Brown Road, during project construction (partially compensated for with implementation of **LAND-6**).
- Continued unauthorized (casual) use of the decommissioned trails, following rehabilitation, until the area is reclaimed by the desert.

Cumulative Land Use Effects

As with Alternative 1, the project would not, with full implementation of all applicable conditions of certification, have a measurable cumulative land use or recreational impact.

C.5.4.2.3 CEQA Level of Significance

Under Alternative 2:

- Impacts to agriculture area would remain less than significant.
- Impacts to recreation would be less than significant with the implementation of **LAND-1** through **LAND-6**.
- Consistency with federal, state, and local LORS would be ensured with implementation of **LAND-7** and **8.**
- Project-specific impacts, if mitigated as proposed in the conditions of certification, would not significantly contribute to any cumulative impact that could result when combined with other proposed wind and solar projects proposed in the region. However, that does not preclude the possibility that cumulative impacts from other proposed projects could be significant.

C.5.4.2.4 NEPA Compliance

Under Alternative 2:

- The effects on the agricultural resource value of established federal rangelands within the California Desert Conservation Area are minor, both locally and regionally and do not exceed the significance thresholds for livestock grazing (WEMO, p.4-3). No further analysis is required.
- The effects on recreational activities and resources would be locally substantial, but relatively minor from a regional perspective. The project would result in a loss of access to an area of historic local recreational importance. This would constitute a significant impact under WEMO (WEMO, p.4-3). Staff has proposed Conditions of Certification **LAND-2** through **LAND-6** that, if fully implemented, would substantially reduce potential impacts to recreational resources and their use.
- The effects on recreational resources within the established Wilderness areas and public access to those resources would be minor and do not exceed any established threshold of significance. No further analysis is required.
- Project activities at all phases of construction, operation, and closure would conform to BLM plans, policies, and procedures, through implementation of the NEPA and CDCA Amendment process. Staff has also proposed Conditions of Certification **LAND-7** and **8** that, if fully implemented, would ensure consistency with applicable local and state land use LORS.
- If all proposed solar and wind projects currently licensed or pending on BLM lands in the Indian Wells Valley are actually constructed, along with the attendant loss of recreational access, the loss, in conjunction with the impact from this project, would be substantial and, possibly, immitigable., especially in the southern and western

portions of the El Paso subregion. However, with implementation of the proposed Conditions of Certification, the project would not substantially contribute to these potential cumulative impacts.

C.5.4.3 ALTERNATIVE 3

Alternative 3, the Southern Unit facility, would be located primarily south of Brown Road, within the boundaries of the ROW proposed in Alternative 1. The power block for this alternative would remain on the north side of Brown Road, still within the original proposed ROW. This alternative is analyzed because it would eliminate about 58 percent of the proposed project area reducing substantial impacts created by the proposed project, especially those related to desert washes, biological resources (desert tortoise), cultural resources, and recreational uses. However, impacts to the MGSCA would increase slightly over the proposed project due to the expanded footprint within the MGSCA boundaries.

Alternative 3 would consist of 119 solar array loops with a net generating capacity of approximately 104 MW, and would occupy approximately 826 acres of land. This alternative would retain 42 percent of the proposed solar array loops and would affect 42 percent of the land of the proposed 250 MW project.

The boundaries of Alternative 3 are shown in **Alternatives Figure 2**. This area would avoid a large portion of the El Paso Wash and associated sensitive biological resources north of Brown Road, including areas that were mapped as occupied desert tortoise and Mohave ground squirrel habitat (live tortoise and/or active burrows and sign).
Similar to the proposed project, Alternative 3 would transmit power to the grid through the planned SCE 230-kV substation, to be located near the proposed project site. The power block, spanning approximately 18 acres, would remain north of Brown Road, as proposed in Alternative 1 and would include all operational power facilities, structures, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system). Similar to the proposed project, Alternative 3 would require the relocation of the two existing SCE transmission lines.

C.5.4.3.1 Assessment of Impacts and Discussion of Mitigation

Agriculture and Rangeland

Alternative 3 would limit the loss of grazing land within the Cantil Commons allotment to approximately 1,076.8 acres. It would also allow access to and use of most staging areas and routes/trails along the north side of Brown Road.

Wilderness and Recreation

Elimination of the northern solar field would preserve trail routes leading from adjacent private inholdings to Brown Road. However, connecting routes to the Golden Valley Wilderness, Spangler Hills, and other OHV sites south of Ridgecrest would be compromised as indicated in Alternative 1. Impacts to Wilderness access and resources would remain less than significant.

Recreational impacts discussed in Alternative 1 (see C.5.4.5.2.2) apply to this alternative only as they relate to the area south of Brown Road; any casual trails eliminated by construction of the power block and access road; and restrictions to access related to increased traffic and construction impacts along Brown Road. Conditions of certification **LAND-1** through **LAND-8** would still apply and would substantially reduce any potential impacts to recreational use and access.

The remaining residual impacts to recreational access to and use of the federal recreational lands within and around the proposed project site would be:

- Loss of specific established recreational sites within the northern project footprint.
- Temporary loss of public access along EP0222, to the south, during construction of the transmission line realignment and new road segment.
- Degradation of the "dark sky" conditions surrounding the project site with installation of on-site security and operational lighting.
- Loss of approximately 3-1/2 miles of casual use trails throughout the project footprint.
- Temporary loss of or interference with access to public lands for parking and staging areas along 1.25 miles of Brown Road, east and west of the project footprint, during project construction.
- Permanent loss of access to public lands for parking and staging areas along 1.59 miles of the southern side of Brown Road and approximately 0.5 miles along the north side of Brown Road, within the project footprint and outside of the Kern County Brown Road ROW.
- Temporary loss of or interference with access to approximately four miles of Brown Road and routes/trails that require access from Brown Road, during project construction (partially compensated for with implementation of **LAND-6**).
- Continued unauthorized (casual) use of the decommissioned trails, following rehabilitation, until the area is reclaimed by the desert.

Cumulative Land Use Effects

As with Alternative 1, the project would not, with full implementation of all applicable conditions of certification, have a measurable cumulative land use or recreational impact.

C.5.4.2.3 CEQA Level of Significance

Under Alternative 3:

- Impacts to agriculture area would remain less than significant.
- Impacts to recreation would be less than significant with the implementation of **LAND-1** through **LAND-6**.
- Consistency with federal, state, and local LORS would be ensured with implementation of **LAND-7** and **8.**

- Project-specific impacts, if mitigated as proposed in the conditions of certification, would not significantly contribute to any cumulative impact that could result when combined with other proposed wind and solar projects proposed in the region. However, that does not preclude the possibility that cumulative impacts from other proposed projects could be significant.

C.5.4.2.4 NEPA Compliance

Under Alternative 3:

- The effects on the agricultural resource value of established federal rangelands within the California Desert Conservation Area are minor, both locally and regionally and do not exceed the significance thresholds for livestock grazing (WEMO, p.4-3).
- The effects on recreational activities and resources would be locally substantial, but relatively minor from a regional perspective. The project would result in a loss of access to an area of historic local recreational importance. This would constitute a significant impact under WEMO (WEMO, p.4-3). Staff has proposed Conditions of Certification **LAND-1** through **LAND-6** that, if fully implemented, would substantially reduce potential impacts to recreational resources and their use.
- The effects on recreational resources within the established Wilderness areas and public access to those resources would be minor and do not exceed any established threshold of significance.
- Project activities at all phases of construction, operation, and closure would conform to BLM plans, policies, and procedures, through implementation of the NEPA and CDCA Amendment process. Staff has also proposed Conditions of Certification **LAND-7** and **8** that, if fully implemented, would ensure consistency with applicable local and state land use LORS.
- If all proposed solar and wind projects currently licensed or pending on BLM lands in the Indian Wells Valley are actually constructed, along with the attendant loss of recreational access, the loss, in conjunction with the impact from this project, would be substantial and, possibly, immitigable., especially in the southern and western portions of the El Paso subregion. However, with implementation of the proposed Conditions of Certification, the project would not substantially contribute to these potential cumulative impacts.

C.5.4.2.5 Alternative 4

Alternative 4 is Alternative 1, as originally proposed. It would also be located at the proposed project site and is being analyzed because it would reduce the amount of land developed within the Mojave Ground Squirrel Conservation Area and would transmit the full megawatts of power that Solar Millennium has requested.

Alternative 4 would consist of 278 solar array loops, with a net generating capacity of approximately 250 MW and would occupy approximately 1,760 acres of land. This alternative would occupy ~755 acres north of Brown Road and ~685 acres south of Brown Road. The transmission interconnection would be 1,250 feet in length. The boundaries of Alternative 4 are shown in **Alternatives Figure 3**. This project footprint

contains two desert ephemeral washes that would require redirection and smaller dry desert washes that traverse the site. In addition, this site is the location of prime desert tortoise and the MGSCA.

The bioremediation unit would be located north of Brown Road, within the proposed project footprint and the power block and ancillary facilities would be located south of Brown Road on approximately 18 acres, in addition to the transmission line and switch-yard (5.5 acres). Alternative 4 would require the relocation of the two existing SCE transmission lines.

C.5.4.4.1Assessment of Impacts and Discussion of Mitigation

Agriculture and Rangeland

Alternative 4 would limit the loss of grazing land within the Cantil Commons allotment to approximately 1,775.7 acres. The level of impact is comparable to Alternative 1 (see C.5.4.5.1).

Wilderness and Recreation

Recreational impacts discussed in Alternative 1 (see C.5.4.5.2.2) apply to this alternative as well. Conditions of certification **LAND-1** through **LAND-8** would apply and would substantially reduce any potential impacts to recreational use and access.

The remaining residual impacts to recreational access to and use of the federal recreational lands within and around the proposed project site would be:

- Temporary loss of public access along EP0222, to the south, during construction of the transmission line realignment and new road segment.
- Degradation of the “dark sky” conditions surrounding the project site with installation of on-site security and operational lighting.
- Loss of approximately four miles of casual use trails throughout the project footprint.
- Temporary loss of or interference with access to public lands for parking and staging areas along 1.25 miles of Brown Road, east and west of the project footprint, during project construction.
- Permanent loss of access to public lands for parking and staging areas along 1.59 miles of Brown Road, on both sides, within the project footprint and outside of the Kern County Brown Road ROW.
- Temporary loss of or interference with access to approximately four miles of Brown Road and routes/trails that require access from Brown Road, during project construction (partially compensated for with implementation of **LAND-6**).
- Continued unauthorized (casual) use of the decommissioned trails, following rehabilitation, until the area is reclaimed by the desert.

Impacts to Wilderness access and resources would remain less than significant.

Cumulative Land Use Effects

As with Alternative 1, the project would not, with full implementation of all applicable conditions of certification, have a measurable cumulative land use impact.

C.5.4.4.2 CEQA Level of Significance

Under Alternative 4:

- Impacts to agriculture area would be less than significant.
- Impacts to recreation would be less than significant with the implementation of **LAND-1** through **LAND-6**.
- Consistency with federal, state, and local LORS would be ensured with implementation of **LAND-5**, **7,** and **8**.
- Project-specific loss of grazing land use and access would not significantly contribute to any cumulative agricultural or rangeland impact.
- Project-specific recreational access impacts, if mitigated as proposed in the conditions of certification, would not significantly contribute to any cumulative recreational impact that could result when combined with other proposed wind and solar projects proposed in the southern portion of the El Paso subregion. However, that does not preclude the possibility that cumulative impacts to recreational access from other projects could be significant.

C.5.4.5.6 NEPA Compliance

Under Alternative 4:

- The effects on the agricultural resource value of established federal rangelands within the California Desert Conservation Area are minor, both locally and regionally and do not exceed the significance thresholds for livestock grazing (WEMO, p.4-3).
- The effects on recreational activities and resources would be locally substantial, but relatively minor from a regional perspective. The project would result in a loss of access to an area of historic local recreational importance. This would constitute a significant impact under WEMO (WEMO, p.4-3). Staff has proposed Conditions of Certification **LAND-1** through **LAND-6** that, if fully implemented, would substantially reduce potential impacts to recreational resources and their use.
- The effects on recreational resources within the established Wilderness areas and public access to those resources would be minor and does not exceed any established threshold of significance.
- Project activities at all phases of construction, operation, and closure would conform with BLM plans, policies, and procedures, through implementation of the NEPA and CDCA Amendment process. Staff has also proposed Conditions of Certification **LAND-7** and **8** that, if fully implemented, would ensure consistency with applicable local and state land use LORS.
- If all proposed solar and wind projects currently licensed or pending on BLM lands in the Indian Wells Valley are actually constructed, along with the attendant loss of recreational access, the loss, in conjunction with the impact from this project, would

be substantial and, possibly, immitigable., especially in the southern and western portions of the El Paso subregion. However, with implementation of the proposed Conditions of Certification, the project would not substantially contribute to these potential cumulative impacts.

C.5.4.5.7 Alternative 5

With Alternative 5, the No Project/No Action Alternative, the proposed action would not be undertaken. Unless BLM implements an amendment to the CDCA Plan, the BLM land on which the project is proposed would continue to be managed within BLM's framework of a program of multiple use and sustained yield, and the maintenance of environmental quality in conformance with applicable statutes, regulations, policies, and land use plans. The No Action alternative is the only alternative that must be analyzed in an EIS that does not respond to the purpose and need for the action.

The No Project Alternative under CEQA or the No Action Alternative under NEPA defines the scenario that would exist if the proposed Ridgecrest Solar Power Project were not constructed. The CEQA Guidelines state that "the purpose of describing and analyzing a 'no project' alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project" (Cal. Code Regs., tit. 14 § 15126.6(i)). The No Project analysis in this SA/Draft EIS considers existing conditions and "what would be reasonably expected to occur in the foreseeable future if the project were not approved…" (Cal. Code Regs, tit. 14 § 15126.6(e)(2)). Under NEPA, the No Action Alternative is used as a benchmark of existing conditions by which the public and decision makers can compare the environmental effects of the proposed action and the alternatives.

If the No Project/No Action Alternative were selected, the construction and operational impacts of the Ridgecrest Solar Power Project would not occur. There would be no grading of the site, no loss of resources or disturbance of approximately 1944 acres of desert habitat, no impacts to cultural resources, and no installation of power generation and transmission equipment.

C.5.4.5.7.1 No Action on Ridgecrest Solar Power Project and amend the CDCA land use plan to make the area available for future solar development.

Under this alternative, the proposed RSPP would not be approved by the Energy Commission, but BLM would amend the CDCA Land Use Plan to specifically allow solar projects on the site. Although speculative, it is possible that another solar energy project could be constructed on the project site. However, any future proposals would encounter the same environmental issues as the proposed project.

The results of the No Project/No Action Alternative would be the following:

- The impacts of the proposed project would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project.
- The benefits of the proposed project in reducing greenhouse gas emissions from gas-fired generation would not occur. Both State and Federal law support the increased use of renewable power generation.

If this project is not approved, renewable projects would likely be developed on other sites in the Mojave Desert or in adjacent states as developers strive to provide renewable power that complies with utility requirements and State/Federal mandates.

C.5.4.5.7.2 No Action on Ridgecrest Solar Power Project application and amend the CDCA land use plan to make the area unavailable for future solar development.

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designations in the CDCA Land Use Plan, as amended by WEMO. There would be no loss of recreational access or use, loss of grazing land, or any other project-related impacts.

C.5.4.5.1 Setting and Existing Conditions

The land use setting for the No Project/No Action Alternative is the same as that identified for the proposed project site and associated linear facilities.

C.5.4.5.2 Assessment of Impacts and Discussion of Mitigation

With the No Project /No Action Alternative, no project-related impacts would occur.

C.5.4.5.3 CEQA Level of Significance

Under the No Project/No Action alternative, land use impacts to the proposed project site and area would be similar as those currently occurring under the existing conditions in the area. Land use impacts currently occurring would continue and existing issues of development, growth, recreational impact, loss of agricultural land, and climate change would not be altered or disrupted by any project-related impacts. No impact.

C.5.4.5.4 NEPA Compliance

As with the CEQA Level of Significance discussed above, existing issues and concerns would continue without the influence of any project-related impacts.

C.5.4.6 ALTERNATIVE 6 (A & B)

These alternatives are not sited on public lands and are only subject to review under CEQA. See the **ALTERNATIVES** section of this SA/Draft EIS for the CEQA analysis of these alternatives.

C.5.4.7 COMPARISON OF ALTERNATIVES AND PROPOSED PROJECT

Land Use Table 7
Comparison of Proposed Project and Alternatives*

Impact Would the project:	Alternative 1 Proposed Project (250MW)	Alternative 2 Northern Unit (146 MW)	Alternative 3 Southern Unit (104 MW)	Alternative 4 Original Proposed Project (250MW)	Alternative 5 No Action/No Project**
Convert Farmland to non-agricultural uses	No impact	No impact	No impact	No impact	No impact.
Conflict with existing agricultural zoning or a Williamson Act contract	Transitory impacts to agricultural uses on properties adjoining the proposed waterline alignment No impact on Williamson Act contract	Transitory impacts to agricultural uses on properties adjoining the proposed waterline alignment No impact on Williamson Act contract	Transitory impacts to agricultural uses on properties adjoining the proposed waterline alignment No impact on Williamson Act contract	Transitory impacts to agricultural uses on properties adjoining the proposed waterline alignment No impact on Williamson Act contract	No impact
Other changes that would convert Farmland or forest land to other uses	No impact	No impact	No impact	No impact	No impact
Disrupt agricultural activities or reduce agricultural resource value on established federal rangelands in the CDCA	Remove ~2,000 acres from Cantil Commons grazing allotment and agricultural use Remove access and staging areas along 1.59 miles of Brown Road	Remove ~825 acres from Cantil Commons grazing allotment and agricultural use Remove access and staging areas along 1.59 miles on north side of Brown Road	Remove ~1,076.8 acres from Cantil Commons grazing allotment and agricultural use Remove access and staging areas along 1.59 miles on south side of Brown Road	Remove ~1,775.7 acres from Cantil Commons grazing allotment and agricultural use Remove access and staging areas along 1.59 miles of Brown Road	No impact
Increase use or require expansion of existing recreational facilities	No impact	No impact	No impact	No impact	No impact

Impact Would the project:	Alternative 1 Proposed Project (250MW)	Alternative 2 Northern Unit (146 MW)	Alternative 3 Southern Unit (104 MW)	Alternative 4 Original Proposed Project (250MW)	Alternative 5 No Action/No Project**
Disrupt activities in established recreation or wilderness areas	Loss of established recreational sites Degrade dark sky conditions Loss of 4 miles of established routes/trails Temporary loss of access to parking/staging areas along 1.25 miles of Brown Rd. Permanent loss of access to parking/staging areas along 1.59 mi on both sides of Brown Rd. Temporary loss of public access to EP0222, south of Brown Rd. Temporary loss of unlimited access to four miles along Brown Rd during project construction Continued casual use of decommissioned portions of routes/trails following rehabilitation, until area is reclaimed by the desert Temporary interference with access to EP0236, EP02265, and unnamed routes (A) and (B)	Degrade dark sky conditions Loss of 1.5 miles of established routes/trails Temporary loss of access to parking/staging areas along 1.25 miles of Brown Rd. Permanent loss of access to parking/staging areas along 1.59 mi on north side of Brown Rd. Temporary loss of unlimited access to four miles along Brown Rd during project construction Continued casual use of decommissioned portions of routes/trails following rehabilitation, until area is reclaimed by the desert Temporary interference with access to EP0236, EP02265, and unnamed routes (A) and (B)	Loss of established recreational sites Degrade dark sky conditions Loss of 3-1/2 miles of established routes/trails Temporary loss of access to parking/staging areas along 1.25 miles of Brown Rd. Permanent loss of access to parking/staging areas along 1.59 mi on south side of Brown Rd. and 0.5 mi on north side. Temporary loss of public access to EP0222, south of Brown Rd. Temporary loss of unlimited access to four miles along Brown Rd during project construction Continued casual use of decommissioned portions of routes/trails following rehabilitation, until area is reclaimed by the desert Temporary interference with access to EP0236, EP02265, and unnamed routes (A) and (B)	Loss of established recreational sites Degrade dark sky conditions Loss of 4 miles of established routes/trails Temporary loss of access to parking/staging areas along 1.25 miles of Brown Rd. Permanent loss of access to parking/staging areas along 1.59 mi on both sides of Brown Rd. Temporary loss of public access to EP0222, south of Brown Rd. Temporary loss of unlimited access to four miles along Brown Rd during project construction Continued casual use of decommissioned portions of routes/trails following rehabilitation, until area is reclaimed by the desert Temporary interference with access to EP0236, EP02265, and unnamed routes (A) and (B)	No impact

Impact Would the project:	Alternative 1 Proposed Project (250MW)	Alternative 2 Northern Unit (146 MW)	Alternative 3 Southern Unit (104 MW)	Alternative 4 Original Proposed Project (250MW)	Alternative 5 No Action/No Project**
Reduce important resource values of recreational facilities or wilderness areas	Substantially reduce biological resource values of area (desert tortoise; genetic diversity of MGS) Substantially reduce the visual quality and character of the area	Substantially reduce biological resource values of area (desert tortoise; genetic diversity of MGS) Substantially reduce the visual quality and character of the area	Substantially reduce biological resource values of area (desert tortoise; genetic diversity of MGS) Substantially reduce the visual quality and character of the area	Substantially reduce biological resource values of area (desert tortoise; genetic diversity of MGS) Substantially reduce the visual quality and character of the area	No impact
Affect qualities or change the characteristics of a wilderness area or study area	No impact	No impact	No impact	No impact	No impact
Divide an established community	Minor impact to access to/from private land holdings to Brown Rd.	Minor impact to access to/from private land holdings to Brown Rd.	Minor impact to access to/from private land holdings to Brown Rd.	Minor impact to access to/from private land holdings to Brown Rd.	No impact
Disrupt an existing or approved land use	Impact to natural resource uses (desert tortoise habitat and MGSCA; see Biological Resources) Disrupt use of significant Native American sacred trails Create potential aviation hazard to sailplanes overflying thermal plume Permanent loss of project footprint for future recreational and natural resource uses	Impact to natural resource uses (desert tortoise habitat; see Biological Resources) Create potential aviation hazard to sailplanes overflying thermal plume Permanent loss of project footprint for future recreational and natural resource uses	Impact to natural resource uses (MGSCA; see Biological Resources) Disrupt use of significant Native American sacred trails Create potential aviation hazard to sailplanes overflying thermal plume Permanent loss of project footprint for future recreational and natural resource uses	Impact to natural resource uses (desert tortoise habitat and MGSCA; see Biological Resources) Disrupt use of significant Native American sacred trails Create potential aviation hazard to sailplanes overflying thermal plume Permanent loss of project footprint for future recreational and natural resource uses	No impact

Impact Would the project:	Alternative 1 Proposed Project (250MW)	Alternative 2 Northern Unit (146 MW)	Alternative 3 Southern Unit (104 MW)	Alternative 4 Original Proposed Project (250MW)	Alternative 5 No Action/No Project**
Induce population growth in the area	Possible increase in development along proposed waterline alignment	Possible increase in development along proposed waterline alignment	Possible increase in development along proposed waterline alignment	Possible increase in development along proposed waterline alignment	No impact
Comply with all applicable local, state, and federal LORS	No impact, with amendment to the CDCA	No impact, with amendment to the CDCA	No impact, with amendment to the CDCA	No impact, with amendment to the CDCA	No impact
Contribute to cumulatively considerable impacts, when considered with past, present, and foreseeable future projects	No impact	No impact	No impact	No impact	No impact
Ranking of Alternatives***	(3)	(2)	(4)	(5)	(1)

* Residual impacts after full implementation of Conditions of Certification **LAND 1** through **LAND-8**
**All No Project/No Action alternatives assume that the RSPP project would not be built on the proposed site
***Does not include Alternatives 6a and 6b

C.5.5 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

Should the Energy Commission approve the project and the BLM approve the ROW, the following measures are recommended as conditions of certification and approval.

LAND-1 The project owner shall realign EP0222 (SCE transmission line access road), consistent with the proposed SCE transmission line reroute. The decommissioned portion of the route shall be remediated to desert conditions, consistent with BLM requirements. The new route segment shall be constructed consistent with existing route conditions, along with any signage necessary for public safety, as determined by BLM and Southern California Edison (SCE). Upon completion, the new route segment shall remain open to public use. The project owner shall provide appropriate bonding or other assurances to ensure rehabilitation of the identified decommissioned access route would be provided by the project owner.

Verification: Within 90 days prior to completion of the rerouting of the SCE transmission lines and construction of the new maintenance access road segment, the project manager shall provide a closure and rehabilitation plan for the decommissioned route segment to BLM for review and comment, and to the CPM for review and approval.

Within 90 days following the completion of rehabilitation, the project owner shall provide photo/videotape documentation to BLM and the CPM that the identified route has been removed and the area remediated. If a maintenance plan is included in the closure and rehabilitation plan, reports of the success of the rehabilitation process shall be included with the annual report to the CPM.

LAND-2 The project owner shall close or block all designated routes and casual trails that would dead-end at the project fenceline, once the fencing is in place, from the project fenceline to the first intersection of an existing through trail outside the project boundaries (see Figure C.5-8). All route/trail removal and rehabilitation shall be consistent with the criteria developed by BLM civil engineering staff, and shall be completed in a manner that would effectively eliminate motorized vehicle use on that portion of said routes/trails. Disturbed areas of trail alignment shall be remediated to desert conditions within 180 days or as approved by BLM and the CPM. The project owner shall provide for appropriate bonding or other assurances to ensure closure and rehabilitation of the identified routes/trails.

Verification: Within 90 days following completion of construction of the project site fencing, the project owner shall submit a decommissioning plan focused on removal and rehabilitation of the identified roads/trails, to BLM for review and comment, and to the CPM for review and approval.

Rehabilitation of the trails outside the project fenceline, consistent with the approved plan, shall be completed within 180 days of completion of any construction work that could impact success of the rehabilitation process. Within 30 days following the completion of rehabilitation, the project owner shall provide photo/videotape

documentation to BLM and the CPM that the identified OHV roads/trails have been removed and the area remediated. If a maintenance plan is included in the closure and rehabilitation plan, reports of the success of the rehabilitation process shall be included with the annual report to the CPM.

LAND-3 The project owner shall avoid impacts to all trails outside the proposed project footprint during construction, including the two existing trails within the El Paso Wash and box culvert crossing connectivity beneath Brown Road, to the extent feasible. Trails within the original ROW, but expected to be outside the final project footprint (except as identified in **Land-2** above), shall be documented prior to the start of construction and repaired to pre-project condition, pursuant to BLM requirements, as follows:

- Documentation of the pre-construction condition of above identified roads/trails from the Brown Road encroachment to the destination or project boundaries. Prior to the start of site mobilization, the project owner shall provide photographs or videotape of the identified roads/trails to the CPM.
- Provide for appropriate bonding or other assurances to ensure that any damage to identified roads/trails due to construction activities will be remedied by the project owner; and
- Reconstruction of portions of identified roads/trails (except as identified in **LAND- 2** above) that are damaged by project construction to pre-project condition.

Verification: At least 90 days prior to the start of site mobilization, the project owner shall submit a mitigation plan focused on restoring the BLM-identified roads/trails to their pre-project condition for review and comment to BLM and the CPM for review and approval.

Repairs to the trails, consistent with the approved plan, shall be completed within 180 days from completion of project construction. Within 90 days following the completion of repairs, the project owner shall provide photo/videotape documentation to BLM and the CPM that the damaged sections of the identified OHV roads/trails have been restored to their pre-project condition.

LAND-4 The project owner shall improve the existing trail along the former Southern Pacific Railroad ROW, south from its intersection with Brown Road, for approximately three miles, to the intersection with BLM-designated trails EP0421, 0429, and 0440, as necessary to accommodate year-round, non-motorized use. The project owner shall coordinate closely with BLM and CPM to identify necessary trail repairs and consistency with BLM trail construction standards and BMPs, and to obtain any necessary permit or ROW for construction. At a minimum, the project owner shall improve the existing trail to all-weather standards and a width of approximately eight feet wide, consistent with shared use requirements; and shall repair, upgrade, and/or replace existing raised berms, bridges, and stormwater conveyances and construct new facilities as necessary to maintain continuity and safety for the length of the trail. The project owner shall also install an informational kiosk at

the trail's Brown Road intersection, mileage markers at ½-mile increments, and an interpretive panel on the project at a viewing point along the trail. In addition, the project owner shall provide annual trail maintenance for the life of the project. Appropriate bonding or other assurances to ensure trail construction and maintenance shall also be provided by the project owner.

Verification: Within 120 days prior to the closure of the powerline access road (EP0222) to public access during transmission line and road realignment, the project owner shall submit a construction plan for an all-weather, year-round trail along the existing decommissioned railroad ROW south, from its intersection with Brown Road, for approximately three miles, to the intersection with BLM-designated trails EP0421, 0429, and 0440, to BLM for review and comment, and to the CPM for review and approval. Plans shall be consistent with BLM guidelines and trail construction BMPs. The trail shall be, at a minimum, eight feet wide, unless prescribed by terrain, with mileage markers at ½-mile increments, an informational panel at the trail's Brown Road intersection, and an interpretive panel with information regarding the project at a viewing point along the trail.

Once approved, trail construction shall begin at least 90 days prior to the temporary closure of EP0222 and shall be completed no later than 30 days following closure of EP0222 for realignment and transmission line construction. Within 30 days following the completion of trail construction, the project owner shall provide photo/videotape documentation to BLM and the CPM that the trail is completed, consistent with the approved construction plan, and shall post the appropriate bond to ensure continued trail maintenance during the life of the project.

LAND-5 The project owner shall construct a bicycle lane connecting to the existing bicycle path at the S. China Lake Blvd/Downs Rd. intersection and continuing south to S. China Lake Blvd/Hwy 395 intersection, within the existing S. China Lake Blvd. ROW. The path shall be constructed consistent with Ridgecrest/Kern County existing bicycle lanes and the Highway Design Manual, Chapter 1000 Bikeway Planning and Design. The project owner shall apply and receive approval of the applicable encroachment permit/franchise agreement(s) with Kern County and City of Ridgecrest for use of the ROW, in conjunction with approval for installation of the proposed waterline within the same ROWs, and shall comply with Kern County and City of Ridgecrest limitations for encroachment(s) into public rights-of-way. The project owner shall provide design plans and other required information, as specified by Kern County and City of Ridgecrest for similar projects, to Kern County and City of Ridgecrest Planning Departments for review, and to the CPM for review and approval, prior to the start of construction. Following completion, the bicycle path shall become the property of Kern County or the City of Ridgecrest, consistent with existing jurisdiction.

Note: Any construction outside the existing Kern County/City of Ridgecrest ROWs onto BLM land shall require an additional ROW from BLM prior to the start of any construction.

Verification: At least 90 days prior to the start of waterline/bicycle path construction, the project owner shall submit design plans and any applicable application(s) for permits

or franchise agreement to Kern County, the City of Ridgecrest, and CPM for review and approval.

At least 30 days prior to the start of waterline/bike path construction, the project owner shall provide copies of all encroachment permits and/or franchise agreements with Kern County and/or the City of Ridgecrest for use of the S. China Lake Blvd. ROW for bicycle path construction. The project owner shall also provide copies of any correspondence from Kern County or the City of Ridgecrest regarding permitting or construction of the proposed bike path to the CPM within 10 days of receipt or with the Monthly Compliance Report, whichever occurs first.

LAND-6 The project owner shall construct a temporary bicycle/pedestrian trail (alternative access) along and parallel to Brown Road, from the Hwy 395/Brown Road intersection to one-quarter mile beyond the farthest construction access point on Brown Road. The path shall provide a stable, all-weather, pedestrian/bicycle-friendly surface, but shall not be paved. It shall be available at least 10 days prior to the start of site preparation and construction and removed following start of plant operations.

The project owner shall apply and receive approval of the applicable encroachment permit/franchise agreement(s) with Kern County and for use of the road ROW, if applicable, and shall comply with Kern County limitations for encroachment(s) into public rights-of-way. The project owner shall provide design plans and other required information, as specified by Kern County for similar projects, to the Kern County Planning Department for review, and to the CPM for review and approval, prior to the start of construction.

Note: Any construction outside the existing Kern County road ROW or BLM project ROW onto BLM land or private property shall require an additional ROW from BLM or permission from the landowner prior to the start of any construction.

Verification: At least 90 days prior to the start of site preparation or construction, the project owner shall submit design plans and any applicable application(s) for permits or franchise agreement to Kern County and CPM for review and approval.

At least 30 days prior to the start of path construction, the project owner shall provide copies of all encroachment permits and/or franchise agreements with Kern County for use of the Brown Road ROW for bicycle path construction. The project owner shall also provide copies of any correspondence from Kern County regarding permitting or construction of the proposed bike path to the CPM within 10 days of receipt or with the Monthly Compliance Report, whichever occurs first.

LAND-7 The project owner shall modify the project's equipment and radio frequency use as necessary to avoid interference with Department of Defense (DOD) military activities, in consultation with the DOD R-2508 Complex Sustainability Office. DOD recommendations, including substitution or modification of equipment or operations, shall be fully implemented prior to or in conjunction with the installation and operation of electronic systems that could result in frequency interference. Prior to the start of operations, the project owner shall

provide, to the CPM, written confirmation from DOD that the frequency spectrum usage for the project, as modified, would not interfere with DOD activities.

Verification: At least 90 days prior to the scheduled installation of any equipment capable of producing frequencies that could interfere with DOD operations, the project operator shall consult directly with the DOD R-2508 Complex Sustainability Office and provide details of said equipment to the DOD staff and CPM for evaluation. The project owner shall provide complete information concerning any intended changes to previously approved equipment, project design, or operational procedures; and all correspondence between the project owner, facilities personnel, and DOD representatives to the CPM for review and approval at least 30 days prior to any scheduled equipment installation date or start of operations, whichever occurs first. DOD recommendations, including substitution or modification of equipment or operations, shall be fully implemented prior to or in conjunction with the installation of electronic systems that could result in frequency interference. Copies of any additional correspondence shall be provided to the CPM within 10 days of receipt. The project owner shall provide written verification from DOD to the CPM that the frequency spectrum usage, as modified, would not interfere with DOD activities and that all equipment, installation, and operational procedures comply with DOD requirements at least 10 days prior to the start of operations.

LAND 8 The project owner shall obtain a Right-of-Way Grant (ROW Grant) from the Bureau of Land Management (BLM), encompassing the complete project footprint, including established fenceline buffer areas, access roads, and associated utility and transmission line alignments and corridors. An approved Plan of Development shall be made a part of the right-of-way grant. Any relocation, additional construction, or use that is not in accord with the approved Plan(s) of Development and Energy Commission licensing and certification requirements shall not be initiated without the prior written approval of BLM's Authorized Officer and the CPM.

Verification: At least 30 days prior to the start of construction and prior to any Notice to Proceed with construction issued by BLM's Authorized Officer and the CPM, the project owner shall provide BLM's Authorized Officer and the CPM with documentation of the following:

A. BLM's ROW Grant and final approved Plan of Development;

B. The bond satisfactory to BLM's Authorized Officer;

C. Certification that the project owner acknowledges that the project's development and all related construction, operation, maintenance, and closure activities shall be conducted in conformance with the approved Plan of Development and Energy Commission licensing requirements, and within the approved ROW boundaries for the life of the project.

C.5.12 CONCLUSIONS

Energy Commission staff has determined the following, based on analyses cited in other sections of this document and consideration of the uses, land use designations for the project site and surrounding locations, and applicable land use laws, regulations, ordinances, and standards:

1. The proposed project area is located on public land (federal land) administered by the U.S. Bureau of Land Management (BLM), except for the proposed waterline alignment along S. China Lake Blvd. and Brown Road.

2. The proposed project is within the California Desert Conservation Area (CDCA) Plan area. The project area is in the Unclassified and "Multiple-Use Class L" land use categories, except the waterline alignment, which would be within the Kern County road ROWs. The Unclassified land use category allows electrical generation plants in accordance with federal, state, and local laws subject to approval of a CDCA Plan Amendment by the BLM; Class L also allows electrical generation plants, subject to conformance with all NEPA requirements.

3. The proposed project and the proposed overhead transmission line route require the BLM's approval of an Amendment to the California Desert Conservation Area Plan and issuance of a Right of Way grant. With the BLM's approval, the project would be consistent with the CDCA Plan.

4. The proposed project would be consistent with all other applicable LORS with implementation of **LAND-5** through **LAND-7**.

5. The proposed project would not result in the conversion of Farmland or forest land to non-agricultural uses. It also would not conflict with any agricultural zoning or existing Williamson Act contracts.

6. The project is not located in or adjacent to a designated federal wilderness area or wilderness study area, nor would it impact wilderness area resources or qualities.

7. The project would disrupt activities agricultural activities on established federal rangelands, resulting in a loss of approximately 2,000 acres of grazing land within the Cantil Commons grazing allotment and some loss of staging areas and access for permittees using that allotment. However, the allotment encompasses over 200,000 acres and there are sufficient alternative staging and access areas in other accessible locations, so the loss would not be considered substantial or significant.

8. The proposed project would not conflict with a habitat conservation plan approved by the U.S. Fish and Wildlife Service, or a natural community conservation plan approved by the California Department of Fish and Game. It would, however, have a significant, potentially immitigable impact on the Mojave Ground Squirrel Conservation Area, as identified in the CDCA, West Mojave Plan, and identified Desert Tortoise habitat. (See **BIOLOGICAL RESOURCES**.)

9. The proposed project would have no significant impact on existing neighborhood and regional parks or other recreational facilities.

10. The proposed project would directly and indirectly disrupt activities in an established federal recreation area. However, full implementation of conditions of certification **LAND-1** through **LAND-6** would substantially reduce these impacts (to a less than significant level under CEQA).

11. The project would substantially reduce the scenic and biological resource value of a federal recreation facility (see #7 above).

12. The proposed project does not divide the physical arrangement of an established community.

13. Impacts to existing land uses would be less than significant under CEQA, consisting of temporary inconveniences during the construction process.

14. The project is incompatible with existing natural resource uses and scenic character of the proposed project site and surrounding area. These impacts are considered substantial (significant under CEQA) and may not be mitigable. (See #7 above.) Loss of the land within the project footprint for future recreational, agricultural, or natural resource use is unavoidable.

15. The project would present a potential hazard to sailplanes using the airspace above the project and eliminate many of the existing recreational uses. However, full implementation of conditions of certification would significantly reduce the potential impacts (to a less than significant level under CEQA).

16. The project may contribute to increased development adjacent to the proposed waterline alignment along S. China Lake Blvd., as public water becomes available to that area. However, the increase in population would not be considerable or significantly contribute to growth. Less than significant under CEQA.

17. The potential CEQA impacts associated with “Land Use and Planning,” “Agriculture and Forest Resources” and “Wilderness and Recreation” with the implementation of Alternatives 2-5 are anticipated to be similar to the proposed project.

18. Impacts associated with the proposed project or other alternatives would not, with full implementation of the applicable conditions of approval, contribute significantly to any cumulative land use or recreation impacts.

C.5.13 REFERENCES

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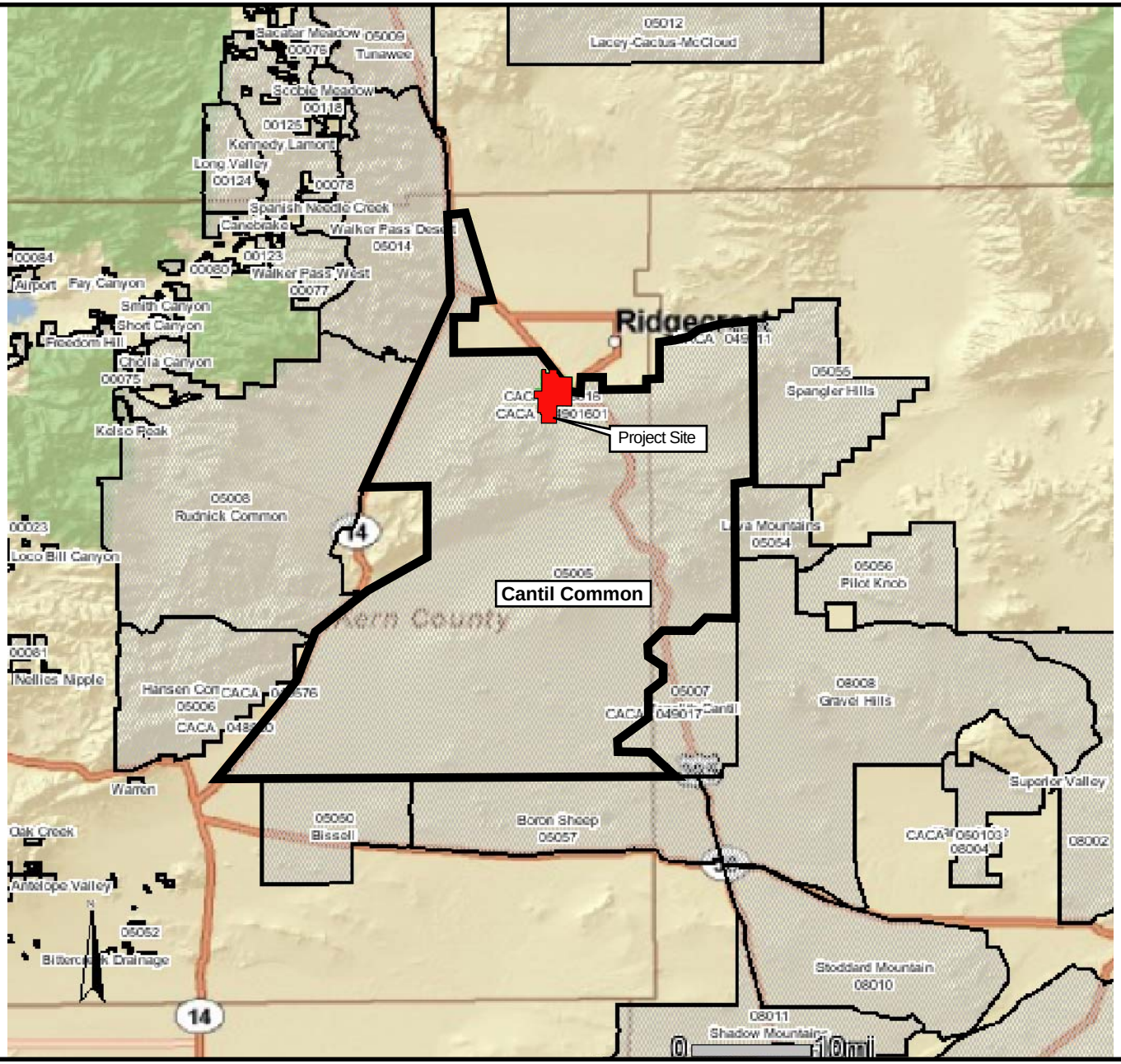
LAND USE- FIGURE C.5-1

Ridgecrest Solar Power Project - Cantil Common Rangeland Grazing Allotment

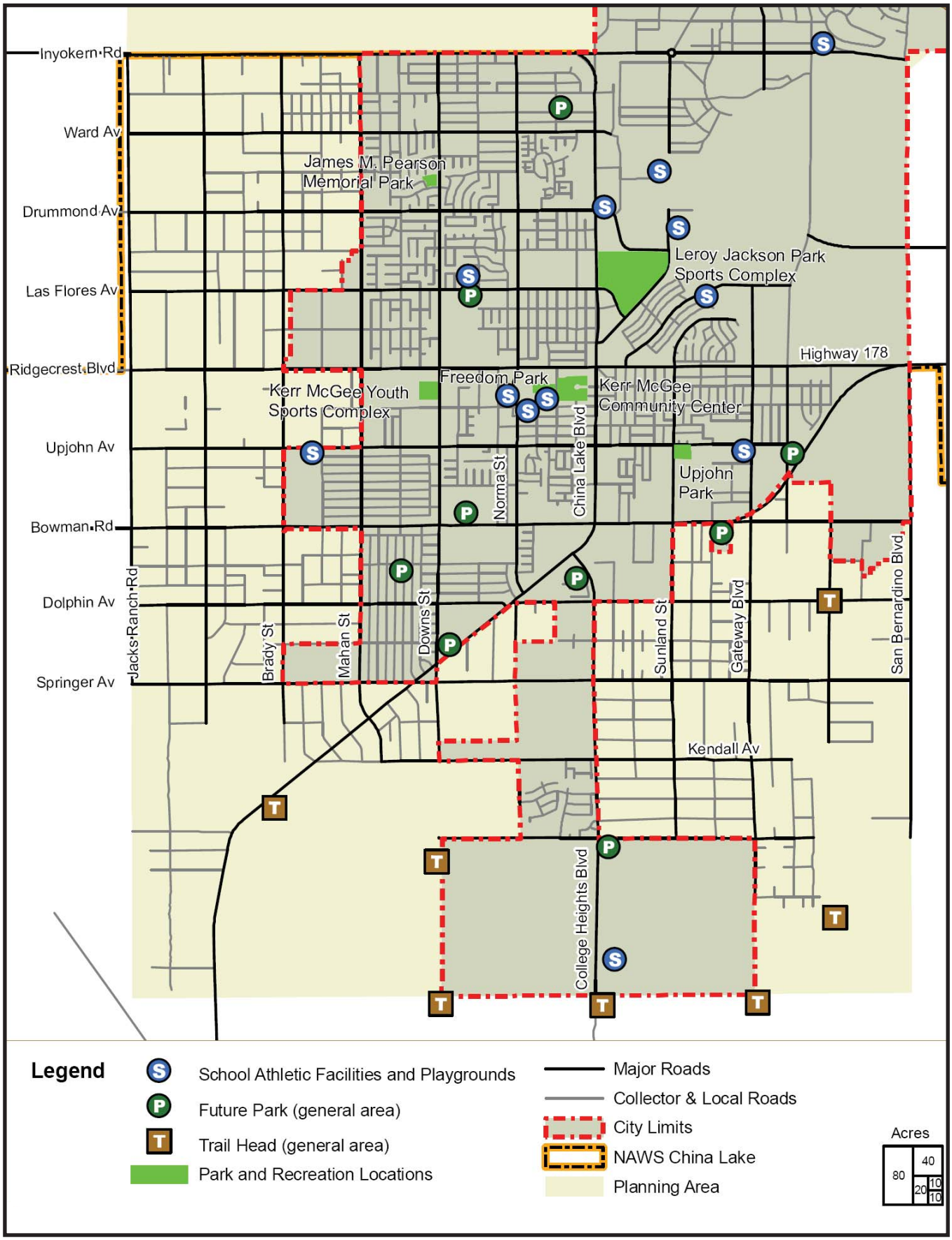


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: BLM 2010(b); http://www.geocommunicator.gov/blmMap/Map.jsp?MAP=LAND

LAND USE - FIGURE C.5-2

Ridgecrest Solar Power Project - City of Ridgecrest Parks and Recreational Venues



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: City of Ridgecrest Parks and Recreation Plan Figure 7-1 (COR 2010(a), p.7-15)

LAND USE - FIGURE C.5-3

Ridgecrest Solar Power Project - Vicinity Aerial Map of CLAS Star Party Location Within RSPP Site Boundaries

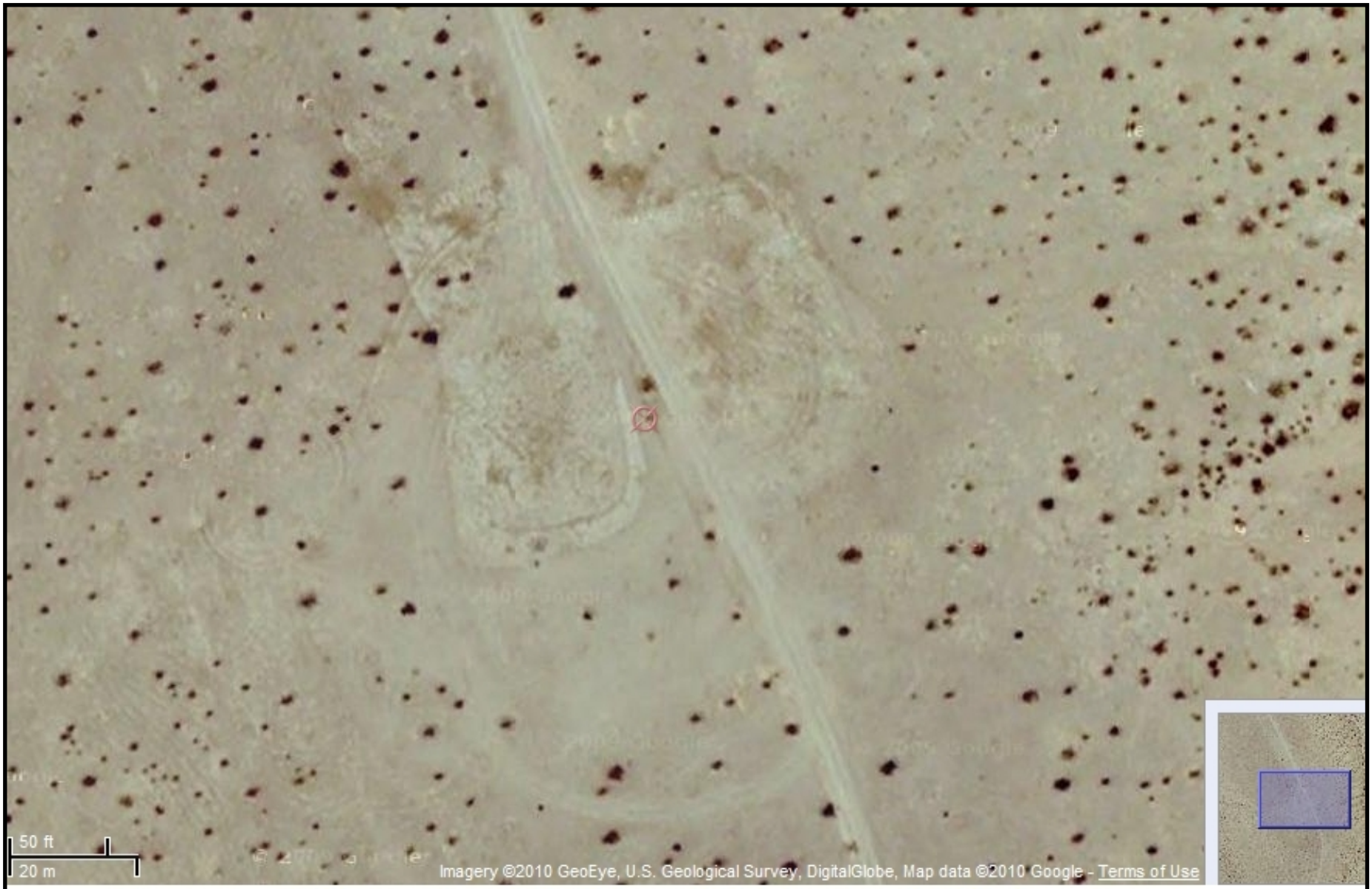
(Map center is at (WGS84 datum) Lat = 35.551748, Lon = -117.748493, which is 78.338 Km from path center.)

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Earl Wilson, President - China Lake Astronomical Society (CLAS)

LAND USE - FIGURE C.5-4

Ridgecrest Solar Power Project - Close-up Aerial View of CLAS Star Party Location Within RSPP Site Boundaries



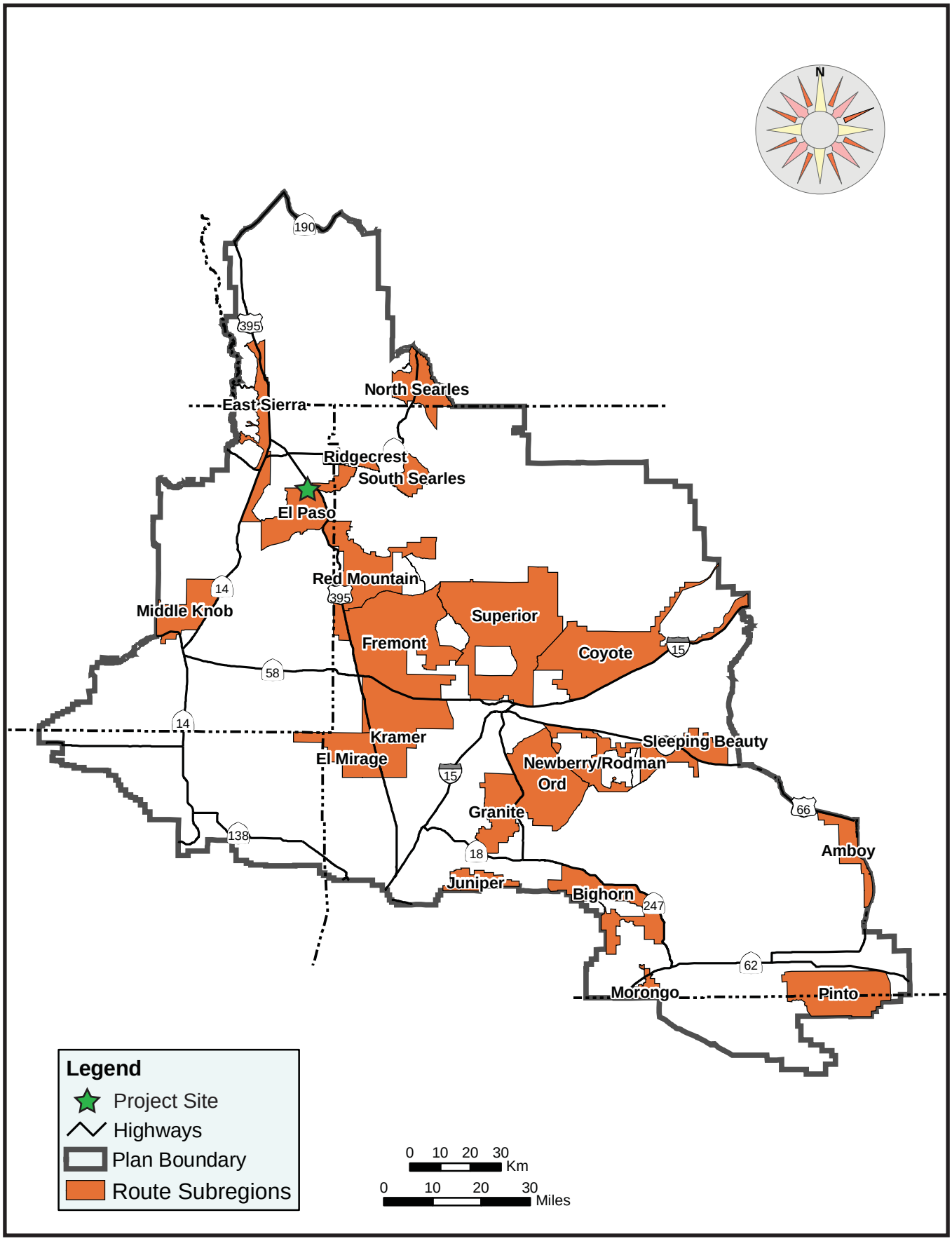
(Map center is at (WGS84 datum) Lat = 35.551748, Lon = -117.748493, which is 78.338 Km from path center.)

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Earl Wilson, President - China Lake Astronomical Society (CLAS)

LAND USE - FIGURE C.5-5

Ridgecrest Solar Power Project - Public Land Motorized Vehicle Access Network

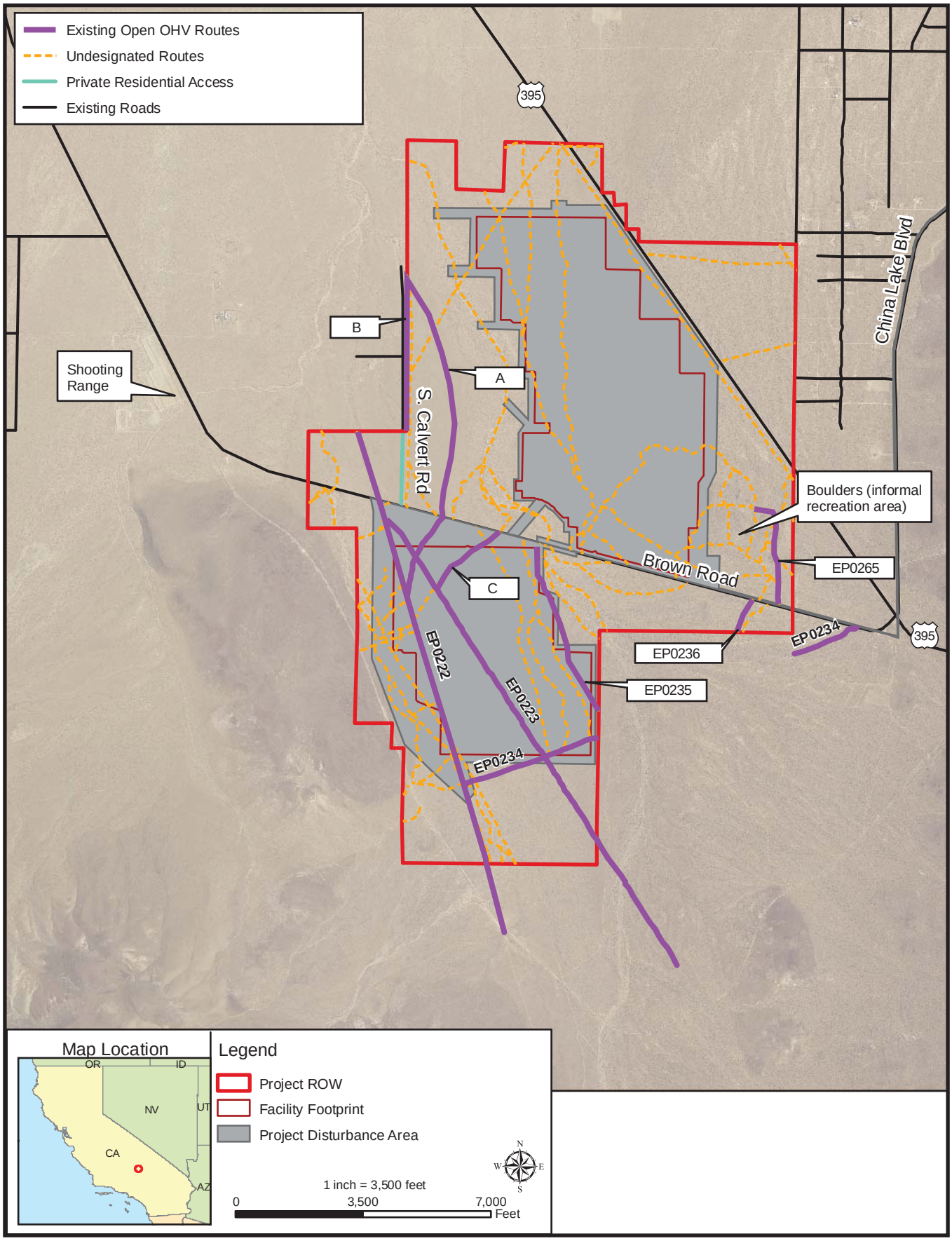


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: BLM 2005, Map 2-14A

LAND USE- FIGURE C.5-6

Ridgecrest Solar Power Project - Existing Designated, Established, and Casual Use Trails

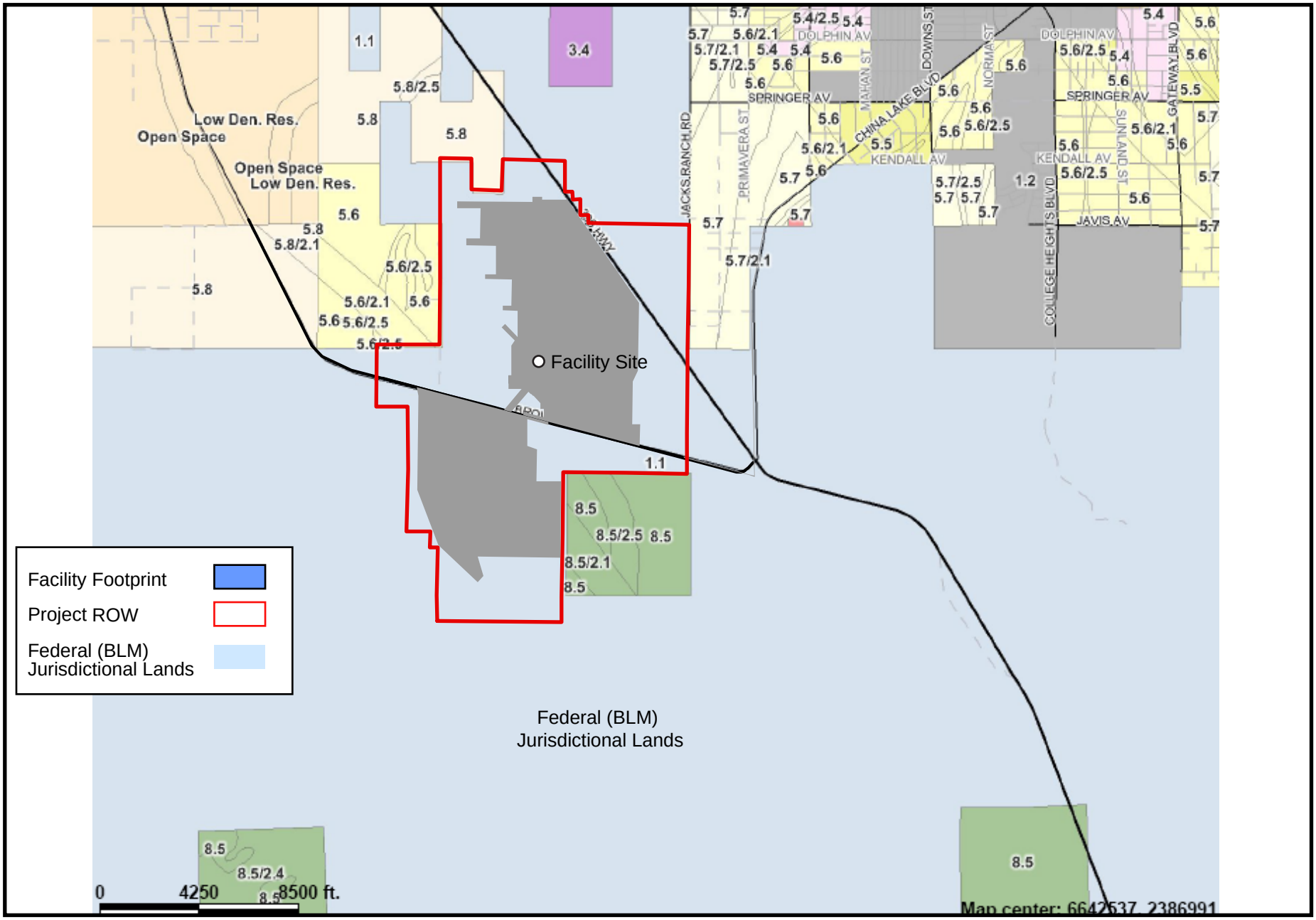


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

Source: TN 55625, Figure DR-LURW-259 Route Decommissioning, Figure DR-LURW-257-1 WEMO Designated Routes

LAND USE - FIGURE C.5-7

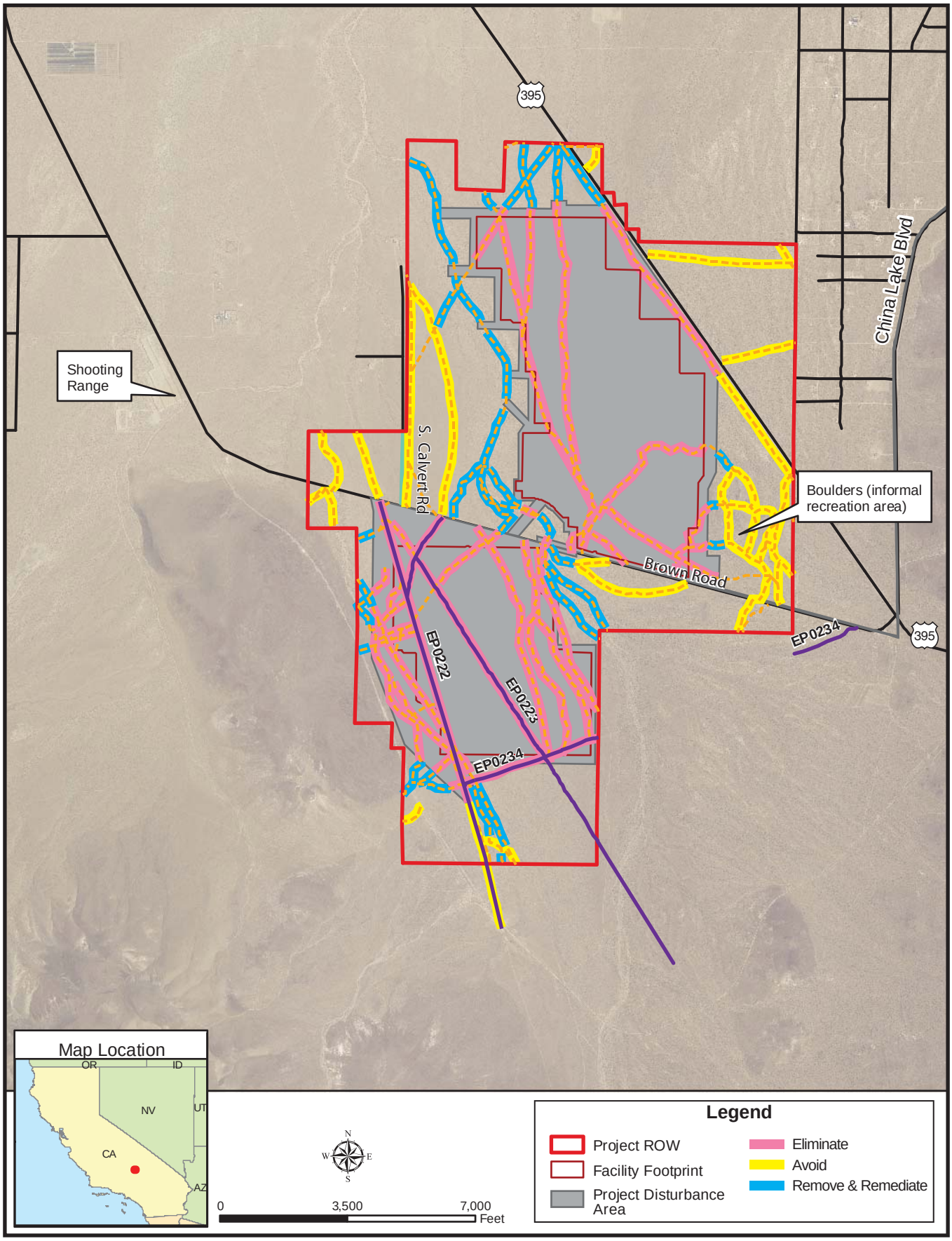
Ridgecrest Solar Power Project - Kern County General Plan Land Use Designation of Non-Jurisdictional Lands



SOURCE: KERN 2010

LAND USE- FIGURE C.5-8

Ridgecrest Solar Power Project - Alternations to Designated OHV Routes and Casual Trails



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

Source: Kern 2010

C.6 NOISE AND VIBRATION

Testimony of Erin Bright

C.6.1 SUMMARY OF CONCLUSIONS

California Energy Commission staff concludes that the Ridgecrest Solar Power Project can be built and operated in compliance with all applicable noise and vibration laws, ordinances, regulations, and standards and, if built in accordance with the conditions of certification proposed below, would produce no significant adverse noise impacts on people within the affected area, either direct, indirect, or cumulative.

C.6.2 INTRODUCTION

The construction and operation of any power plant creates noise, or unwanted sound. The character and loudness of this noise, the times of day or night that it is produced, and the proximity of the facility to sensitive receptors combine to determine whether the facility would meet applicable noise control laws and ordinances and whether it would cause significant adverse environmental impacts under CEQA. In some cases, vibration may be produced as a result of power plant construction practices, such as blasting or pile driving. The groundborne energy of vibration has the potential to cause structural damage and annoyance.

The purpose of this analysis is to identify and examine the likely noise and vibration impacts from the construction and operation of the Ridgecrest Solar Power Project (RSPP) and to recommend procedures to ensure that the resulting noise and vibration impacts would be adequately mitigated to comply with applicable laws, ordinances, regulations, and standards (LORS) and to avoid creation of significant adverse noise or vibration impacts. For an explanation of technical terms and acronyms employed in this section, please refer to **NOISE APPENDIX A** immediately following.

C.6.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

The analysis of proposed project effects must comply with both CEQA and NEPA requirements given the respective power plant licensing and land jurisdictions of the California Energy Commission and U.S. Bureau of Land Management (BLM). Because this document is intended to meet the requirements of both NEPA and CEQA, the methodology used for determining environmental impacts of the proposed project includes a consideration of guidance provided by both laws.

As noted above, CEQA identifies criteria that may be used to determine the significance of identified impacts. A significant impact is defined by CEQA as “a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project” (Cal. Code Reg., tit. 14 (hereinafter State CEQA Guidelines) Section 15382).

In comparison, NEPA states that "'Significantly' as used in NEPA requires considerations of both context and intensity…" (40 CFR 1508.27). Therefore, thresholds serve as a benchmark for determining if a project action will result in a significant adverse environmental impact when evaluated against the baseline. NEPA requires that an Environmental Impact Statement (EIS) is prepared when the proposed federal action (project) as a whole has the potential to "significantly affect the quality of the human environment."

Criteria for determining significance in this section are based on Appendix G of the CEQA Guidelines (CCR 2006) and performance standards or thresholds identified by the Energy Commission staff. In addition, staff's evaluation of the environmental effects of the proposed project on land uses (i.e., those listed below) includes an assessment of the context and intensity of the impacts, as defined in the NEPA implementing regulations 40 CFR Part 1508.27.

Effects of the proposed project on noise and vibration (and in compliance with both CEQA and NEPA) have been determined using the thresholds listed below.

C.6.3.1 CALIFORNIA ENVIRONMENTAL QUALITY ACT

The California Environmental Quality Act (CEQA) requires that significant environmental impacts be identified and that such impacts be eliminated or mitigated to the extent feasible. Section XI of Appendix G of CEQA Guidelines (*See* Cal. Code Regs., tit. 14, Section 15063) sets forth some characteristics that may signify a potentially significant impact. Specifically, a significant effect from noise may exist if a project would result in:

1. Exposure of persons to, or generation of, noise levels in excess of standards established in the local General Plan or noise ordinance or applicable standards of other agencies;

2. Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels;

3. Substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or

4. Substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

The Energy Commission staff, in applying item 3 above to the analysis of this and other projects, has concluded that a potential for a significant noise impact exists where the noise of the project plus the background exceeds the background by 5 dBA or more at the nearest sensitive receptor. A change in level of at least 5 dB is required before any noticeable change in community response would be expected.

Staff considers it reasonable to assume that an increase in background noise levels up to 5 dBA in a residential setting is insignificant; an increase of more than 10 dBA is considered significant. An increase between 5 and 10 dBA should be considered adverse, but may be either significant or insignificant, depending on the particular circumstances of the case.

Factors to be considered in determining the significance of an adverse impact (as defined above) include:

1. The resulting combined noise level;[1]
2. The duration and frequency of the noise;
3. The number of people affected;
4. The land use designation of the affected receptor sites; and
5. Public concern or controversy expressed at workshops or hearings or in correspondence.

Noise impacts due to construction activities are usually considered to be insignificant if:

- The construction activity is temporary;
- Use of heavy equipment and noisy activities are limited to daytime hours; and
- All industry-standard noise abatement measures are implemented for noise-producing equipment.

Staff uses the above method and threshold to protect the most sensitive populations, including the minority population.

[1] For example, a noise level of 40 dBA would be considered quiet in many locations. A noise limit of 40 dBA would be consistent with the recommendations of the California Model Community Noise Control Ordinance for rural environments and with industrial noise regulations adopted by European jurisdictions. If the project would create an increase in ambient noise no greater than 10 dBA at nearby sensitive receptors, and the resulting noise level would be 40 dBA or less, the project noise level would likely be insignificant.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Noise Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
(OSHA): 29 U.S.C. § 651 et seq.	Protects workers from the effects of occupational noise exposure.
State	
(Cal/OSHA): Cal. Code Regs., tit. 8, §§ 5095–5099	Protects workers from the effects of occupational noise exposure.
Local	
Kern County General Plan Noise Element Policies (5)(a) and (5)(b)	Policy (5) prohibits new noise-sensitive land uses in noise-impacted areas unless effective mitigation measures are incorporated to (a) reduce noise levels in outdoor activity areas to 65 dBA L_{dn} or less, and (b) reduce interior noise levels to 45 dBA L_{dn} or less.
Kern County Code of Ordinance, Chapter 8.36 ("Noise Control")	Subsection H limits hours of noisy construction work.

FEDERAL

Under the Occupational Safety and Health Act of 1970 (29 USC § 651 et seq.), the Department of Labor, Occupational Safety and Health Administration (OSHA) has adopted regulations designed to protect workers against the effects of occupational noise exposure (29 CFR § 1910.95). These regulations list permissible noise exposure levels as a function of the amount of time during which the worker is exposed (see **Noise Appendix A, Table A4** immediately following this section). The regulations further specify a hearing conservation program that involves monitoring the noise to which workers are exposed, assuring that workers are made aware of overexposure to noise, and periodically testing the workers' hearing to detect any degradation.

There are no federal laws governing off-site (community) noise.

The only guidance available for evaluation of power plant vibration is guidelines published by the Federal Transit Administration (FTA) for assessing the impacts of groundborne vibration associated with construction of rail projects. These guidelines have been applied by other jurisdictions to assess groundborne vibration of other types of projects. The FTA-recommended vibration standards are expressed in terms of the "vibration level," which is calculated from the peak particle velocity measured from groundborne vibration. The FTA measure of the threshold of perception is 65 VdB,[2] which correlates to a peak particle velocity of about 0.002 inches per second (in/sec).

[2] VdB is the common measure of vibration energy.

The FTA measure of the threshold of architectural damage for conventional sensitive structures is 100 VdB, which correlates to a peak particle velocity of about 0.2 in/sec.

STATE

California Government Code section 65302(f) encourages each local governmental entity to perform noise studies and implement a noise element as part of its General Plan. In addition, the California Office of Planning and Research has published guidelines for preparing noise elements, which include recommendations for evaluating the compatibility of various land uses as a function of community noise exposure. The State land use compatibility guidelines are listed in **Noise Table 2**.

Noise Table 2
Land Use Compatibility for Community Noise Environment

LAND USE CATEGORY	COMMUNITY NOISE EXPOSURE - Ldn or CNEL (db)						
	50	55	60	65	70	75	80
Residential - Low Density Single Family, Duplex, Mobile Home							
Residential - Multi-Family							
Transient Lodging – Motel, Hotel							
Schools, Libraries, Churches, Hospitals, Nursing Homes							
Auditorium, Concert Hall, Amphitheaters							
Sports Arena, Outdoor Spectator Sports							
Playgrounds, Neighborhood Parks							
Golf Courses, Riding Stables, Water Recreation, Cemeteries							
Office Buildings, Business Commercial and Professional							
Industrial, Manufacturing, Utilities, Agriculture							

	Normally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
	Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design.
	Normally Unacceptable	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.
	Clearly Unacceptable	New construction or development generally should not be undertaken.

Source: State of California General Plan Guidelines, Office of Planning and Research, June 1990.

The California Occupational Safety and Health Administration (Cal/OSHA) has promulgated Occupational Noise Exposure Regulations (Cal. Code Regs., tit. 8, §§ 5095–5099) that set employee noise exposure limits. These standards are equivalent to the federal OSHA standards (see the **WORKER SAFETY AND FIRE PROTECTION** section of this document, and **Noise Appendix A, Table A4**).

LOCAL

Kern County General Plan Noise Element

Two policies enunciated in this noise element (Kern County 2007) impact the construction and operation of a project such as the RSPP. Policy (5)(a) prohibits new noise-sensitive land uses in noise-impacted areas unless effective mitigation measures are incorporated into the project design to reduce noise levels in outdoor activity areas to 65 dBA L_{dn} or less. Policy (5)(b) prohibits new noise-sensitive land uses in noise impacted areas unless effective mitigation measures are incorporated into the project design to reduce interior noise levels within living spaces or other noise sensitive interior spaces to 45 dBA L_{dn} or less. It should be noted that there are no current noise ordinances in Kern County.

Kern County Code of Ordinance

The Noise Control Ordinance in Chapter 8.36 of the Kern County Code states that noise from construction should be limited to the following hours when construction takes place within 1,000 feet of a sensitive receptor:

- Weekdays 6:00 a.m. to 9:00 p.m.
- Weekends 8:00 a.m. to 9:00 p.m.

(Kern County 2009)

C.6.4 PROPOSED PROJECT

C.6.4.1 SETTING AND EXISTING CONDITIONS

The proposed SES Solar Two Project would be constructed on a 1,440 acre site located approximately 5 miles southwest of the town of Ridgecrest in Kern County. The site is primarily on undisturbed federal land managed by the BLM (SM 2009a, AFC §§ 2.1, 2.3).

The ambient noise regime in the project vicinity consists primarily of highway traffic, wind and wildlife. The nearest noise sensitive receptor to the power block of the project is a residence located approximately 3,000 feet west of the project's western site boundary. Additional sensitive receptors are located northeast of the project boundaries at greater distances (SM 2009a, AFC 5.8.2.2; SM 2010a Data Response 262, Figure DR-Noise-249).

Ambient Noise Monitoring

In order to establish a baseline for comparison of predicted project noise to existing ambient noise, the applicant has presented the results of an ambient noise survey (SM 2009a, AFC § 5.8.2.4, Tables 5.8-4 and 5.8-5). The survey was conducted on

June 10, 11 and 12, 2009, and monitored existing noise levels at the following locations, shown on **Noise and Vibration Figure 1** (SM 2010a, Data Response 262, Figure DR-Noise-249):

1. Measuring Location LT-1: Near a residence located approximately 3,000 feet west of the project site boundary, approximately 5,000 feet from the power block. This represents the noise sensitive receptor closest to the power block, thus the receptor most likely to be impacted the greatest by project operation. Long-term (25-hour) monitoring showed ambient noise levels typical of a desert environment.

2. Measuring Location ST-3: Near a residence located approximately 2,500 feet from the project's eastern site boundary, on the opposite side of Highway 395. This represents the noise sensitive receptor closest to the project site boundary, and thus the receptor likely to be impacted the most by project construction noise.

3. Measuring Location ST-4: Near a residence located approximately 3,600 feet northeast of the project's eastern site boundary, on the opposite side of Highway 395.

Long term (25-hour) monitoring was only performed at location LT-1. Short term (10 to 20 minutes) measurements were taken for ST-3 and ST-4.

Noise Table 4 summarizes the ambient noise measurements:

Noise Table 4
Summary of Measured Ambient Noise Levels

Measurement Location	Measured Noise Levels, dBA		
	L_{eq} – Daytime[1]	L_{eq} – Nighttime[2]	L_{90} – Nighttime[3]
LT1: Northwest Residence	44	41	35
ST3: East Residence	46	-	-
ST4: Northeast Residence	40	-	-

Source: AFC § 5.8.2.4, Tables 5.8-4 and 5.8-5
[1] Staff calculations of average of 15 daytime hours
[2] Staff calculations of average of 9 nighttime hours
[3] Staff calculations of average of 4 consecutive quietest hours of the nighttime

C.6.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Direct Impacts and Mitigation

Noise impacts associated with the project can be created by short-term construction activities and by normal long-term operation of the power plant.

Construction Impacts and Mitigation

Construction of the RSPP is expected to occur over a period of 28 months (SM 2009a, AFC § 5.8.3.1).

Compliance with LORS

Construction of an industrial facility such as a power plant is typically noisier than permissible under usual noise ordinances. In order to allow the construction of new facilities, construction noise during certain hours of the day is commonly exempt from enforcement by local ordinances. It should be noted that there are no specific LORS limiting construction noise levels in Kern County.

The Kern County Code limits noisy construction to daytime hours, but only if construction takes place within 1,000 feet of a residence. There are no residences within 1,000 feet from any project boundary, so this LORS restriction does not apply to the RSPP.

CEQA Impacts

Power Plant Site

To evaluate construction noise impacts, staff compares the projected noise levels to the ambient. Since construction noise typically varies continually with time, it is most appropriately measured by, and compared to, the L_{eq} (energy average) metric.

The Applicant has predicted the noise impacts of project construction on the nearest sensitive receptor (SM 2009a, AFC § 5.8.3.1; SM 2010a Data Response 262). Assuming peak construction activity, a maximum noise level of 85 dBA L_{eq} is estimated to occur at a distance of 50 feet from the acoustic center of the construction activity and attenuate to 51 dBA L_{eq} or less at the residence east of the project near location ST3, the nearest noise-sensitive receptor, and to 49 dBA L_{eq} or less at the residence west of the project near location LT1 (SM 2009a, AFC § 5.8.3.1; SM 2010a Data Response 262, Figure DR-Noise-249; and staff calculations). A comparison of construction noise estimates to ambient measurements is presented in **Noise Table 5**:

Noise Table 5
Predicted Power Plant Construction Noise Impacts

Receptor	Highest Construction Noise Level[1] (Dba L_{eq})	Measured Existing Ambient[2] (dBA L_{eq})	Cumulative (dBA L_{eq})	Change (dBA)
ST3 – East Residence	51	46 daytime	52 daytime	+6 daytime
LT1 - West Residence	49	44 daytime	50 daytime	+6 daytime

1 Source: AFC § AFC § 5.8.3.1; SM 2010a Data Response 262, Figure DR-Noise-249; and staff calculations
2 Source: AFC Table 5.8-5 and staff calculations of average of daytime hours.

Construction may be expected to reach levels as high as 51 dBA L_{eq} at the nearest sensitive receptor, the residence to the east, for construction activities occurring near the eastern project boundary, which, when added to existing ambient levels, would result in a noise level increase of 6 dBA. A similar increase would occur at the residence to the west of the project for construction activities taking place near the

western project boundary. Such an increase is considered potentially significant. However, most of the construction activities are expected to take place closer to the power block (approximately 5,000 feet further from the east receptor and 2,000 feet further from the west receptor than the respective project boundaries), which would attenuate to a level of 41 and 45 dBA L_{eq} at the east and west receptors, respectively. Thus most of the construction work would result in an increase of no more than 3 dBA over ambient levels at any sensitive receptor, which is less than significant.

If noisy construction work is restricted to daytime hours, staff believes it will be noticeable, but tolerable, at the nearest residences. To ensure this, staff suggests that the project be subjected to the regulation set forth by Kern County which limits hours of noisy construction, even though the noise sensitive receptors are more than 1,000 feet away. To ensure that these hours are, in fact, enforced, staff proposes Condition of Certification **NOISE-6**.

Because the maximum construction noise would be temporary and limited to daytime hours, staff considers the noise impacts due to construction activity to be less than significant.

In the event that actual construction noise should annoy nearby residents, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a Notification Process to make nearby residents aware of the project, and a Noise Complaint Process that requires the applicant to resolve any problems caused by noise from the project.

Linear Facilities

Linear facilities include a new water supply pipeline extending five miles from the Ridgecrest Heights storage tank to the project, and existing electrical transmission lines currently running through the project site that would be rerouted around the southern solar field (SM 2009a, AFC §§ 2.5, 2.5.5.2, 2.6.1). Only the water supply pipeline would extend past the project boundary. While the construction noise levels for the linears would be noticeable to nearby sensitive receptors, construction on linears proceeds rapidly, so no particular area is exposed to noise for more than a few days.

Steam Blows

Typically, the loudest noise encountered during construction, inherent in building any project incorporating a steam turbine, is created by the steam blows. After erection and assembly of the feedwater and steam systems, the piping and tubing that comprises the steam path has accumulated dirt, rust, scale and construction debris such as weld spatter, dropped welding rods and the like. If the plant were started up without thoroughly cleaning out these systems, all this debris would find its way into the steam turbine, quickly destroying the machine.

The Applicant intends to employ a low-pressure steam blow technique in which lower pressure steam is released over a continuous period of approximately 36 hours. Resulting noise levels reach only about 80 dBA at 100 feet, compared to 130 dBA at 100 feet for a high pressure steam blow. Noise levels from the steam blow at the nearest residence to the power block (that to the west of the project, near LT1) would

thus be about 46 dBA, resulting in an increase of no more than 4 dBA in the existing ambient, which is less than significant (SM 2010a, Data Response 262; and staff calculations).

Though the noise impacts from the low pressure steam blow would be minimal and temporary, staff proposes a notification process (see proposed Condition of Certification **NOISE-7** below) to make neighbors aware of impending steam blows.

Vibration

The only construction operation likely to produce vibration that could be perceived off site would be pile driving, which the applicant has stated would not be employed (SM 2009a, AFC § 5.8.3.1). Staff therefore believes there would be no significant impacts from construction vibration.

Worker Effects

The applicant has acknowledged the need to protect construction workers from noise hazards and has recognized those applicable LORS that would protect construction workers (SM 2009a, AFC § 5.8.1). To ensure that construction workers are, in fact, adequately protected, staff has proposed Condition of Certification **NOISE-3**, below.

Operation Impacts and Mitigation

The primary noise sources of the RSPP include the steam turbine generators, air cooled condenser (ACC), start-up boiler, and various pumps and fans (SM 2009a, AFC §§ 2.5, 5.8.3.2). Staff compares the projected noise with applicable LORS. In addition, staff evaluates any increase in noise levels at sensitive receptors due to the project in order to identify any significant adverse impacts.

Common noise mitigating factors included in parabolic trough solar thermal generating facilities include:

- Metal acoustical steam turbine enclosure; and
- 25-foot high solar mirror arrays surrounding the power block.

Compliance with LORS

The applicant performed noise modeling to determine the project's noise impacts on sensitive receptors (SM 2009a, AFC § 5.8.3.2; SM 2010a, Data Response 262). Project operating noise levels are expected to attenuate to 45 dBA L_{eq} (51 dBA L_{dn}) at the nearest sensitive receptor, the residence to the west of the project near measuring location LT1. This figure complies with the noise level limits specified in the Kern County General Plan Noise Element; see **Noise Table 6**.

Noise Table 6
Plant Operating Noise LORS Compliance

Receptor	LORS	LORS Limit	Projected Noise Level (L_{dn})
LT1	Kern County General Plan Noise Element	65 dBA L_{dn} daytime	51 dBA

Source: Kern County 2007, and SM 2010a, Data Response 262

CEQA Impacts

Power plant noise is unique. Essentially, a power plant operates as a steady, continuous, broadband noise source, unlike the intermittent sounds that comprise the majority of the noise environment. As such, power plant noise contributes to, and becomes part of, the background noise level, or the sound heard when most intermittent noises cease. Where power plant noise is audible, it will tend to define the background noise level. For this reason, staff compares the projected power plant noise to the existing ambient background (L_{90}) noise levels at the affected sensitive receptors. If this comparison identifies a significant adverse impact, then feasible mitigation must be incorporated in the project to reduce or remove the impact.

In many cases, a power plant will be intended to operate around the clock for much of the year. As a solar thermal generating facility, The RSPP would operate only during the daytime hours, typically 15 hours per day during the summer (with fewer hours during the fall, winter, and spring), when sufficient solar insolation is available. Nighttime operation would be limited to the auxiliary boilers for the steam seal system of the steam turbine and the HTF heat exchanger for HTF freeze protection, and maintenance activities (SM 2009a, AFC § 2.5.2).

Typically, daytime ambient noise consists of both intermittent and constant noises. The noise that stands out during this time is best represented by the average noise level, or L_{eq}. Staff's evaluation of the above noise surveys shows that the daytime noise environment in the RSPP area consists of both intermittent and constant noises. Thus, staff compares the project's daytime noise levels to the daytime ambient L_{eq} levels at the project's noise-sensitive receptors.

As shown in **Noise Table 7**, power plant noise levels are predicted to be no more than 45 dBA L_{eq} at the nearest sensitive receptor (the western residence near location LT1) during daytime operation and no more than 25 dBA L_{eq} at night (SM 2010a, Data Response 262; and staff calculations).

Noise Table 7
Power Plant Noise Impacts at Nearest Sensitive Receptor

LT1 (West Residence)	Power Plant Noise Level, dBA L_{eq}[1]	Ambient Noise Level, dBA	Cumulative Noise Level, dBA	Change from Ambient Level dBA
Daytime	45	44 L_{eq}[2]	48	+4
Nighttime	25	35 L_{90}[3]	35	+0

[1] Source: SM 2010a Data Response 262, and staff calculations.
[2] Source: AFC Table 5.8-5, and staff calculations of average of fifteen consecutive daytime hours.
[3] Source: AFC § 5.8.2.4.

When projected plant noise is added to the daytime ambient value (as calculated by staff), the cumulative level is higher than the ambient value at location LT1 by a barely audible amount (see **NOISE Table 7**). No change in ambient noise at night would result from plant operation. To ensure that project operational noise does not cause annoyance, staff proposes Condition of Certification **NOISE-4** below.

Tonal Noises

One possible source of disturbance would be strong tonal noises. Tonal noises are individual sounds (such as pure tones) that, while not louder than permissible levels, stand out in sound quality. The applicant can to avoid the creation of annoying tonal (pure-tone) noises by balancing the noise emissions of various power plant features during plant design. To ensure that tonal noises do not cause annoyance, staff proposes Condition of Certification **NOISE-4**, below.

Linear Facilities

Noise effects from the electrical interconnection line typically do not extend beyond the right-of-way easement of the line and would thus be inaudible to any receptors.

Vibration

Vibration from an operating power plant could be transmitted by two chief means; through the ground (groundborne vibration) and through the air (airborne vibration).

The operating components of the RSPP consist of a high-speed steam turbine generator and various pumps and fans. All of these pieces of equipment must be carefully balanced in order to operate; permanent vibration sensors are attached to the turbines and generators. Based on experience with numerous previous projects employing similar equipment, Energy Commission staff believes that ground borne vibration from the RSPP would be undetectable by any likely receptor.

Airborne vibration (low frequency noise) can rattle windows and objects on shelves and can rattle the walls of lightweight structures. None of the project equipment is likely to produce low frequency noise; this makes it highly unlikely that the RSPP would cause perceptible airborne vibration effects.

Worker Effects

The applicant has acknowledged the need to protect plant operating and maintenance workers from noise hazards and has committed to comply with applicable LORS (SM 2009a, AFC § 5.8.1). To ensure that plant operation and maintenance workers are, in fact, adequately protected, Energy Commission staff has proposed Condition of Certification **NOISE-5**, below.

FACILITY CLOSURE

In the future, upon closure of the RSPP, all operational noise from the project would cease, and no further adverse noise impacts from operation of the RSPP would be possible. The remaining potential temporary noise source is the dismantling of the structures and equipment and any site restoration work that may be performed. Since this noise would be similar to that caused by the original construction, it can be treated similarly. That is, noisy work could be performed during daytime hours, with machinery and equipment properly equipped with mufflers. Any noise LORS that are in existence at that time would apply. Applicable conditions of certification included in the Energy Commission decision would also apply unless modified.

C.6.4.3 CEQA LEVEL OF SIGNIFICANCE

For the purposes of CEQA compliance, the significance of construction and operating noise impacts of the proposed project at the nearest sensitive receptors has been determined.

Construction Impacts

As discussed in detail in section C.8.4.2 above (under the subsection entitled "Construction Impacts and Mitigation"), the noise level increase at the nearest sensitive receptors resulting from construction of the project (presented in **Noise Table 5**) would be noticeable. However, given the temporary nature of construction noise and the fact that noisy construction activity would be restricted to daytime hours (by both the local LORS and Condition of Certification **NOISE-6**), the impacts due to construction noise are considered less than significant.

Operation Impacts

As discussed in detail in section C.8.4.2 above (under the subsection entitled "Operation Impacts and Mitigation"), power plant noise levels are predicted to be no more than 45 dBA L_{eq} at the nearest sensitive receptor during daytime operation, which would result in a barely audible increase over ambient noise. No change in ambient noise at any sensitive receptor at night would result from plant operation. Thus, operation noise impacts of the project would not be significant.

C.6.5 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because (1) it eliminates about 42 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources

(desert tortoise and Mohave ground squirrel), cultural resources, and recreational uses, and (2) avoids constructing a solar facility in the Mohave Ground Squirrel Conservation Area (MGSCA).

The Northern Unit Alternative would consist of 167 solar collector array loops with a net generating capacity of approximately 146 MW. The total disturbance area would be approximately 1134 acres of land. This alternative would retain 58 percent of the proposed solar array loops and would affect 58 percent of the land of the proposed 250 MW project. The boundaries of the Northern Unit Alternative are shown in **Alternatives Figure 1**.

Similar to the proposed project, the Northern Unit Alternative would transmit power to the grid through the planned SCE 230-kV substation to be located near the proposed project site. The power block covering approximately 18 acres, would remain north of Brown Road, as proposed by the project and would include all operational power facilities, structures, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system). The proposed transmission line alignment is 3,900 ft and would connect to the proposed switchyard (3.2 acres) adjacent to the existing SCE 230kV transmission line, west of the proposed project. In addition, the site would require access roads, a parking lot, bio-remediation unit and main office building (3 acres) all of which are proposed north of Brown Road within the proposed project footprint (AECOM 2009). The proposed 16.3 acre water line would remain at the location as proposed by the project. The Northern Unit Alternative would not require the relocation of the two existing SCE transmission lines.

As stated above, the Northern Unit Alternative is evaluated in this SA/DEIS because it would reduce some impacts of the project. Additionally, the Northern Unit Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals, while minimizing impacts to the desert environment. A limited acreage alternative was suggested in scoping comments.

C.6.5.1 SETTING AND EXISTING CONDITIONS

The Northern Unit Alternative would be constructed within the boundaries of the proposed project described in Section C.8.4.1. As a result, the setting is the same as that of the proposed project. The ambient noise regime in the project vicinity consists of highway traffic, wind and wildlife. The nearest sensitive receptors would be the same as for the proposed project, located 2,500 east of the eastern project boundary and approximately 3,000 feet west of the western project boundary (SM 2010a, Data Response 262).

C.6.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Operational noise impacts for the Northern Unit Alternative would likely be the same as the proposed project because the power block would be in the same location and the same noise sources would be in use. So, as discussed above in section 10.4.2, operational noise impacts would not be significant. Construction noise impacts would

likely also be the same as the proposed project because construction activities would take place at approximately the same distance from the receptors and would produce the same noise levels.

C.6.5.3 CEQA LEVEL OF SIGNIFICANCE

Like the proposed project, the Northern Unit Alternative, if built and operated in conformance with the proposed conditions of certification defined for the proposed project, would comply with all applicable noise and vibration LORS and would produce no significant adverse noise impacts on people within the project area, directly, indirectly, or cumulatively.

C.6.6 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would be a 104 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because it eliminates about 58 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources, and cultural resources.

The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of approximately 104 MW. The total disturbance area would be approximately 908 acres of land. This alternative would retain 42 percent of the proposed solar array loops and would affect 42 percent of the land of the proposed 250 MW project.

The boundaries of the Southern Unit Alternative are shown in **Alternatives Figure 2**. This area was would avoid a large portion of the El Paso Wash and sensitive biological resources, including areas that were mapped as occupied tortoise and Mohave ground squirrel habitat (live tortoise and/or active burrows and sign).

Similar to the proposed project, the Southern Unit Alternative would transmit power to the grid through the planned SCE 230-kV substation to be located near the proposed project site. The power block, spanning approximately 18 acres, would remain north of Brown Road, as proposed by the project and would include all operational power facilities, structures, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system). The proposed transmission line alignment is 3,900 ft and would connect to the proposed switchyard (3.2 acres) adjacent to the existing SCE 230kV transmission line, west of the proposed project. In addition, the site would require access roads, a parking lot, bio-remediation unit and main office building (3 acres) all of which are proposed north of Brown Road (AECOM 2009). The proposed 16.3 acre water line would remain at the location as proposed by the project. Similar to the proposed project, the Southern Unit Alternative would require the relocation of the two existing SCE transmission lines; this realignment would require approximately 58.2 acres.

As stated above, the Southern Unit Alternative is evaluated in this SA/DEIS because it would reduce some impacts of the project. Additionally, the Southern Unit Alternative

would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals, while minimizing impacts to the desert environment. A limited acreage alternative was suggested in scoping comments.

C.6.6.1 SETTING AND EXISTING CONDITIONS

The Southern Unit Alternative would be constructed within the boundaries of the original proposed project described in the AFC; the solar field would be located south of Brown Road and the power block would be located to the north of the road (in the same location as the proposed project, as discussed in section 10.4.1 above). As a result, the setting is similar to that of the proposed project. The ambient noise regime in the project vicinity consists of highway traffic, wind and wildlife. The nearest sensitive receptors would be the same as for the proposed project, however their position in relation to project features would be slightly different. The power block would be the same distance from the receptors as for the proposed location, but the boundaries of the solar field would be further away (see **Alternatives Figure 2**).

C.6.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Operational noise impacts for the Southern Unit Alternative would likely be the same as the proposed project because the power block would be in the same location and the same noise sources would be in use. So, as discussed above in section 10.4.2, operational noise impacts would not be significant. Construction noise impacts would be lower than those of the proposed project because construction activities would take place at greater distances from the receptors. The maximum construction noise would be expected to come from activities at the power block, which would be the same as discussed in section 10.4.2 above and would cause less than significant impacts.

C.6.6.3 CEQA LEVEL OF SIGNIFICANCE

Like the proposed project, the Southern Unit Alternative, if built and operated in conformance with the proposed conditions of certification defined for the proposed project, would comply with all applicable noise and vibration LORS and would produce no significant adverse noise impacts on people within the project area, directly, indirectly, or cumulatively.

C.6.7 ORIGINAL PROPOSED PROJECT ALTERNATIVE

The Original Proposed Project Alternative would be a 250 MW solar facility as originally proposed by Solar Millennium. This alternative is analyzed because it would reduce the amount of land developed within the Mojave Ground Squirrel Conservation Area and it could transmit the full 250 MW of power that Solar Millennium has requested.

The Original Proposed Project Alternative would consist of 278 solar array loops with a net generating capacity of approximately 250 MW. The total disturbance area would be approximately 1,794 acres of land A shorter transmission interconnection – 1,250 feet as compared to the proposed project interconnection of 3,900 feet – would be needed.

The boundaries of the Original Proposed Project Alternative are shown in **Alternatives Figure 3**. This project footprint contains two desert ephemeral washes that would

require redirection and smaller dry desert washes also traverse the site. In addition this site is the location of prime desert tortoise and Mojave ground squirrel habitat.

Similar to the proposed project, the Original Proposed Project Alternative would transmit power to the grid through the planned SCE 230-kV substation located near the proposed project site and would require infrastructure including main office building (3 acres), power block, water line, transmission line, switch yard, access roads, parking area, bio-remediation unit and maintenance building (AECOM 2009). The 18-acre off-site water line route would follow the same route as the proposed project. The bioremediation unit would be located north of Brown Road, within the proposed project footprint; the power block and ancillary facilities would be located south of Brown Road on approximately 18 acres in addition to the transmission line and switch-yard (5.5 acres). The Original Proposed Project Alternative would require the relocation of the two existing SCE transmission lines.

As stated above, the Original Proposed Alternative is evaluated in this SA/DEIS because it reduces land developed with the MGSCA. Additionally, the Original Proposed Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals.

C.6.7.1 SETTING AND EXISTING CONDITIONS

The Original Proposed Project Alternative would be constructed within the boundaries of the original proposed project described in the AFC. As a result, the setting is similar to that of the proposed project. The ambient noise regime in the project vicinity consists of highway traffic, wind and wildlife. The nearest sensitive receptors would be the same as for the proposed project; however their position in relation to project features would be slightly different. The power block would be the about 1,300 feet further from the receptors as for the proposed location, and the boundaries of the solar field would be slightly further away.

C.6.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Operational noise impacts for the Original Proposed Project Alternative would be slightly less than the proposed project because the power block would be located further south, and thus slightly further away from the receptors. As discussed above in section 10.4.2, operational noise impacts for the proposed project would not be significant, thus impacts from this alternative, with its slightly lower noise levels at receptors, would also be less than significant. Construction noise impacts would be similar to those of the proposed project because the project boundaries (and thus the closest construction activities) would be only slightly closer to the receptors.

C.6.7.3 CEQA LEVEL OF SIGNIFICANCE

Like the proposed project, the Original Proposed Project Alternative, if built and operated in conformance with the proposed conditions of certification defined for the proposed project, would comply with all applicable noise and vibration LORS and would produce no significant adverse noise impacts on people within the project area, directly, indirectly, or cumulatively.

C.6.8 NO PROJECT/NO ACTION ALTERNATIVES

C.6.8.1 NO PROJECT/NO ACTION ALTERNATIVE #1:

No Action on Ridgecrest Solar Power Project application and on CDCA land use plan amendment

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the construction and operation noise-related impacts of the Ridgecrest Solar Power Project would not occur at the proposed site. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations

C.6.8.2NO PROJECT/NO ACTION ALTERNATIVE #2:

No Action on Ridgecrest Solar Power Project and amend the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site. Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. Construction would require the use of large construction vehicles that would create unwanted noise and some intermittent noise during operations. However, as with the proposed project, it is expected that solar technologies create minor increases in ambient noise during operation. As such, this No Project/No Action Alternative could result in an impact from increased ambient noise during construction and operation similar to under the proposed project.

C.6.8.3 NO PROJECT/NO ACTION ALTERNATIVE #3:

No Action on Ridgecrest Solar Power Project application and amend the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA

Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain with the existing ambient noise from its existing condition. Ambient noise of the site is not expected to change noticeably from existing conditions and, as such, this No Project/No Action Alternative would not result in impacts from any increase in noise at the project site. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.6.9 CUMULATIVE IMPACT ANALYSIS

GEOGRAPHIC EXTENT

The geographic scope for considering cumulative noise impacts on sensitive receptors for this project consists of the region immediately surrounding those receptors in the vicinity of the project, as shown in **Noise and Vibration Figure 1**.

EXISTING CUMULATIVE CONDITIONS

Any existing cumulative noise conditions are included in the existing ambient noise survey conducted at the sensitive receptors.

FUTURE FORESEEABLE PROJECTS

Foreseeable Projects in the Ridgecrest Area

There are no future foreseeable projects near enough to the RSPP to create cumulative noise impacts.

Foreseeable Renewable Projects in the California and Arizona Desert

Projects further afield than the immediate vicinity of the project, whether renewable or otherwise, would be outside the geographic scope of consideration for noise impacts of the project and would thus pose no potential for cumulative noise impacts.

C.6.10 COMPLIANCE WITH LORS

A detailed discussion of the proposed project's compliance with LORS applicable to noise and vibration is provided above in subsection C.8.4.2.

C.6.11 NOTEWORTHY PUBLIC BENEFITS

The proposed project would affect the daytime ambient noise levels in the project area. While this change would not be very noticeable at the sensitive receptors near the project, and thus not significant, development of the proposed project would not result in any noteworthy public benefits.

C.6.12 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

NOISE-1 At least 15 days prior to the start of ground disturbance, the project owner shall notify all residents within two miles of the site, by mail or other effective means, of the commencement of project construction. At the same time, the project owner shall establish a telephone number for use by the public to report any undesirable noise conditions associated with the construction and operation of the project and include that telephone number in the above notice. If the telephone is not staffed 24 hours per day, the project owner shall include an automatic answering feature, with date and time stamp recording, to answer calls when the phone is unattended. This telephone number shall be posted at the project site during construction in a manner visible to passersby. This telephone number shall be maintained until the project has been operational for at least one year.

Verification: Prior to ground disturbance, the project owner shall transmit to the Compliance Project Manager (CPM) a statement, signed by the project owner's project manager, stating that the above notification has been performed and describing the method of that notification, verifying that the telephone number has been established and posted at the site, and giving that telephone number.

NOISE COMPLAINT PROCESS

NOISE-2 Throughout the construction and operation of Solar Two, the project owner shall document, investigate, evaluate, and attempt to resolve all project-related noise complaints. The project owner or authorized agent shall:

- Use the Noise Complaint Resolution Form (below), or a functionally equivalent procedure acceptable to the CPM, to document and respond to each noise complaint;
- Attempt to contact the person(s) making the noise complaint within 24 hours;
- Conduct an investigation to determine the source of noise related to the complaint;
- Take all feasible measures to reduce the noise at its source if the noise is project related; and
- Submit a report documenting the complaint and the actions taken. The report shall include: a complaint summary, including final results of noise reduction efforts, and if obtainable, a signed statement by the complainant stating that the noise problem is resolved to the complainant's satisfaction.

Verification: Within five days of receiving a noise complaint, the project owner shall file a copy of the Noise Complaint Resolution Form with the CPM, documenting the resolution of the complaint. If mitigation is required to resolve a complaint, and the complaint is not resolved within a three-day period, the project owner shall submit an updated Noise Complaint Resolution Form when the mitigation is implemented.

NOISE-3 The project owner shall submit to the CPM for review and approval a noise control program and a statement, signed by the project owner's project manager, verifying that the noise control program will be implemented throughout construction of the project. The noise control program shall be used to reduce employee exposure to high noise levels during construction and also to comply with applicable OSHA and Cal/OSHA standards.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall submit to the CPM the noise control program and the project owner's project manager's signed statement. The project owner shall make the program available to Cal/OSHA upon request.

NOISE RESTRICTIONS

NOISE-4 Within the specified time frame in **Verification**, below, of the project first achieving a sustained output of 90 percent or greater of rated capacity, the project owner shall conduct a 25-hour community noise survey at LT-1. The survey shall also include the octave band pressure levels to ensure that no new pure-tone noise components have been introduced. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints. If the results from the survey indicate that the noise level from the project alone is in excess of 45 dBA L_{eq} at LT-1 (near the residence located west of the project site (shown in **Noise and Vibration Figure 1**), additional mitigation measures shall be implemented to reduce noise to a level of compliance with this limit.

Verification: Within 30 days after completing the survey, the project owner shall submit a summary report of the survey to the CPM. Included in the report will be a description of any additional mitigation measures necessary to achieve compliance with the above listed noise limits, and a schedule, subject to CPM approval, for implementing these measures. Within 30 days of completion of installation of these measures, the project owner shall submit to the CPM a summary report of a new noise survey, performed as described above and showing compliance with this condition.

NOISE-5 Following the project's first achieving a sustained output of 80 percent or greater of rated capacity, the project owner shall conduct an occupational noise survey to identify the noise hazardous areas in the facility.

The survey shall be conducted by a qualified person in accordance with the provisions of Title 8, California Code of Regulations sections 5095–5099 and Title 29, Code of Federal Regulations section 1910.95. The survey results shall be used to determine the magnitude of employee noise exposure.

The project owner shall prepare a report of the survey results and, if necessary, identify proposed mitigation measures that will be employed to comply with the applicable California and federal regulations.

Verification: Within 30 days after completing the survey, the project owner shall submit the noise survey report to the CPM. The project owner shall make the report available to OSHA and Cal/OSHA upon request.

CONSTRUCTION TIME RESTRICTIONS

NOISE-6 Heavy equipment operation and noisy construction work relating to any project features shall be restricted to the times of day delineated below:

Weekdays:	6:00 a.m. to 9:00 p.m.
Weekends:	8:00 a.m. to 9:00 p.m.

Haul trucks and other engine-powered equipment shall be equipped with mufflers that meet all applicable regulations. Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust brake use shall be limited to emergencies.

Verification: Prior to ground disturbance, the project owner shall transmit to the CPM a statement acknowledging that the above restrictions will be observed throughout the construction of the project.

C.6.13 CONCLUSIONS

Staff concludes that the RSPP, if built and operated in conformance with the proposed conditions of certification below, would comply with all applicable noise and vibration LORS and would produce no significant adverse noise impacts on people within the project area, directly, indirectly, or cumulatively.

EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

Ridgecrest Solar Power Project
(09-AFC-9)

NOISE COMPLAINT LOG NUMBER _____

Complainant's name and address:

Phone number: _____

Date complaint received: _____
Time complaint received: _____

Nature of noise complaint:

Definition of problem after investigation by plant personnel:

Date complainant first contacted: _____

Initial noise levels at 3 feet from noise source _____ dBA Date: _____

Initial noise levels at complainant's property: _____ dBA Date: _____

Final noise levels at 3 feet from noise source: _____ dBA Date: _____

Final noise levels at complainant's property: _____ dBA Date: _____

Description of corrective measures taken:

Complainant's signature: _____ Date: _____

Approximate installed cost of corrective measures: $ _____
Date installation completed: _____
Date first letter sent to complainant: _____ (copy attached)
Date final letter sent to complainant: _____ (copy attached)

This information is certified to be correct:

Plant Manager's Signature: _____

(Attach additional pages and supporting documentation, as required).

C.6.14 REFERENCES

Kern County. 2007. Kern County General Plan, Noise Element. March 13, 2007.

Kern County 2009 — Kern County Code of Ordinance, Title 8, Chapter 8.36: Noise Control. Effective November 3, 2009.

SM 2009a - Solar Millenium LLC/J. Eichhammer (tn 53100). AFC for Ridgecrest Solar Power Project, dated 8/31/2009. Submitted to CEC/Docket Unit on 9/1/2009.

SM 2010a - Solar Millennium/A. Harron (tn 55004). Applicant's Responses to Energy Commission Data Request Set 1 & 2, dated 1/25/2010. Submitted to CEC/Docket Unit on 1/25/2010.

NOISE APPENDIX A
FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE

To describe noise environments and to assess impacts on noise sensitive area, a frequency weighting measure, which simulates human perception, is customarily used. It has been found that "A-weighting" of sound intensities best reflects the human ear's reduced sensitivity to low frequencies and correlates well with human perceptions of the annoying aspects of noise. The A-weighted decibel scale (dBA) is cited in most noise criteria. Decibels are logarithmic units that conveniently compare the wide range of sound intensities to which the human ear is sensitive. **Noise Table A1** provides a description of technical terms related to noise.

Noise environments and consequences of human activities are usually well represented by an equivalent A-weighted sound level over a given time period (L_{eq}), or by average day and night A-weighted sound levels with a nighttime weighting of 10 dBA (L_{dn}). Noise levels are generally considered low when ambient levels are below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA. Outdoor day-night sound levels vary over 50 dBA depending on the specific type of land use. Typical L_{dn} values might be 35 dBA for a wilderness area, 50 dBA for a small town or wooded residential area, 65 to 75 dBA for a major metropolis downtown (e.g., San Francisco), and 80 to 85 dBA near a freeway or airport. Although people often accept the higher levels associated with very noisy urban residential and residential-commercial zones, those higher levels nevertheless are considered to be levels of noise adverse to public health.

Various environments can be characterized by noise levels that are generally considered acceptable or unacceptable. Lower levels are expected in rural or suburban areas than would be expected for commercial or industrial zones. Nighttime ambient levels in urban environments are about seven decibels lower than the corresponding average daytime levels. The day-to-night difference in rural areas away from roads and other human activity can be considerably less. Areas with full-time human occupation that are subject to nighttime noise, which does not decrease relative to daytime levels, are often considered objectionable. Noise levels above 45 dBA at night can result in the onset of sleep interference effects. At 70 dBA, sleep interference effects become considerable (U.S. Environmental Protection Agency, Effects of Noise on People, December 31, 1971).

To help the reader understand the concept of noise in decibels (dBA), **Noise Table A2** illustrates common noises and their associated sound levels, in dBA.

Noise Table A1
Definition of Some Technical Terms Related to Noise

Terms	Definitions
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this testimony are A-weighted.
L_{10}, L_{50}, & L_{90}	The A-weighted noise levels that are exceeded 10%, 50%, and 90% of the time, respectively, during the measurement period. L_{90} is generally taken as the background noise level.
Equivalent Noise Level, L_{eq}	The energy average A-weighted noise level during the noise level measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 4.8 decibels to levels in the evening from 7 p.m. to 10 p.m., and after addition of 10 decibels to sound levels in the night between 10 p.m. and 7 a.m.
Day-Night Level, L_{dn} or DNL	The Average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10 p.m. and 7 a.m.
Ambient Noise Level	The composite of noise from all sources, near and far. The normal or existing level of environmental noise at a given location.
Intrusive Noise	That noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.
Pure Tone	A pure tone is defined by the Model Community Noise Control Ordinance as existing if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the two contiguous bands by 5 decibels (dB) for center frequencies of 500 Hz and above, or by 8 dB for center frequencies between 160 Hz and 400 Hz, or by 15 dB for center frequencies less than or equal to 125 Hz.

Source: Guidelines for the Preparation and Content of Noise Elements of the General Plan, Model Community Noise Control Ordinance, California Department of Health Services 1976, 1977.

Noise Table A2
Typical Environmental and Industry Sound Levels

Noise Source (at distance)	A-Weighted Sound Level in Decibels (dBA)	Noise Environment	Subjective Impression
Civil Defense Siren (100')	140-130		Pain Threshold
Jet Takeoff (200')	120		Very Loud
Very Loud Music	110	Rock Music Concert	
Pile Driver (50')	100		
Ambulance Siren (100')	90	Boiler Room	
Freight Cars (50')	85		
Pneumatic Drill (50')	80	Printing Press Kitchen with Garbage Disposal Running	Loud
Freeway (100')	70		Moderately Loud
Vacuum Cleaner (100')	60	Data Processing Center Department Store/Office	
Light Traffic (100')	50	Private Business Office	
Large Transformer (200')	40		Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing

Source: Handbook of Noise Measurement, Arnold P.G. Peterson, 1980

Subjective Response to Noise

The adverse effects of noise on people can be classified into three general categories:

- Subjective effects of annoyance, nuisance, dissatisfaction.
- Interference with activities such as speech, sleep, and learning.
- Physiological effects such as anxiety or hearing loss.

The sound levels associated with environmental noise, in almost every case, produce effects only in the first two categories. Workers in industrial plants can experience noise effects in the last category. There is no completely satisfactory way to measure the subjective effects of noise or of the corresponding reactions of annoyance and dissatisfaction, primarily because of the wide variation in individual tolerance of noise.

One way to determine a person's subjective reaction to a new noise is to compare the level of the existing (background) noise, to which one has become accustomed, with the

level of the new noise. In general, the more the level or the tonal variations of a new noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by the exposed individual.

With regard to increases in A-weighted noise levels, knowledge of the following relationships can be helpful in understanding the significance of human exposure to noise.

1. Except under special conditions, a change in sound level of 1 dB cannot be perceived.

2. Outside of the laboratory, a 3-dB change is considered a barely noticeable difference.

3. A change in level of at least 5 dB is required before any noticeable change in community response would be expected.

4. A 10-dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response (Kryter, Karl D., The Effects of Noise on Man, 1970).

Combination of Sound Levels

People perceive both the level and frequency of sound in a non-linear way. A doubling of sound energy (for instance, from two identical automobiles passing simultaneously) creates a 3-dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus 3 dB). **Noise Table A3** indicates the rules for decibel addition used in community noise prediction.

Noise Table A3
Addition of Decibel Values

When two decibel values differ by:	Add the following amount to the larger value
0 to 1 dB	3 dB
2 to 3 dB	2 dB
4 to 9 dB	1 dB
10 dB or more	0

Figures in this table are accurate to ± 1 dB.
Source: Architectural Acoustics, M. David Egan, 1988.

Sound and Distance

Doubling the distance from a noise source reduces the sound pressure level by 6 dB.

Increasing the distance from a noise source 10 times reduces the sound pressure level by 20 dB.

Worker Protection

OSHA noise regulations are designed to protect workers against the effects of noise exposure and list permissible noise level exposure as a function of the amount of time to which the worker is exposed, as shown in **Noise Table A4**.

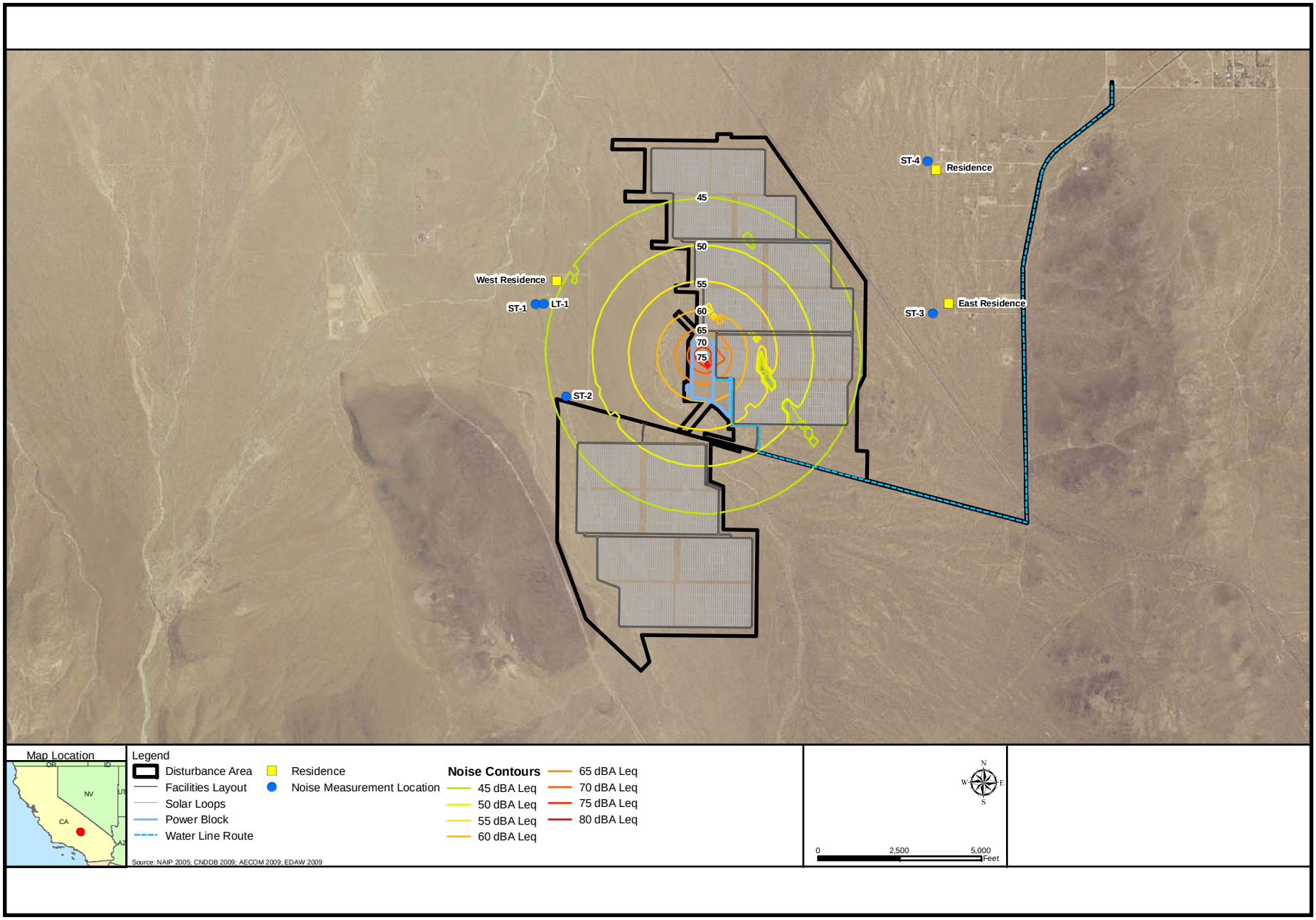
Noise Table A4
OSHA Worker Noise Exposure Standards

Duration of Noise (Hrs/day)	A-Weighted Noise Level (dBA)
8.0	90
6.0	92
4.0	95
3.0	97
2.0	100
1.5	102
1.0	105
0.5	110
0.25	115

Source: 29 CFR § 1910.95.

NOISE AND VIBRATION - FIGURE 1

Ridgecrest Solar Power Project - Noise Measurement Locations and Noise Contours



SOURCE: Solar Millenium, January 2010

C.7 PUBLIC HEALTH AND SAFETY

Testimony of Alvin Greenberg, Ph.D.

C.7.1 SUMMARY OF CONCLUSIONS

U.S. Bureau of Land Management and Energy Commission staff (hereafter jointly referred to as staff) have analyzed potential public health and safety risks associated with construction and operation of the Ridgecrest Solar Power Project (RSPP) and does not expect there would be any significant adverse cancer, or short - or long-term noncancer health effects from project toxic emissions. Staff's analysis of potential health impacts from the proposed RSPP project was based on a conservative health protective methodology that accounts for impacts to the most sensitive individuals in a given population, including newborns and infants. According to the results of staff's health risk assessment, emissions from RSPP would not contribute significantly to morbidity or mortality in any age or ethnic group residing in the project area.

C.7.2 INTRODUCTION

The purpose of this section of the Staff Assessment/Draft Plan Amendment/Draft Environmental Impact Statement (SA/DPA/DEIS) is to determine if emissions of toxic air contaminants (TACs) from the proposed RSPP project would have the potential to cause significant adverse public health impacts or to violate standards for public health protection. If potentially significant health impacts are identified, staff will evaluate mitigation measures to reduce such impacts to less than significant levels.

In addition to the analysis contained in this Public Health and Safety Section that focuses on potential effects to the public from emissions of toxic air contaminants, other related aspects to the assessment of potential public health and safety impacts from RSPP are considered elsewhere in this document as listed and briefly described below:

- Air Quality - evaluates the expected air quality impacts from the emissions of criteria air pollutants from both the construction and operation of the RSPP Project; Criteria air pollutants are defined as air contaminants for which the state and/or federal governments have established an ambient air quality standard to protect public health;
- Hazardous Materials Management - evaluates the potential impacts on public and worker health from accidental releases of hazardous materials;
- Socioeconomics and Environmental Justice - evaluates project-induced changes on community services including law enforcement and hospitals;
- Soil and Water Resources – evaluates the potential for RSPP to cause contamination of soil and water resources, to exacerbate flooding, and to cause adverse effects to water supply in consideration of other existing users and projected needs;
- Transmission Line Safety and Nuisance – evaluates potential effects associated with proposed transmission lines accounting for both the physical presence of the lines

and the physical interactions of their electric and magnetic fields; The potential effects include aviation safety, interference with radio-frequency communication, audible noise, fire hazards, hazardous shocks, nuisance shocks, and electric and magnetic field (EMF) exposure.

- Worker Safety and Fire Protection - assess the worker safety and fire protection measures proposed by the applicant including determining whether the project would have any adverse impacts on fire protection and emergency medical services that are also relied upon by the public;
- Waste Management - evaluates issues associated with wastes generated from the proposed project construction and operation including ensuring that wastes would be managed in an environmentally safe manner.

C.7.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

The analysis of proposed project effects must comply with both CEQA and NEPA requirements given the respective power plant licensing and land jurisdictions of the California Energy Commission (CEC) and U.S. Bureau of Land Management (BLM). CEQA requires that the significance of individual effects be determined by the Lead Agency.

Because this document is intended to meet the requirements of both NEPA and CEQA, the methodology used for determining environmental impacts of the proposed project includes a consideration of guidance provided by both laws.

CEQA requires a list of criteria that are used to determine the significance of identified impacts. A significant impact is defined by CEQA as “a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project” (State CEQA Guidelines Section 15382).

In comparison, NEPA states that “‘Significantly’ as used in NEPA requires considerations of both context and intensity…” (40 CFR 1508.27). Therefore, thresholds serve as a benchmark for determining if a project action will result in a significant adverse environmental impact when evaluated against the baseline. NEPA requires that an Environmental Impact Statement (EIS) is prepared when the proposed federal action (project) as a whole has the potential to “significantly affect the quality of the human environment.”

Thresholds for determining significance in this section are based on Appendix G of the CEQA Guidelines (CCR 2006) and performance standards or thresholds identified by the Energy Commission staff. In addition, staff’s evaluation of the environmental effects of the proposed project on land uses (i.e., those listed below) includes an assessment of the context and intensity of the impacts, as defined in the NEPA implementing regulations 40 CFR Part 1508.27.

Effects of the proposed project on the environment (and in compliance with both CEQA and NEPA) have been determined using the thresholds listed below.

The **PUBLIC HEALTH AND SAFETY** section of this staff assessment discusses toxic emissions to which the public could be exposed during project construction and routine operation. Following the release of toxic contaminants into the air or water, people may come into contact with them through inhalation, dermal contact, or ingestion via contaminated food or water.

Air pollutants for which no ambient air quality standards have been established are called noncriteria pollutants. Unlike criteria pollutants such as ozone, carbon monoxide, sulfur dioxide, or nitrogen dioxide, noncriteria pollutants have no ambient (outdoor) air quality standards that specify levels considered safe for everyone.

Since noncriteria pollutants do not have such standards, a health risk assessment is used to determine if people might be exposed to those types of pollutants at unhealthy levels. The risk assessment consists of the following steps:

- Identify the types and amounts of hazardous substances that RSPP could emit to the environment;
- Estimate worst-case concentrations of project emissions in the environment using dispersion modeling;
- Estimate amounts of pollutants that people could be exposed to through inhalation, ingestion, and dermal contact; and
- Characterize potential health risks by comparing worst-case exposure to safe standards based on known health effects.

Staff relies upon the expertise of the California Environmental Protection Agency (Cal/EPA) Office of Environmental Health Hazard Assessment (OEHHA) to identify contaminants that are known to the state to cause cancer or other noncancer toxicological endpoints and to calculate the toxicity and cancer potency factors of these contaminants. Staff also relies upon the expertise of the California Air Resources Board and the local air districts to conduct ambient air monitoring of toxic air contaminants and the state Department of Public Health to conduct epidemiological investigations into the impacts of pollutants on communities. It is not within the purview or the expertise of the Energy Commission staff to duplicate the expertise and statutory responsibility of these agencies.

Initially, a screening level risk assessment is performed using simplified assumptions that are intentionally biased toward protection of public health. That is, an analysis is designed that overestimates public health impacts from exposure to project emissions. In reality, it is likely that the actual risks from the power plant will be much lower than the risks as estimated by the screening level assessment. The risks for screening purposes are based on examining conditions that would lead to the highest, or worst-case, risks and then using those conditions in the study. Such conditions include:

- Using the highest levels of pollutants that could be emitted from the plant;
- Assuming weather conditions that would lead to the maximum ambient concentration of pollutants;
- Using the type of air quality computer model which predicts the greatest plausible impacts;

- Calculating health risks at the location where the pollutant concentrations are estimated to be the highest;
- Assuming that an individual's exposure to cancer-causing agents occurs continuously for 70 years; and
- Using health-based standards designed to protect the most sensitive members of the population (i.e., the young, elderly, and those with respiratory illnesses).

A screening level risk assessment will, at a minimum, include the potential health effects from inhaling hazardous substances. Some facilities may also emit certain substances that could present a health hazard from noninhalation pathways of exposure (OEHHA 2003, Tables 5.1, 6.3, 7.1). When these substances are present in facility emissions, the screening level analysis includes the following additional exposure pathways: soil ingestion, dermal exposure, and mother's milk (OEHHA 2003, p. 5-3).

The risk assessment process for this project addresses two categories of health impacts: chronic (long-term) noncancer effects, and cancer risk (also long-term). Since the only TAC emitted from this project would be diesel particulate from emergency diesel-fueled engines, and since only long-term health effects have been established for diesel particulate, no acute (short-term) health effects are calculated for this project.

Chronic health effects are those that arise as a result of long-term exposure to lower concentrations of pollutants. The exposure period is considered to be approximately from 12 percent to 100 percent of a lifetime, or from 8 to 70 years (OEHHA 2003, p. 6-5). Chronic health effects include diseases such as reduced lung function and heart disease.

The analysis for noncancer health effects compares the maximum project contaminant levels to safe levels called *Reference Exposure Levels*, or RELs. These are amounts of toxic substances to which even sensitive people can be exposed and suffer no adverse health effects (OEHHA 2003, p. 6-2). These exposure levels are designed to protect the most sensitive individuals in the population, such as infants, the aged, and people suffering from illness or disease which makes them more sensitive to the effects of toxic substance exposure. The Reference Exposure Levels are based on the most sensitive adverse health effect reported in the medical and toxicological literature and include margins of safety. The margin of safety addresses uncertainties associated with inconclusive scientific and technical information available at the time of standard setting and is meant to provide a reasonable degree of protection against hazards that research has not yet identified. The margin of safety is designed to prevent pollution levels that have been demonstrated to be harmful, as well as to prevent lower pollutant levels that may pose an unacceptable risk of harm, even if the risk is not precisely identified as to nature or degree. Health protection is achieved if the estimated worst-case exposure is below the relevant reference exposure level. In such a case, an adequate margin of safety exists between the predicted exposure and the estimated threshold dose for toxicity.

Exposure to multiple toxic substances may result in health effects that are equal to, less than, or greater than effects resulting from exposure to the individual chemicals. Only a small fraction of the thousands of potential combinations of chemicals have been tested

for the health effects of combined exposures. In conformity with the California Air Pollution Control Officers Association (CAPCOA) guidelines, the health risk assessment assumes that the effects of each substance are additive for a given organ system (OEHHA 2003, pp. 1-5, 8-12). Other possible mechanisms due to multiple exposures include those cases where the actions may be synergistic or antagonistic (where the effects are greater or less than the sum, respectively). For these types of substances, the health risk assessment could underestimate or overestimate the risks.

For carcinogenic substances, the health assessment considers the risk of developing cancer and assumes that continuous exposure to the cancer-causing substance occurs over a 70-year lifetime. The risk that is calculated is not meant to project the actual expected incidence of cancer, but rather a theoretical upper-bound number based on worst-case assumptions.

Cancer risk is expressed in chances per million and is a function of the maximum expected pollutant concentration, the probability that a particular pollutant will cause cancer (called *potency factors* and established by OEHHA), and the length of the exposure period. Cancer risks for each carcinogen are added to yield total cancer risk. The conservative nature of the screening assumptions used means that actual cancer risks due to project emissions are likely to be considerably lower than those estimated.

The screening analysis is performed to assess worst-case risks to public health associated with the proposed project. If the screening analysis predicts no significant risks, then no further analysis is required. However, if risks are above the significance level, then further analysis, using more realistic site-specific assumptions, would be performed to obtain a more accurate assessment of potential public health risks.

SIGNIFICANCE CRITERIA

Energy Commission staff determines the health effects of exposure to toxic emissions based on impacts to the maximum exposed individual. This is a person hypothetically exposed to project emissions at a location where the highest ambient impacts were calculated using worst-case assumptions, as described above.

As described earlier, noncriteria pollutants for this project are evaluated for long-term (chronic) noncancer health effects as well as cancer (long-term) health effects. The significance of project health impacts is determined separately for each of these categories.

Chronic Noncancer Health Effects

Staff assesses the significance of noncancer health effects by calculating a *hazard index*. A hazard index is a ratio comparing exposure from facility emissions to the reference (safe) exposure level. A ratio of less than 1.0 signifies that the worst-case exposure is below the safe level. The hazard index for every toxic substance that has the same type of health effect is added to yield a Total Hazard Index. A Total Hazard Index of less than 1.0 indicates that cumulative worst-case exposures are less than the reference exposure levels. Under these conditions, health protection from the project is

likely to be achieved, even for sensitive members of the population. In such a case, staff presumes that there would be no significant noncancer project-related public health impacts.

Cancer Risk

Staff relied upon regulations implementing the provisions of Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986, (Health & Safety Code, §§25249.5 et seq.) for guidance to determine a cancer risk significance level. Title 22, California Code of Regulations section 12703(b) states that "the risk level which represents no significant risk shall be one which is calculated to result in one excess case of cancer in an exposed population of 100,000, assuming lifetime exposure." This level of risk is equivalent to a cancer risk of 10 in 1 million, which is also written as 10×10^{-6}. An important distinction is that the Proposition 65 significance level applies separately to each cancer-causing substance, whereas staff determines significance based on the total risk from all cancer-causing chemicals. Thus, the manner in which the significance level is applied by staff is more conservative (health-protective) than that applied by Proposition 65. The significant risk level of 10 in 1 million is consistent with the level of significance adopted by many air districts. In general, a project with a cancer risk level above 10 in 1 million would not be approved.

As noted earlier, the initial risk analysis for a project is typically performed at a screening level, which is designed to overstate actual risks, so that health protection can be ensured. Staff's analysis also addresses potential impacts on all members of the population including the young, the elderly, people with existing medical conditions that may make them more sensitive to the adverse effects of toxic air contaminants, and any minority or low-income populations that are likely to be disproportionately affected by impacts. To accomplish this goal, staff uses the most current acceptable public health exposure levels set to protect the public from the effects of airborne toxics. When a screening analysis shows cancer risks to be above the significance level, refined assumptions would likely result in a lower, more realistic risk estimate. Based on refined assumptions, if risk posed by the facility exceeds the significance level of 10 in 1 million, staff would require appropriate measures to reduce the risk to less than significant. If, after all risk reduction measures had been considered, a refined analysis identifies a cancer risk greater than 10 in 1 million, staff would deem such risk to be significant and would not recommend project approval.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Public Health and Safety Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Clean Air Act section 112 (Title 42, U.S. Code section 7412)	This act requires new sources that emit more than 10 tons per year of any specified Hazardous Air Pollutant (HAP) or more than 25 tons per year of any combination of HAPs to apply Maximum Achievable Control Technology.
State	
California Health and Safety Code section 25249.5 et seq. (Proposition 65)	These sections establish thresholds of exposure to carcinogenic substances above which Prop 65 exposure warnings are required.
California Health and Safety Code section 41700	This section states that "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."
California Health and Safety Code Sections 44300 et seq.	Air Toxics Hot Spots Program requires participation in the inventory and reporting program at the District level.
California Health and Safety Code Sections 44360 - 44366	Air Toxics Hot Spots Information and Assessment Act requires that based on results of an HRA conducted per CARB/OEHHA guidelines, toxic contaminants do not exceed acceptable levels.
California Public Resource Code section 25523(a); Title 20 California Code of Regulations (CCR) section 1752.5, 2300–2309 and Division 2 Chapter 5, Article 1, Appendix B, Part (1); California Clean Air Act, Health and Safety Code section 39650, et seq.	These regulations require a quantitative health risk assessment for new or modified sources, including power plants that emit one or more toxic air contaminants (TACs).
Local	
Kern County Air Pollution Control District (KCAPCD) Rule 419; Nuisance	Prohibits the discharge of air contaminates or other materials which cause injury, detriment, nuisance, or annoyance to the public or which endangers the comfort, repose, health or safety of the public or which causes injury or damage to business or property.
KCAPCD CEQA Implementation Guidelines	Provide significance thresholds under CEQA for exposure of sensitive receptors to cancer and non-cancer public health risk impacts.

C.7.4 PROPOSED PROJECT

C.7.4.1 SETTING AND EXISTING CONDITIONS

This section describes the environment in the vicinity of the proposed project site from the public health perspective. Features of the natural environment, such as meteorology and terrain, affect the project's potential for causing impacts on public health. An emissions plume from a facility may affect elevated areas before lower terrain areas, due to a reduced opportunity for atmospheric mixing. Consequently, areas of elevated terrain can often be subjected to increased pollutant impacts. Also, the types of land use near a site influence the surrounding population distribution and density, which, in turn, affects public exposure to project emissions. Additional factors affecting potential public health impacts include existing air quality, existing public health concerns, and environmental site contamination.

Site and Vicinity Description

The proposed facility would be located in the high desert portion of Kern County, approximately five miles southwest of the city of Ridgecrest. The project layout (which has been slightly revised since the original AFC) is described and depicted in Data Response ALT-49 and accompanying figures (SM 2010a). The topography of the site is essentially flat (about 2,630 feet to 2,770 feet above sea level). Undeveloped desert surrounds the project site from all directions, with some elevated terrain existing to the east, west, and south within 2-3 miles of the site (SM 2009a, Section 2.4.1).

The general population includes many sensitive subgroups that may be at greater risk from exposure to emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses. Sensitive receptors in the project vicinity are listed in Section 5.6.2.1 of the AFC. There are four sensitive receptors within a 3-mile radius of the project site, the nearest of which is the Mountain View Christian Academy (school or church) located about 1.6 miles northeast of the project site. The nearest residence is approximately 2,000 feet west of the northwestern fenceline of the reconfigured solar field #1 (SM 2009a, Section 5.6.2.1 and SM 2010a). As mentioned above, the location of sensitive receptors near the proposed site is an important factor in considering potential public health impacts.

Meteorology

Meteorological conditions, including wind speed, wind direction, and atmospheric stability, affect the extent to which pollutants are dispersed into ambient air as well as the direction of pollutant transport. This, in turn, affects the level of public exposure to emitted pollutants and associated health risks. When wind speeds are low and the atmosphere is stable, for example, dispersion is reduced and localized exposure may be increased.

This region of Kern County (part of the Mojave Desert) is characterized by a dry-hot desert climate; summers are hot and dry, winters are moderate with low precipitation, and temperature inversions are strong. The region typically experiences clear skies and

strong seasonal winds. Winds generally flow from the southwest across the region and tend to transport air pollutants from the Los Angeles area into the Mojave Desert Air Basin (SM 2009a, section 5.2.2.1).

Atmospheric stability is a measure related to turbulence, or the ability of the atmosphere to disperse pollutants due to convective air movement. Mixing heights (the height above ground level through which the air is well mixed and in which pollutants can be dispersed) are lower during mornings due to temperature inversions and increase during the warmer afternoons. Staff's **AIR QUALITY** section presents more detailed meteorological data.

Existing Air Quality

The proposed site is within the jurisdiction of the Kern County Air Quality Management District (KCAQMD). By examining average toxic concentration levels from representative air monitoring sites in the project vicinity with cancer risk factors specific to each contaminant, lifetime cancer risk can be calculated to provide a background risk level for inhalation of ambient air. For comparison purposes, it should be noted that the overall lifetime cancer risk for the average individual in the United States from all causes is about 1 in 3, or 333,000 in one million. For the year 2004, the American Cancer Society estimated that the death rate due to cancer was 23.1%, about 1 in 4.

There are no monitoring stations within the Mojave Desert Air Basin (MDAB) that measure TACs, and therefore the background cancer risk in the MDAB cannot be determined. The nearest California Air Resources Board (CARB) air toxics monitoring station that actively reports values is located in Bakersfield, approximately 80 miles west of the project site. Although staff does not consider this location to be representative of air quality in the area of the proposed site, it serves to show the upper-bound levels of toxic air contaminants found in the region. In 2008, the background cancer risk calculated by CARB for the Bakersfield California Ave monitoring station was 92 in one million (CARB 2009). The pollutants 1,3-butadiene and benzene, emitted primarily from mobile sources, accounted together for more than half of the total risk. The risk from 1,3-butadiene was about 25 in one million, while the risk from benzene was about 33 in one million. Formaldehyde accounts for about 21% of the 2008 average calculated cancer risk based on air toxics monitoring results, with a risk of about 19 in one million. Formaldehyde is emitted directly from vehicles and other combustion sources, such as the proposed facility. The risk from hexavalent chromium was about 5 in one million, or ~5% of the total risk.

The use of reformulated gasoline, beginning in the second quarter of 1996, as well as other toxics reduction measures, have led to a decrease of ambient levels of toxics and associated cancer risk in all areas of California during the past few years. For example, in one large air district, cancer risk was 342 in one million based on 1992 data and in 2002, the average inhalation cancer risk decreased to 162 in one million. Similar reductions occurred throughout the state's major metropolitan areas.

Existing Public Health Concerns

When evaluating a new Project, staff sometimes conducts an analysis of existing public health issues in the Project vicinity. This analysis is prepared in order to identify the

current status of respiratory diseases (including asthma), cancer, and childhood mortality rates in the population located near the proposed Project, which provides a basis on which to evaluate the significance of any additional health impacts from the proposed Project. Because of the very low population in the immediate vicinity of the project and because no existing health concerns within a 6-mile radius of the project have been identified by the applicant (SM 2009a, Section 5.10.2) or by the Kern County Health Department, staff did not conduct an analysis of existing public health issues.

Environmental Site Contamination

Site disturbances occur during demolition of existing structures, facility construction from excavation, grading, and earth moving. Such activities have the potential to adversely affect public health through various mechanisms, such as the creation of airborne dust, material being carried off-site through soil erosion, and uncovering buried hazardous substances. The Phase I Environmental Site Assessment conducted for the original proposed site in 2009 found no "Recognized Environmental Conditions" per the American Society for Testing and Materials Standards (ASTM) definition. That is, there was no evidence or record of any use, spillage, or disposal of hazardous substances on the site, nor was there any other environmental concern that would require remedial action (SM 2009a, Section 5.16.2.3 & Appendix I).

To address the possibility that soil contamination would be encountered during construction of the RSPP, proposed Conditions of Certification **WASTE-1** and **WASTE-2** require a registered professional engineer or geologist to be available during soil excavation and grading to ensure proper handling and disposal of contaminated soil. Staff believes that adherence to current ordinances and to staff's proposed Conditions of Certification mentioned above will be adequate to address any soil or groundwater contamination that exists on this site. See the SA/DPA/DEIS section on **WASTE MANAGEMENT** for a more detailed analysis of this topic.

C.7.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Construction Impacts and Mitigation

Potential risks to public health during construction may be associated with exposure to toxic substances in contaminated soil disturbed during site preparation (discussed in the "Setting" section above), as well as diesel exhaust from heavy equipment operation. Criteria pollutant impacts from the operation of heavy equipment and particulate matter from earth moving are examined in staff's **AIR QUALITY** analysis.

The operation of construction equipment will result in air emissions from diesel-fueled engines. Diesel emissions are generated from sources such as trucks, graders, cranes, welding machines, electric generators, air compressors, and water pumps. Although diesel exhaust contains criteria pollutants such as nitrogen oxides, carbon monoxide, and sulfur oxides, it also includes a complex mixture of thousands of gases and fine particles. These particles are primarily composed of aggregates of spherical carbon particles coated with organic and inorganic substances. Diesel exhaust contains over 40 substances that are listed by the U.S. Environmental Protection Agency (U.S. EPA) as hazardous air pollutants and by the California Air Resources Board (ARB) as toxic air contaminants.

Exposure to diesel exhaust may cause both short- and long-term adverse health effects. Short-term effects can include increased cough, labored breathing, chest tightness, wheezing, and eye and nasal irritation. Long-term effects can include increased coughing, chronic bronchitis, reductions in lung function, and inflammation of the lung. Epidemiological studies also strongly suggest a causal relationship between occupational diesel exhaust exposure and lung cancer.

Based on a number of health effects studies, the Scientific Review Panel (SRP) on Toxic Air Contaminants recommended a chronic REL (see REL discussion in Method of Analysis section above) for diesel exhaust particulate matter of 5 $\mu g/m^3$ and a cancer unit risk factor of $3x10^{-4}$ $(\mu g/m^3)^{-1}$ (SRP 1998, p. 6). [The SRP, established pursuant to California Health and Safety Code section 39670, evaluates the risk assessments of substances proposed for identification as Toxic Air Contaminants by ARB and the Department of Pesticide Regulation (DPR). The SRP reviews the exposure and health assessment reports and the underlying scientific data upon which the reports are based.] The SRP did not recommend a value for an acute REL, since available data in support of a value was deemed insufficient. On August 27, 1998, ARB listed particulate emissions from diesel-fueled engines as a toxic air contaminant and approved SRP's recommendations regarding health effect levels.

Construction of the RSPP, including site preparation, is anticipated to take place over a period of 28 months (SM 2009a, Section 5.2.4.1). As noted earlier, assessment of chronic (long-term) health effects assumes continuous exposure to toxic substances over a significantly longer time period, typically from eight to seventy years.

AFC Appendix E.2 and the Construction Emissions Attachment to DR- AIR-3 (SM 2010a) present maximum daily and annual emissions from construction activities including fugitive dust and diesel exhaust. In response to Data Request # 123, the applicant conducted a health risk assessment for diesel particulate matter (DPM) from construction equipment emissions using the OFFROAD2007 model to estimate emissions. The applicant estimated that 13,934 pounds of DPM would be emitted during the entire construction period (about 2.3 years). In order to model the cancer risk from construction emissions, the applicant divided the total amount of DPM by the exposure period of 70 years which is typically used to assess health risks. The applicant's modeling of worst-case construction emissions (using a 100-meter spacing receptor grid) found that the cancer risk was estimates to be 3.42 in one million at the point of maximum impact (PMI), below the level of significance of 10 in one million. The chronic hazard index was found to be 0.002 at the PMI, below the level of significance of 1.0. The PMI was located in a remote area that is not frequently accessed by the public (SM 2010a, DR-PH-123).

Mitigation measures are proposed by both the applicant and Air Quality staff to reduce the maximum calculated PM10 as well as PM2.5 concentrations. These include the use of extensive fugitive dust control measures that are assumed to result in 90% reduction of fugitive dust emissions. In order to mitigate potential impacts from particulate emissions during the operation of diesel-powered construction equipment, Air Quality staff recommends the use of ultra low-sulfur diesel fuel and Tier 2 or Tier 1 California Emission Standards for Off-Road Compression-Ignition Engines or the installation of an oxidation catalyst and soot filters on diesel equipment. The catalyzed diesel particulate

filters are passive, self-regenerating filters that reduce particulate matter, carbon monoxide, and hydrocarbon emissions through catalytic oxidation and filtration. The degree of particulate matter reduction is comparable for both mitigation measures in the range of approximately 85-92%. Such filters will reduce diesel emissions during construction and further reduce the impacts associated with diesel exhaust. (See the **AIR QUALITY** section of this SA/DPA/DEIS for staff's proposal to control particulate matter.)

Operation Impacts and Mitigation

Emissions Sources

The emissions sources at the proposed RSPP site include one auxiliary boiler, one HTF heater, one cooling tower, one diesel-fueled emergency generator, one diesel-fueled emergency fire pump, one ullage tank vent, and DPM from maintenance vehicles.

As noted earlier, the first step in a health risk assessment is to identify potentially toxic compounds that may be emitted from the facility. Table 5.10-4 of the AFC lists toxic air contaminants that may be emitted by the project along with the toxicity values used to calculate their health affects. Toxicity values include RELs which are used to calculate short-term and long-term noncancer health effects, and cancer unit risks, which are used to calculate the lifetime risk of developing cancer, as published in the OEHHA Guidelines (OEHHA 2003). **Public Health and Safety Table 2** lists toxic emissions and shows how each contributes to the health risk analysis.

Public Health and Safety Table 2
Types of Health Impacts and Exposure Routes Attributed to Toxic Emissions*

Substance	Oral Cancer	Oral Noncancer	Inhalation Cancer	Noncancer (Chronic)	Noncancer (Acute)
Benzene			✔	✔	✔
Biphenyl**					
Chloroform			✔	✔	✔
Dichlorobenzene			✔	✔	
Diesel Exhaust			✔	✔	
Formaldehyde			✔	✔	✔
Hexane				✔	
Naphthalene		✔	✔	✔	
Polycyclic Aromatic Hydrocarbons (PAHs)	✔	✔	✔	✔	
Toluene				✔	✔
Xylene				✔	✔

*Source: OEHHA 2003 Appendix L and SM 2009a, Table 5.10-4.
**Biphenyl has no established risk factors or RELs.

Appendix E.2 and Tables 5.10-5 through 5.10-8 of the AFC lists non-criteria pollutants and their emission factors that may be emitted from the sources listed above (SM 2009a). Emission factors for the majority of plant components were obtained from the U.S. EPA emission factors database (AP-42) and the California Air Toxics Emission Factors (CATEF II) database. Data from an existing solar plant (Kramer Junction Solar Energy Generating System Facility) was used to estimate emissions from the HTF expansion tanks, which consist of benzene and biphenyl. Since biphenyl has not been assigned a health risk factor, it was not included in the HRA calculations (SM 2009a, Section 5.10.3.2).

In response to Data Request 127, the applicant stated that VOC emissions from the HTF expansion tank are estimated to be 137 pounds per MW per year, based on comparable thermal solar projects and on an operational mass balance for the ullage system developed by the applicant's solar design engineer. In regards to the composition of VOC emissions from the HTF expansion tank, the applicant notes that HTF breakdown products may include benzene, toluene, xylene, phenol, naphthalene, methane, ethane, benzenol, and biphenyl. In the health risk assessment conducted for this project the applicant modeled the entire amount of HTF emissions as benzene since it is the compound with the highest health risk factors for cancer and non-cancer effects (SM 2010a, DR-PH-127).

In response to Data Requests 124 and 126, the applicant provided total daily and yearly DPM emissions from maintenance vehicles and total cumulative daily and yearly PM2.5 emissions including fugitive dust and DPM. The total DPM emissions from maintenance vehicles were estimated to be 2.13 pounds per year and the total PM2.5 emissions were estimated to be 4,360 pounds per year. DPM emissions are therefore negligible when compared to non-exhaust emissions which represent 99.9% of PM emissions. The estimated DPM emissions from maintenance vehicles were added to the applicant's revised health risk assessment.

Since the RSPP project intends to use groundwater for cooling, the potential exists for TACs present in the water to disperse into the air via cooling tower drift. The applicant conducted water sampling and analysis of the on-site well water for VOCs, petroleum hydrocarbons, pesticides, herbicides, minerals and metals. The results are presented in Table DR-PH-129-1, showing that two metals considered as TACs are present in the well water, arsenic and vanadium. Emissions calculations for the project's health risk assessment were revised to include the metals detected in the groundwater samples (SM 2010a, DR-PH-129).

Emissions Levels

Once potential emissions are identified, the next step is to quantify them by conducting a "worst case" analysis. Maximum hourly emissions are required to calculate acute (one-hour) noncancer health effects, while estimates of maximum emissions on an annual basis are required to calculate cancer and chronic (long-term) noncancer health effects.

The next step in the health risk assessment process is to estimate the ambient concentrations of toxic substances that may result from the project. This is accomplished by using a screening air dispersion model and assuming conditions that

result in maximum impacts. The applicant's screening analysis was performed using the ARB/OEHHA Hotspots Analysis and Reporting Program (HARP) modeling program. Finally, ambient concentrations were used in conjunction with RELs and cancer unit risk factors to estimate health effects which might occur from exposure to facility emissions. Exposure pathways, or ways in which people might come into contact with toxic substances, include inhalation, dermal (through the skin) absorption, soil ingestion, consumption of locally grown plant foods, and mother's milk.

The above method of assessing health effects is consistent with OEHHA's Air Toxics Hot Spots Program Risk Assessment Guidelines (OEHHA 2003) referred to earlier, and results in the following health risk estimates.

Impacts

The applicant's revised screening health risk assessment for the project (provided in Data Response 125) including all sources resulted in a maximum acute hazard index of 0.035 and a maximum chronic hazard index of 0.0011 at the point of maximum impact (PMI). The worst-case cancer risk was calculated to be 2.55 in 1,000,000 at the PMI. As **Public Health and Safety Table 3** shows, both acute and chronic hazard indices are under the significance level of 1.0 and cancer risk is under the significant level of 10 in 1,000,000, indicating that no short- or long-term adverse health effects are expected.

Public Health and Safety Table 3
Operation Hazard/Risk at Point of Maximum Impact

Type of Hazard/Risk	Hazard Index/Risk	Significance Level	Significant?
Acute Noncancer	0.035	1.0	No
Chronic Noncancer	0.0011	1.0	No
Individual Cancer	2.55 in one million	10 in one million	No

Source: SM 2010a Table DR-PH-125-1.

Staff conducted a thorough evaluation of the risk assessment results presented in the Ridgecrest Solar Power Project AFC (09-AFC-9) and in the "Responses to CEC Staff Public Health Data Requests 123-130" (January 2010). Staff conducted this evaluation in order to determine if the applicant's modeling was both transparent and verifiable. Modeling files provided by the applicant were also reviewed. Staff concludes that standard procedures were followed and appropriate assumptions were made in the applicant's analysis.

Construction Phase Analysis

For the construction phase analysis, atmospheric dispersion modeling of diesel particulate matter (DPM) emissions from construction equipment and vehicles was conducted by the applicant using the OFFROAD2007 Model. Total on-site PM emissions from diesel construction equipment exhaust over the estimated two and a half year construction period was provided in the January 2010 data responses and is

13,934 lbs. The corresponding annual DPM emission rate for exhaust emissions from onsite construction equipment and vehicles is 199 lb/yr for residential exposure over a 70 year lifetime.

The maximum predicted offsite concentration of diesel particulate matter, on a 70-year basis, was reported by the applicant to be 0.0107 ug/m^3 (Tighe 2010). Cancer risk due to diesel exhaust emissions was determined by multiplying the DPM concentration by the diesel cancer inhalation unit risk of 0.0003 $(ug/m^3)^{-1}$. Cancer risk at the location of the maximum offsite concentration was determined to be 3.2 in a million and chronic HI to be 0.0021 (noncancer chronic REL is 5 ug/m^3).

Operations Phase Analysis

For the operations phase analysis, atmospheric dispersion modeling of facility emissions was conducted by the applicant using AERMOD. Local meteorological data were used, building downwash effects were included for 26 buildings, and 1,444 grid receptors were modeled.

A total of 17 emitting units were modeled by the applicant for facility operations including:

- 1 auxiliary boiler
- 1 cooling tower (modeled as two sources)
- 1 HTF (heat transfer fluid) heater
- 1 ullage system vent
- 1 diesel emergency generator
- 1 diesel firewater pump
- Mobile sources involved in routine operations (mirror washing trucks, trucks used in weed abatement, trucks used in application of soil stabilizer, water trucks); 10 on-site points modeled for emissions
- Total of 17 emitting sources evaluated at the proposed facility

The HTF (heat transfer fluid) is circulated through the solar field where it is heated by sunlight concentrated on the receiver tube elements of the solar collectors. HTF is comprised of biphenyl/diphenyl oxide. Thermal decomposition of HTF results in decomposition products that can include benzene, phenol and toluene. In modeling HTF fugitive loss emissions, the applicant assumed that 99% of the emissions would be comprised of benzene.

Staff used the HARP On-Ramp program to load the applicant's AERMOD results into the CARB/OEHHA Hotspots Analysis and Reporting Program (HARP), Version 1.4a for the risk analysis. Exposure pathways assessed include inhalation, ingestion of home-grown produce, dermal absorption, soil ingestion and mother's milk. Emission factors obtained from the applicant's modeling files and used in this analysis are listed in **Public Health and Safety Table 4**. For risk calculations using the HARP model, the "Derived (Adjusted) Method" was used for cancer risk and the "Derived (OEHHA) Method" was used for chronic noncancer hazard.

Cancer risk and chronic and acute hazard index values obtained by staff are compared to results reported by the applicant in the January 2010 response to data requests in **Public Health and Safety Table 5**. Risk and hazard were determined at the point of maximum impact, PMI, under the 70 year residential scenario. The nearest residential receptor was identified by the applicant to be located approximately 2000 feet west of the northwest boundary of the reconfigured northern solar field while the maximally exposed individual resident (MEIR) is located at the northeast corner of the project site. Seventy-four residential and four sensitive receptors were identified within three miles of the project site.

Public Health and Safety Table 6 presents substance- and source-specific cancer risks at the PMI. Analysis of this table indicates that 97% of the cancer risk at the PMI is attributed to emissions from three sources: 50% due to emissions from the HTF ullage system, 26% due to emissions from the diesel firewater pump engine and 21% due to emissions from the emergency generator. Additional analysis indicates that 98% of cancer risk at the PMI is attributed to emissions of two substances: 50% due to benzene emissions (from the auxiliary boiler, the HTF heater and ullage system) and 48% due to diesel particulate matter emissions (from onsite mobile sources as well as the two diesel engines).

Cumulative impacts were not evaluated. A proposed Super Wal-Mart store and wind monitoring projects on Bureau of Land Management lands are located within six miles of the project site (SM 2009a, page 5.10-19).

Public Health and Safety Table 4
Operation Phase Emission Rates

Substance	Annual Average Emissions (lbs/year)	Maximum 1-Hour Emissions (lbs/hour)
EMISSION RATES FROM THE AUXILIARY BOILER		
Benzene	1.17E-01	7.21E-05
DiClBenzenes	6.69E-02	4.12E-05
Formaldehyde	4.18E+00	2.57E-03
Hexane	1.00E+02	6.20E-02
Naphthalene	3.40E-02	2.09E-05
Toluene	1.90E-01	1.17E-04
PAHs-w/o	3.32E-03	2.05E-06
EMISSION RATES FROM EACH OF 2 COOLING TOWER CELLS		
Arsenic	7.71E-04	2.08E-07
Chloroform	6.94E+01	9.38E-06
Vanadium	3.08E-03	8.33E-07
EMISSION RATES FROM THE HTF HEATER		
Benzene	3.60E-02	7.21E-05
DiClBenzenes	2.06E-02	4.12E-05
Formaldehyde	1.29E+00	2.57E-03
Hexane	3.09E+01	6.20E-02
Naphthalene	1.05E-02	2.09E-05
Toluene	5.80E-02	1.17E-04
PAHs-w/o	1.02E-03	2.05E-06
EMISSION RATES FROM THE ULLAGE SYSTEM VENT		
Benzene	3.00E+02	7.50E-01
Biphenyl	3.00E-02	7.50E-05
EMISSION RATES FROM OPERATION OF EACH OF 4 EMERGENCY GENERATORS		
Diesel PM	48.3	-
EMISSION RATES FROM OPERATION OF EACH OF 4 EMERGENCY FIRE PUMPS		
Diesel PM	4.96	-
EMISSION RATES FROM ON-SITE MAINTENANCE VEHICLES		
Diesel PM	0.18 – 0.24	-

Public Health and Safety Table 5
Cancer Risk and Chronic Hazard Due to Operation Phase Emissions.

	Staff's Analysis			Applicant's Analysis		
	Cancer Risk (per million)	**Acute HI**	**Chronic HI**	**Cancer Risk (per million)**	**Acute HI**	**Chronic HI**
PMI (for cancer risk and chronic HI, Rec #1157)	2.50	0.023	0.0015	2.55	0.035*	0.0011
MEIR (Rec#1406)	0.081	0.0049	0.000065	0.088	0.0072	0.00004

**At Receptor 1156.*

Public Health and Safety Table 6. Results of Staff's Analysis: Contribution to Total Cancer Risk by Individual Substances from All Sources at the Point of Maximum Impact (PMI).

Substance	Auxiliary Boiler	Cooling Tower (2 stacks)	Diesel Generator	Diesel Firewater Pump
Arsenic		3.65E-09		
Benzene	1.44E-10			
Chloroform		3.40E-08		
DieselExhPM			5.26E-07	6.42E-07
Formaldehyde	1.08E-09			
Naphthalene	5.02E-11			
PAHs-w/o	2.30E-08			
TOTAL	2.43E-08	3.77E-08	5.26E-07	6.42E-07

Substance	HTF Heater	Ullage System Vent	On-site Mobile Sources (10 sources)	Total Cancer Risk
Arsenic				3.65E-09
Benzene	6.80E-12	1.25E-06		1.25E-06
Chloroform				3.40E-08
DieselExhPM			1.96E-08	1.19E-06
Formaldehyde	5.12E-11			1.13E-09
Naphthalene	2.38E-12			5.26E-11
PAHs-w/o	1.08E-09			2.41E-08
TOTAL	1.15E-09	1.25E-06	1.96E-08	2.50E-06

Cooling Towers

In addition to being a source of potential toxic air contaminants, the possibility exists for bacterial growth including Legionella to occur in the one small wet cooling tower used to cool ancillary equipment. Legionella is a bacterium that is ubiquitous in natural aquatic environments and is also widely distributed in man-made water systems. It is the principal cause of legionellosis, otherwise known as Legionnaires' Disease, which is similar to pneumonia. Transmission to people results mainly from inhalation or aspiration of aerosolized contaminated water. Untreated or inadequately treated cooling systems, such as industrial cooling towers and building heating, ventilating, and air conditioning systems, have been correlated with outbreaks of legionellosis.

Legionella can grow symbiotically with other bacteria and can infect protozoan hosts. This provides Legionella with protection from adverse environmental conditions, including making it more resistant to water treatment with chlorine, biocides, and other disinfectants. Thus, if not properly maintained, cooling water systems and their components can amplify and disseminate aerosols containing Legionella.

The State of California regulates recycled water for use in cooling towers in Title 22, Section 60303, California Code of Regulations. This section requires that, in order to protect workers and the public who may come into contact with cooling tower mists, chlorine or another biocide must be used to treat the cooling system water to minimize the growth of Legionella and other micro-organisms. This regulation does not apply to the RSPP project since it intends to use groundwater supplied from the Indian Wells Valley Water District (IWVWD); however, the potential remains for Legionella growth in cooling water at the RSPP due to nutrients found in groundwater.

The U.S. EPA published an extensive review of Legionella in a human health criteria document (EPA 1999). The U.S. EPA noted that Legionella may propagate in biofilms (collections of microorganisms surrounded by slime they secrete, attached to either inert or living surfaces) and that aerosol-generating systems such as cooling towers can aid in the transmission of Legionella from water to air. The U.S. EPA has inadequate quantitative data on the infectivity of Legionella in humans to prepare a dose-response evaluation. Therefore, sufficient information is not available to support a quantitative characterization of the threshold infective dose of Legionella. Thus, the presence of even small numbers of Legionella bacteria presents a risk - however small - of disease in humans.

In February of 2000 the Cooling Technology Institute (CTI) issued its own report and guidelines for the best practices for control of Legionella (CTI 2000). The CTI found that 40-60 percent of industrial cooling towers tested were found to contain Legionella. More recently, staff has received a 2005 report of testing in cooling towers in Australia that found the rate of Legionella presence in cooling tower waters to be extremely low, approximately three to six percent. The cooling towers all had implemented aggressive water treatment and biocide application programs similar to that required by proposed condition of certification **PUBLIC HEALTH-1**.

To minimize the risk from Legionella, the CTI noted that consensus recommendations included minimization of water stagnation, minimization of process leads into the cooling

system that provide nutrients for bacteria, maintenance of overall system cleanliness, the application of scale and corrosion inhibitors as appropriate, the use of high-efficiency mist eliminators on cooling towers, and the overall general control of microbiological populations.

Good preventive maintenance is very important in the efficient operation of cooling towers and other evaporative equipment (ASHRAE 1998). Preventive maintenance includes having effective drift eliminators, periodically cleaning the system if appropriate, maintaining mechanical components in working order, and maintaining an effective water treatment program with appropriate biocide concentrations. Staff notes that most water treatment programs are designed to minimize scale, corrosion, and biofouling and not to control Legionella.

The efficacy of any biocide in ensuring that bacterial and in particular Legionella growth, is kept to a minimum is contingent upon a number of factors including but not limited to proper dosage amounts, appropriate application procedures and effective monitoring.

In order to ensure that Legionella growth is kept to a minimum, thereby protecting both nearby workers as well as members of the public, staff has proposed Condition of Certification **PUBLIC HEALTH-1**. The condition would require the project owner to prepare and implement a biocide and anti-biofilm agent monitoring program to ensure that proper levels of biocide and other agents are maintained within the small wet cooling tower water at all times, that periodic measurements of Legionella levels are conducted, and that periodic cleaning is conducted to remove bio-film buildup. Staff believes that with the use of an aggressive antibacterial program coupled with routine monitoring and biofilm removal, the chances of Legionella growing and dispersing would be reduced to insignificance. The applicant has stated that an appropriate biocide program and anti-biofilm agent monitoring program would be implemented for the cooling towers (SM 2009a, Section 5.10.3.5).

Closure and Decommissioning Impacts and Mitigation

Closure of the proposed RSPP (temporary or permanent) would follow a closure plan prepared by the applicant and designed to minimize public health and environmental impacts. Staff expects that impacts to public health from the closure and decommissioning process would represent a fraction of the impacts associated with the construction or operation of the proposed RSPP. Therefore based on staff's analysis for the construction and operation phases of this project, staff concludes that public health-related impacts from closure and decommissioning of the RSPP would be insignificant.

C.7.4.3 CEQA LEVEL OF SIGNIFICANCE

Staff's analysis of public health impacts from the proposed RSPP has determined that impacts would be below the CEQA level of significance.

C.7.5 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because (1) it eliminates about 42 percent of the proposed project area so all

impacts are reduced, especially those related to desert washes, biological resources (desert tortoise and Mohave ground squirrel), cultural resources, and recreational uses, and (2) avoids constructing a solar facility in the Mohave Ground Squirrel Conservation Area (MGSCA).

Similar to the proposed project, the Northern Unit Alternative would transmit power to the grid through the planned SCE 230-kV substation to be located near the proposed project site. The power block covering approximately 18 acres, would remain north of Brown Road, as proposed by the project and would include all operational power facilities, structures, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system). The proposed transmission line alignment is 3,900 ft and would connect to the proposed switchyard (3.2 acres) adjacent to the existing SCE 230kV transmission line, west of the proposed project. In addition, the site would require access roads, a parking lot, bio-remediation unit and main office building (3 acres) all of which are proposed north of Brown Road within the proposed project footprint. The proposed 16.3 acre water line would remain at the location as proposed by the project. The Northern Unit Alternative would not require the relocation of the two existing SCE transmission lines.

As stated above, the Northern Unit Alternative is evaluated in this SA/DPA/DEIS because it would reduce some impacts of the project. Additionally, the Northern Unit Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals, while minimizing impacts to the desert environment. A limited acreage alternative was suggested in scoping comments.

C.7.5.1 SETTING AND EXISTING CONDITIONS

The Northern Unit Alternative would consist of 167 solar collector array loops with a net generating capacity of approximately 146 MW. The total disturbance area would be approximately 1134 acres of land. This alternative would retain 58 percent of the proposed solar array loops and would affect 58 percent of the land of the proposed 250 MW project. The boundaries of the Northern Unit Alternative are shown in **Alternatives Figure 1.**

C.7.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Northern Unit Alternative is likely to result in some reduced emissions due to the smaller scope of the project, which would slightly decrease the cancer risk and chronic and acute hazard indices predicted for the 250 MW project as proposed. However, the differences in health risk would be so minor as to not be quantifiable and the public health analysis has determined that the cancer risk and chronic and acute hazard indices are far below the level of significance pursuant CEQA at the point of maximum impact for the project as proposed.

C.7.5.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA level of significance for public health would not change with the Northern Unit Alternative, as both the project as proposed and the Northern Unit Alternative would have impacts below the level of significance. The same conditions of certification would be required for the Northern Unit Alternative and the project as proposed.

C.7.6 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would be a 104 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because it eliminates about 58 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources, and cultural resources.

Similar to the proposed project, the Southern Unit Alternative would transmit power to the grid through the planned SCE 230-kV substation to be located near the proposed project site. The power block, spanning approximately 18 acres, would remain north of Brown Road, as proposed by the project and would include all operational power facilities, structures, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system). The proposed transmission line alignment is 3,900 ft and would connect to the proposed switchyard (3.2 acres) adjacent to the existing SCE 230kV transmission line, west of the proposed project. In addition, the site would require access roads, a parking lot, bio-remediation unit and main office building (3 acres) all of which are proposed north of Brown Road. The proposed 16.3 acre water line would remain at the location as proposed by the project. Similar to the proposed project, the Southern Unit Alternative would require the relocation of the two existing SCE transmission lines; this realignment would require approximately 58.2 acres.

As stated above, the Southern Unit Alternative is evaluated in this SA/DPA/DEIS because it would reduce some impacts of the project. Additionally, the Southern Unit Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals, while minimizing impacts to the desert environment. A limited acreage alternative was suggested in scoping comments.

C.7.6.1 SETTING AND EXISTING CONDITIONS

The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of approximately 104 MW. The total disturbance area would be approximately 908 acres of land. This alternative would retain 42 percent of the proposed solar array loops and would affect 42 percent of the land of the proposed 250 MW project. The boundaries of the Southern Unit Alternative are shown in **Alternatives Figure 2**. This area was would avoid a large portion of the El Paso Wash and sensitive biological resources, including areas that were mapped as occupied tortoise and Mohave ground squirrel habitat (live tortoise and/or active burrows and sign).

C.7.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Southern Unit Alternative is likely to result in some reduced emissions due to the smaller scope of the project, which would slightly decrease the cancer risk and chronic and acute hazard indices predicted for the 250 MW project as proposed. However, the differences in health risk would be so minor as to not be quantifiable and the public health analysis has determined that the cancer risk and chronic and acute hazard indices are far below the level of significance pursuant CEQA at the point of maximum impact for the project as proposed.

C.7.6.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA level of significance for public health would not change with the Southern Unit Alternative, as both the project as proposed and the Southern Unit Alternative would have impacts below the level of significance. The same conditions of certification would be required for the Southern Unit Alternative and the project as proposed.

C.7.7 ORIGINAL PROPOSED PROJECT ALTERNATIVE

The Original Proposed Project Alternative would be a 250 MW solar facility as originally proposed by Solar Millennium. This alternative is analyzed because it would reduce the amount of land developed within the Mojave Ground Squirrel Conservation Area and it could transmit the full 250 MW of power that Solar Millennium has requested.

Similar to the proposed project, the Original Proposed Project Alternative would transmit power to the grid through the planned SCE 230-kV substation located near the proposed project site and would require infrastructure including main office building (3 acres), power block, water line, transmission line, switch yard, access roads, parking area, bio-remediation unit and maintenance building. The 18-mile off-site water line route would follow the same route as the proposed project. The bioremediation unit would be located north of Brown Road, within the proposed project footprint; the power block and ancillary facilities would be located south of Brown Road on approximately 18 acres in addition to the transmission line and switch-yard (5.5 acres). The Original Proposed Project Alternative would require the relocation of the two existing SCE transmission lines.

As stated above, the Original Proposed Alternative is evaluated in this SA/DPA/DEIS because it reduces land developed with the MGSCA. Additionally, the Original Proposed Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals.

C.7.7.1 SETTING AND EXISTING CONDITIONS

The Original Proposed Project Alternative would consist of 278 solar array loops with a net generating capacity of approximately 250 MW. The total disturbance area would be approximately 1,794 acres of land A shorter transmission interconnection – 1,250 feet as compared to the proposed project interconnection of 3,900 feet – would be needed. The boundaries of the Original Proposed Project Alternative are shown in **Alternatives Figure 3**. This project footprint contains two desert ephemeral washes that would require redirection and smaller dry desert washes also traverse the site. In addition this site is the location of prime desert tortoise and Mojave ground squirrel habitat.

C.7.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Construction and operation of the Original Proposed Project Alternative would have similar public health impacts to those analyzed for the current configuration of the RSPP, since this alternative is comprised of the same equipment rearranged in a different configuration and location and with a slightly smaller footprint.

C.7.7.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA level of significance for public health would not change with the Original Proposed Project Alternative, as both the project as currently proposed and previous configuration would have impacts below the level of significance. The same conditions of certification would be required for both alternatives.

C.7.8 NO PROJECT/NO ACTION ALTERNATIVES

C.7.8.1 NO PROJECT/NO ACTION ALTERNATIVE #1

No Action on Ridgecrest Solar Power Project application and on CDCA land use plan amendment

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the public health-related impacts of the Ridgecrest Solar Power Project would not occur at the proposed site. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations

C.7.8.2 NO PROJECT/NO ACTION ALTERNATIVE #2

No Action on Ridgecrest Solar Power Project and amend the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. It is expected that public health-related impacts would result from the construction and operation of the solar technology and would likely be similar to the public health-related impacts from the proposed project. As such, this No Project/No Action Alternative could result in the public health-related impacts similar to the impacts under the proposed project.

C.7.8.3 NO PROJECT/NO ACTION ALTERNATIVE #3

No Action on Ridgecrest Solar Power Project application and amend the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, this No Project/No Action Alternative would not result in public health-related impacts. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.7.9 COMPARISON OF ALTERNATIVES AND PROPOSED PROJECT

Table X Comparison of Proposed Project and Alternatives

	Proposed Project (250 MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250 MW)	No Project/No Action*
Estimated Cancer Risk at PMI	Below level of significance of 10 in one million	Below level of significance of 10 in one million (the differences in health risk would be so minor as to not be quantifiable)	Below level of significance of 10 in one million (the differences in health risk would be so minor as to not be quantifiable)	Below level of significance of 10 in one million (the differences in health risk would be so minor as to not be quantifiable)	Unknown

*All No Project/No Action alternatives assume that the RSPP project would not be built on the proposed site

C.7.10 CUMULATIVE IMPACTS

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (California Code Regulation, Title 14, section 15130). NEPA states that cumulative effects can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR §1508.7).

C.7.10.1 GEOGRAPHIC EXTENT

For the purpose of the public health cumulative analysis, emissions from construction or operation of the RSPP could potentially combine with emissions from past, present and reasonably foreseeable projects to result in adverse health effects to the public. Cumulative impacts in the area of public health could occur if emission sources are close enough so that their plumes combine. Due to differences in emission source elevations, terrain features, wind direction, and other meteorological factors, it is unlikely that emission plumes from two or more facilities would combine unless they are located in very close proximity. Furthermore, dispersion of plumes tends to occur in parallel, preventing the mixing of plumes from separate locations. On the basis of numerous previous air dispersion modeling conducted by staff to assess public health cumulative impacts, staff finds that the geographic area considered for cumulative impacts on Public Health is only within the project boundaries or within 1/4 mile of the project.

C.7.10.2 EXISTING CUMULATIVE CONDITIONS

For this analysis, staff analyzed the potential of existing projects in the vicinity of the RSPP to contribute to cumulative impacts. The only existing nearby facility is the China Lake Naval Weapons Center, where activities may produce fugitive dust and DPM. This emissions source, located several miles north of the proposed RSPP, is not close enough to cause cumulative impacts with the proposed RSPP. Staff's previous modeling has shown repeatedly that unless two sources are within approximately one-quarter of a mile, their cumulative health risks do not combine to turn an insignificant individual health risk into a significant one.

C.7.10.3 FUTURE FORESEEABLE PROJECTS

Foreseeable Projects in the Project Area

Staff analyzed the potential of foreseeable projects in the vicinity of the RSPP to contribute to cumulative impacts, which include a waste water treatment plant, a solar project, and three wind projects.

The construction of the RSPP is not expected to result in short term adverse impacts related to public health. It is expected that some of the cumulative projects described above which are not yet built may be under construction the same time as the RSPP, however, short term impacts related to Public Health during construction of those cumulative projects are not expected to occur due to the short duration of construction and the distance between the RSPP and future projects.

The operation of the RSPP is not expected to result in long term adverse impacts related to Public Health. The worst-case cancer risk calculated by the Applicant is 2.55 in one million at the PMI. The point of maximum impact occurs where pollutant concentrations from RSPP would theoretically be the highest. Even at this location, staff does not expect any significant change in lifetime risk to any person, and the increase does not represent any real contribution to the average lifetime cancer incidence rate due to all causes (environmental as well as life-style and genetic). Modeled facility-related residential risks are lower at more distant locations, and actual risks are expected to be much lower since worst-case estimates are based on conservative

assumptions and thus overstate the true magnitude of the risk expected. Therefore, staff does not consider the incremental impact of the additional risk posed by RSPP to be either individually or cumulatively significant.

Foreseeable Renewable Projects in the California Desert

The nature of public health impacts from exposure to materials that could result in negative health effects combined with the vast area over which the future solar and wind development projects would be built in southeastern California, as well as the relative isolation of these projects from sensitive receptors, precludes the potential for impacts of these projects to combine with each other to result in significant impacts. Any emission from construction of these projects would be dispersed over these areas and would not be expected to result in chronic health problems to sensitive receptors. Operation of the future solar and wind energy projects would result in negligible emissions, mostly related to worker vehicles and maintenance trucks, therefore, operation of these future projects would not result in negative regional health effects.

C.7.10.4 OVERALL CONCLUSION

Public health impacts of the RSPP would not combine with impacts of any past, present, or reasonably foreseeable projects to result in cumulatively considerable local or regional impacts. Therefore, no mitigation is recommended to address potential cumulative project impacts.

C.7.11 COMPLIANCE WITH LORS

Staff has considered the minority population as identified in **Socioeconomics Figure 1** in its impact analysis and has found no potential significant adverse impacts for any receptors, including environmental justice populations. In arriving at this conclusion, staff notes that its analysis complies with all directives and guidelines from the Cal/EPA Office of Environmental Health Hazard Assessment and the California Air Resources Board. Staff's assessment is biased toward the protection of public health and takes into account the most sensitive individuals in the population. Using extremely conservative (health-protective) exposure and toxicity assumptions, staff's analysis demonstrates that members of the public potentially exposed to toxic air contaminant emissions of this project—including sensitive receptors such as the elderly, infants, and people with pre-existing medical conditions—will not experience any significant chronic or cancer health risk as a result of that exposure. Staff believes that it incorporated every conservative assumption called for by state and federal agencies responsible for establishing methods for analyzing public health impacts. The results of that analysis indicate that there would be no direct or cumulative significant public health and safety impact to any population in the area. Therefore, given the absence of any significant health impacts, there are no disparate health impacts and there are no environmental justice issues associated with **PUBLIC HEALTH AND SAFETY**.

Staff concludes that construction and operation of the RSPP will be in compliance with all applicable LORS regarding long-term and short-term project impacts in the area of **PUBLIC HEALTH AND SAFETY**.

C.7.12N NOTEWORTHY PUBLIC BENEFITS

It is noteworthy that a solar electric generating facility such as the proposed RSPP project would emit significantly less TACs to the environment than other energy sources available in California such as natural gas or biomass, thereby reducing the health risks that would otherwise occur with these non-renewable energy sources. At the same time, the proposed RSPP would provide much needed electrical power to California residences and businesses, and will contribute to electric reliability. Electrical power is not only necessary to maintain a functioning society, but it also benefits many individuals who rely on powered equipment for their health (such as dialysis equipment and temperature control equipment). For example, it is documented that during heat waves in which elevated air-conditioning use causes an electrical blackout, hospitalizations and deaths due to heat stroke are increased.

C.7.13 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

PUBLIC HEALTH-1 The Project owner shall develop and implement a Cooling Water Management Plan to ensure that the potential for bacterial growth in cooling water is kept to a minimum. The Plan shall be consistent with either staff's "Cooling Water Management Program Guidelines" or with the Cooling Technology Institute's "Best Practices for Control of Legionella" guidelines but in either case, the Plan must include sampling and testing for the presence of Legionella bacteria at least every six months. After two years of power plant operations, the Project owner may ask the CPM to re-evaluate and revise the Legionella bacteria testing requirement.

Verification: At least 60 days prior to the commencement of cooling tower operations, the Cooling Water Management Plan shall be provided to the CPM for review and approval.

C.7.14 CONCLUSIONS

Staff has analyzed potential public health risks associated with construction and operation of the RSPP and does not expect any significant adverse cancer, short-term, or long-term health effects to any members of the public including low income and minority populations, from project toxic emissions. Staff also concludes that its analysis of potential health impacts from the proposed RSPP uses a conservative health protective methodology that accounts for impacts to the most sensitive individuals in a given population, including newborns and infants. According to the results of staff's health risk assessment, emissions from the RSPP project would not contribute significantly to morbidity or mortality in any age or ethnic group residing in the project area. With the incorporation of staff's proposed mitigation (Condition of Certification **PUBLIC HEALTH-1**), the proposed facility will not present a significant health risk to the public.

C.7.15 REFERENCES

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C.8 SOCIOECONOMCIS AND ENVIRONMENTAL JUSTICE

Testimony of Sue Walker

C.8.1 SUMMARY AND CONCLUSIONS

Energy Commission staff (hereafter referred to as staff) concludes that the 250-megawatt (MW) (nominal) Solar Millennium Ridgecrest Solar Power Project (RSPP or proposed project) would not result in significant adverse direct, indirect, or cumulative socioeconomics impacts. Staff additionally concludes that the RSPP would not result in any disparate health impacts to environmental justice (low income or minority) populations. Gross public benefits from the proposed project include capital costs, construction and operation payroll, and sales taxes.

C.8.2 INTRODUCTION

Staff's socioeconomics impact analysis evaluates project-induced changes on existing population and employment patterns, housing, public services, local business and government revenues and related community issues such as environmental justice. A discussion of the project's estimated beneficial economic impacts and contribution to cumulative impacts are addressed as well.

C.8.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

C.8.3.1 METHODOLOGY

Staff reviewed the socioeconomics section of the applicant's RSPP Application for Certification (AFC) (09-AFC-9), its Data Adequacy Supplement to the AFC, and conducted independent research and analysis from various sources information provided by governmental agencies and trade associations to both verify the content of the AFC's socioeconomics section and augment the information that was contained within it.

In this analysis, staff used fixed numeric and percentage criteria for evaluating population, demography and employment. Impacts on housing, schools, hospitals and emergency services, law enforcement, fire protection, parks and recreation, and cumulative impacts are based on both qualitative and quantitative data, as available from governmental agencies and trade associations, and involved, as needed, professional judgment. The impact criteria used for this analysis and its conclusions are provided in Section C.10.3.2, below.

C.8.3.2 THREHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

The analysis of RSPP's impacts must comply with both California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) requirements given the respective power plant licensing and land management jurisdictions and authority of the California Energy Commission and BLM.

For the purposes of satisfying the requirements of both CEQA and NEPA, the phrases "action" and "project" are used synonymously in this analysis to refer to implementation (construction, operation and closure and decommissioning) of the proposed RSPP or one of its alternatives.

CEQA requires a list of criteria to determine the significance of identified impacts. A significant impact is defined by CEQA as “a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project” (State CEQA Guidelines Section 15382).

Thresholds serve as the benchmark for determining if a project will result in a significant adverse impact when evaluated against existing conditions (e.g., "baseline" conditions). CEQA and the State CEQA Guidelines do not provide specific, quantifiable thresholds of significance for socioeconomic impact determinations. To the contrary, State CEQA Guideline Section 15064(e) specifies that: "[e]conomic and social changes resulting from the project shall not be treated as significant effects on the environment." However, Section 15064(e) continues by stating that when "a physical change is caused by economic or social effects of a project, the physical change may be regarded as a significant effect in the same manner as any other physical change resulting from the project. Alternatively, economic and social effects of a physical change may be used to determine that the physical change is a significant effect on the environment. If the physical change causes adverse economic or social effects on people, those adverse effects may be used as a factor in determining whether the physical change is significant. For example, if a project would cause overcrowding of a public facility and the overcrowding causes an adverse effect on people, the overcrowding would be regarded as a significant effect."

In lieu of specific thresholds of significance for socioeconomic impacts under CEQA, staff has used Appendix G of the State CEQA Guidelines for this analysis, which specifies that a project could have a significant effect on population, housing, and public services if it would:

- Induce substantial population growth in an area, either directly or indirectly;
- Displace substantial numbers of people and/or existing housing, necessitating the construction of replacement housing elsewhere; or
- Adversely impact acceptable levels of service for fire and police protection, schools, parks and recreation, and hospitals and emergency medical response.
- In addition, staff concludes that the following is relevant to the proposed project's adverse and beneficial effects:
- Substantially change local employment; or
- Cause a substantial change in revenue for local businesses or government agencies.

- Under CEQA, impacts are typically categorized as being significant and unavoidable (e.g., impacts that cannot be mitigated to a level of less than significant), adverse but mitigable to a level of less than significant, adverse but less than significant or no impact. Staff has used these categories to calibrate impacts and identify conditions of approval/mitigation measures, as warranted and feasible.

Appendix D of the BLM's "Land Use Planning Handbook" (BLM 2005) provides the socioeconomic attributes that are recommended for consideration as part of the BLM's land use decision making process. Appendix D of the "Land Use Planning Handbook" acknowledges that the full range of socioeconomic topics to be considered in land use decisions is shaped, in part, by the specific social context and potential resource allocation(s) associated with an action. Table D-2 of the "Land Use Planning Handbook" lists 27 socioeconomic topics for possible consideration as part of the land use decision making process, and the table's accompanying text recommends the prioritization of these topics according to the following criteria: (1) "Basic" (the topic should be addressed); (2) "Optional" (the topic should be addressed if warranted by "context" and "issues"); and, (3) "Not Currently Indicated" (the topic should be addressed if warranted by new information) (BLM 2005).

Of the 27 topics listed in Table D-2, the following socioeconomic issues are noted as "Basic:" population; inequality (e.g., the identification of vulnerable populations); communities of place (e.g., the identification of local and regional population centers); occupational and interest groups; distribution of communities, roads, and resources (e.g., the identification of wildland-urban interfaces and recreational demand); interrelationships among producing sectors (e.g., regional economic sectors); employment; personal income; and, environmental justice (BLM 2005). Based upon staff's review of the Table D-2 of the BLM's "Land Use Planning Handbook," it has been determined that the "Basic" topics listed above are germane to the RSPP's socioeconomics analysis; however, no additional topics have been identified as needing review and assessment.

C.8.3.3 LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Socioeconomics Table 1 contains the socioeconomic and environmental justice laws, ordinances, regulations, and standards (LORS) applicable to the proposed RSPP.

Socioeconomics Table 1
Laws, Ordinances, Regulations and Standards (LORS)

Applicable LORS	Description
Federal	
Emergency Economic Stabilization Act of 2008 (P.L. 110-343) Business Solar Investment Tax Credit (ITC) (IR Code §48)	This Act extends the 30% ITC for solar energy property for eight years through December 31, 2016. The bill allows the ITC to be used to offset both regular and alternative minimum tax (AMT) and waives the public utility exception of current law (i.e., permits utilities to directly invest in solar facilities and claim the ITC). The five-year accelerated depreciation allowance for solar property is permanent and unaffected by passage of the eight-year extension of the solar ITC.
State	
California Education Code, Section 17620	The governing board of any school district is authorized to levy a fee, charge, dedication, or other requirement for the purpose of funding the construction or reconstruction of school facilities.
California Government Code, Sections 65996–65997	These sections include provisions for school district levies against development projects. As amended by Senate Bill 50 (Greene, Chapter 407, section 23, Statutes of 1998), these sections state that, except for fees established under Education Code 17620, state and local public agencies may not impose fees, charges, or other financial requirements to offset the cost of school facilities.
California Revenue and Taxation Code, Sections 721–725: California Board of Equalization (BOE) – Property Tax Rule 905 (BOE authority to assess electrical generating facilities is found in Article XIII, Section 19, of California's Constitution)	Property Tax Rule 905 states “the Board shall annually assess every electric generation facility with generating capacity of 50 MW or more...” It also states that for purposes of this rule, “electric generation facility” does not include a qualifying small power production facility or qualifying cogeneration facility within the meaning of section 201 and section 210 of Title II of the Public Utility Regulatory Policies Act of 1978. According to this act, (16 USC, Section 796 [17] [A]), a “small power production facility is defined as ’A facility which is eligible solar, wind, waste, or geothermal facility...[that] has a power production capacity, which together with any other facilities located at the same site, is not greater than 80 MW.’”

C.8.4 PROPOSED PROJECT

C.8.4.1 SETTING AND EXISTING CONDITIONS

The RSPP is located northeastern Kern County, California, approximately five miles southwest of the City of Ridgecrest. The proposed project site is located on federal land managed by the BLM. The RSPP would include two solar fields: Solar Field #1 (North) would be approximately 894 acres in size; and, Solar Field #2 (South) would be approximately 554 acres in size. The total land disturbance (inside and outside of the site's fenceline) would be 1,944 acres. It would additionally require a new 12-inch diameter water supply pipeline approximately 4.6 miles in length, a new 230 kilovolt (kV)

transmission line approximately 0.75 mile in length, the rerouting of an estimated 1.6 miles of two existing transmission lines and a new 230kV switchyard. In addition, the proposed project would require access roads, a parking lot, a bio-remediation unit and a main office building. Please refer to Section B.1for a detailed description of the proposed project.

Construction of the RSPP would require an average of 405 employees over a 28-month construction period, with a peak workforce of approximately 633 employees during the11th month of construction (AECOM Environment 2009a). Operation of the RSPP would require an estimated workforce of 84 full-time employees.

Research shows that workers may commute as much as two hours from their place of residence rather than relocate for their employment (EPRI 1982). Portions of the Tulare, Inyo, Kern, San Bernardino and Los Angeles Counties fall within a two-hour driving distance of the project site. However, the vast majority of that portion of Inyo County which is within a two-hour commuting distance of the project site is made up of the China Lake Naval Weapons Center (CLNWC), and the remaining areas of Inyo County that are within a two-hour commuting distance are sparsely populated. Similarly, that portion of Tulare County which is within a two-hour commuting distance of the project site is comprised of Sequoia National Forest, which is also sparsely populated. As such, to focus the analysis on those population centers that are most likely to be affected by the RSPP, either directly or indirectly, the socioeconomics study area is comprised of Kern, Los Angeles and San Bernardino Counties. It is noted, though, that the project's impact on some socioeconomic attributes would be localized, such as in the case of law enforcement and emergency response services; as such, in those instances where the socioeconomics study area is centered on a smaller geographic area, it is specified below.

Demographic Characteristics

According to the California Department of Finance (DOF), California had an estimated population of 37,883,992 people as of January 1, 2008 and population of 38,292,687 people as of January 1, 2009; between 2008 and 2009 there was thus a population increase of 1.1% (DOF 2009a). As of January 1, 2009 Kern County had a population of 827,173 people, Los Angeles County has a population of 10,393,185 people and San Bernardino County had a population of 2,060,950 people; all three counties experienced population increases between January 2008 and January 2009, including a 0.8% increase in San Bernardino County, a 0.9% increase in Los Angeles County, and an 1.5% increase in Kern County (DOF 2009b).

Similar to the population increases that occurred between 2008 and 2009, the populations of the State and Kern, Los Angeles and San Bernardino Counties are expected to continue growing through 2050, as outlined in **Socioeconomics Table 2**.

Socioeconomics Table 2
Population Projections Through 2050

Location	Year					
	2000	2010	2020	2030	2040	2050
California	34,105,437	39,135,676	44,135,923	49,240,891	54,226,115	59,507,876
Percent Change from Previous Decade	___	+12.8	+11.3	+10.4	+9.2	+8.9
Kern County	665,519	871,728	1,086,113	1,352,627	1,707,239	2,106,024
Percent Change from Previous Decade	___	+23.7	+19.7	+19.7	+20.8	+18.9
Los Angeles County	9,578,960	10,514,663	11,214,237	11,920,289	12,491,606	13,061,787
Percent Change from Previous Decade	___	+8.9	+6.2	+5.9	+4.6	+4.4
San Bernardino County	1,721,942	2,177,596	2,581,371	2,958,939	3,309,292	3,662,193
Percent Change from Previous Decade	___	+20.9	+15.6	+12.8	+10.6	+9.6

Source: DOF 2009b
____ Data not available

At a local scale, for the years 2006 through 2008 the U.S. Census Bureau estimates that the City of Ridgecrest had a population of 27,613 people (U.S. Census Bureau 2009). For the year 2000 Census (the most recently available data), the estimated populations for the other cities and communities within an estimated 60 linear miles of the project site were as follows: Tehachapi - 10,957 people; California City - 8,385 people; Mojave - 3,836 people; Boron - 2,025 people; Inyokern - 984 people; Lake Isabella - 3,315 people; Kernville - 1,736 people; Wofford Heights - 2,276 people; Randsburg - 77 people; and, Johannesburg - 176 people (U.S. Census Bureau 2000).

Demographic Screening and Environmental Justice

Executive Order 12898, “Federal Actions to address Environmental Justice in Minority Populations and Low-Income Populations,” focuses federal attention on the environment and human health conditions of minority communities and calls on federal agencies to achieve environmental justice as part of this mission. The order requires the United States Environmental Protection Agency (USEPA) and all other federal agencies (as well as State agencies receiving federal funds) to develop strategies to address this issue. The agencies are required to identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations.

According to the Council on Environmental Quality's "Environmental Justice: Guidance Under the National Environmental Policy Act," minority individuals are defined as members of the following groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic (Council on Environmental Quality 1997).

For all siting cases, Energy Commission staff conducts an environmental justice screening analysis in accordance with the "Final Guidance for Incorporating Environmental Justice Concerns in USEPA's National Environmental Policy Act (NEPA) Compliance Analysis" dated April 1998, which defined minority populations as either:

- The minority population of the affected area is greater than 50% of the affected area's general population; and
- The minority population percentage of the area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

To detect poverty, the U.S. Census Bureau uses a set of money income thresholds that vary by family size and composition to detect poverty. If a family's total income is less than that family's established threshold, then each individual within that family is considered to be below-poverty-level. The definition of poverty counts income before taxes and excludes capital gains and non-cash benefits (such as public housing, Medicaid and food stamps) (U.S. Census Bureau 1999). For the U.S. Census Bureau year 1999, which applies to the data associated with the year 2000 U.S. census count, the national poverty thresholds for income for the 48 contiguous states were as follows:

- Family of 1: $8,501
- Family of 2: $10,869
- Family of 3: $13,290
- Family of 4: $17,029
- Family of 5: $20,127
- Family of 6: $22,727
- Family of 7: $25,912
- Family of 8: $28,967
- Family of 9 or more: $34,417

The steps recommended by the above-referenced guidance documents to assure compliance with Executive Order 12898 are: (1) outreach and involvement; (2) a screening-level analysis to determine the existence of a minority or low-income population; and, (3) if warranted, a detailed examination of the distribution of impacts on segments of the population.

Although the U.S. Census Bureau has prepared and published some data sets for race and income for the years 2006 through 2008, such data is not available for all regions of the country or for the entire State of California. As such, to ensure a consistent data set for the evaluation of minority and below-poverty-level populations, staff's screening process relies on Year 2000 U.S. Census Bureau data.

Minority Populations

Socioeconomics Table 3 provides the demographic profile for race/ethnicity for Kern, Los Angeles and San Bernardino Counties, as well as the City of Ridgecrest and the Inyokern U.S. Census Bureau Census Designated Place (CDP), which are the two closest population centers to the project site. Overall, the counties themselves have similar race/ethnicity profiles, the exception being that Los Angeles County has greater Asian and Hispanic/Latino (of any race) populations and a correspondingly smaller White population in comparison to the other two counties. At a local level, Ridgecrest and Inyokern also have similar race/ethnicity profiles with the exception of Inyokern

having smaller Black or African American and Hispanic/Latino (of any race) populations and a larger American Indian or Alaskan Native population when compared to Ridgecrest. The counties, as a whole, have appreciably higher minority populations than Ridgecrest and Inyokern. The City of Ridgecrest has a total minority population of 23.5% and Inyokern has a total minority population of 16.2%.

Socioeconomics Table 3
Demographic Profiles by Race/Ethnicity

Race/Ethnicity	Kern County	Los Angeles County	San Bernardino County	City of Ridgecrest	Inyokern CDP[1]
Total Population With Persons of Hispanic or Latino Origin (Any Race) Incorporated					
White					
• Number of Persons	407,581	4,637,062	1,006,960	20,446	863
• Percent of Population	61.6	48.7	58.9	82.0	87.7
Black of African American					
• Number of Persons	39,798	930,957	155,348	879	4
• Percent of Population	6.0	9.8	9.1	3.5	0.4
American Indian or Alaska Native					
• Number of Persons	9,999	76,988	19,915	270	48
• Percent of Population	1.5	0.8	1.2	1.1	4.9
Asian					
• Number of Persons	22,268	1,137,500	80,217	967	22
• Percent of Population	3.4	11.9	4.7	3.9	2.2
Native Hawaiian/Other Pacific Islander					
• Number of Persons	972	27,053	5,110	144	0
• Percent of Population	0.1	0.3	0.3	0.6	0.0
Some Other Race					
• Number of Persons	153,610	2,239,997	355,843	1,229	10
• Percent of Population	23.2	23.5	20.8	4.9	1.0
Two or More Races					
• Number of Persons	27,417	469,781	86,041	992	37
• Percent of Population	4.1	4.9	5.0	4.0	3.8
Total Population - Number of Persons	661,645	9,519,338	1,709,434	24,927	984
Total Population - Percent[2]	100	100	100	100	100
Total Population Minority and Non-Minority Populations					
Minority Populations					
Hispanic or Latino (Of Any Race)					
• Number of Persons	254,036	4,242,213	669,387	3,001	64
• Percent Total Population	38.4	44.6	39.2	12.0	6.5
Other Race - Not Hispanic or Latino or White Alone					
• Number of Persons	80,419	2,317,511	287,825	2,859	95
• Percent Total Population	12.1	24.3	16.8	11.5	9.7
Total Minority Population					
• Number of Persons	334,455	6,559,724	957,212	5,860	159
• Percent Total Population	50.5	68.9	56	23.5	16.2
Total Non-Minority Population (White Alone)					
• Number of Persons	327,190	2,959,614	752,222	19,067	825
• Percent Total Population	49.5	31.1	44	76.5	83.8
Total Population - Number of Persons	661,645	9,519,338	1,709,434	24,927	984
Total Population - Percent[2]	100	100	100	100	100

Source: U.S. Census Bureau, 2000

[1] CDP: Census Designated Place: a statistical entity defined for each decennial census according to U.S. Census Bureau guidelines, comprising a densely settled concentration of population that is not within an incorporated place, but is locally identified by a name. CDPs are delineated cooperatively by state and local officials and the Census Bureau, following Census Bureau guidelines. Beginning with Census 2000 there are no size limits.

[2] Rounding errors to the nearest tenth may occur, as provided by the U.S. Census Bureau.

Socioeconomics Figure 1 provides, at a U.S. Census Bureau block level, the minority populations within a six-mile radius of the project site. The total population within a six-mile radius of the project site is 29,383 persons, with a total minority population of 6,405 persons, or 21.8% (rounded). As such, the minority population of the total population within six-miles of the project site is not greater than 50%. Similarly, the minority population within a six-mile radius of the project site is substantially less than the minority populations of the tri-county region and falls within the range of the minority populations of Ridgecrest and Inyokern; therefore, the minority population is not considered to be meaningfully greater than the minority population percentage of the general population.

Below-Poverty-Level Populations

Socioeconomics Table 4 provides the total number and percent of individuals and families that fall below-poverty-level for Kern, Los Angeles and San Bernardino Counties, as well as the City of Ridgecrest and the Inyokern CDP.

Socioeconomics Table 4
Below-Poverty-Level Population Profiles

Below-Poverty-Level Population Attribute	Kern County	Los Angeles County	San Bernardino County	City of Ridgecrest	Inyokern CDP[1]
Total Population	661,645	9,519,338	1,709,434	24,927	984
Number of All Persons Below-Poverty-Level[2]	130,949	1,674,599	263,412	3,042	196
Percent of All Persons Below-Poverty-Level[3]	20.8	17.9	15.8	12.3	20.5
Total Number of Families	157,723	2,154,311	407,205	6,801	248
Number of All Families Below-Poverty-Level	26,467	311,226	51,186	691	26
Percent of All Families Below-Poverty-Level	16.8	14.4	12.6	10.2	10.5

Source: U.S. Census Bureau, 2000

[1] CDP: Census Designated Place: a statistical entity defined for each decennial census according to U.S. Census Bureau guidelines, comprising a densely settled concentration of population that is not within an incorporated place, but is locally identified by a name. CDPs are delineated cooperatively by state and local officials and the Census Bureau, following Census Bureau guidelines. Beginning with Census 2000 there are no size limits.

[2] Weighted average (per data available from U.S. Census Bureau).

[3] Percent of persons below-poverty-level versus total population varies between 0.1 and 1.0% due to weighted averages. Total percent of all persons below-poverty-level is derived from U.S. Census Bureau data.

As indicated in **Socioeconomics Table 4**, population percentages for all persons falling below-poverty-level for Kern, Los Angeles and San Bernardino Counties range between 15.8-20.8%, and the percent of all families falling below-poverty-level ranges between 12.6-16.8%. For the City of Ridgecrest and Inyokern, the percentages of all persons falling below-poverty-level are 12.3 and 20.5, respectively; within Ridgecrest 10.2% of all families fall below-poverty-level and within Inyokern 10.5% of all families fall below-poverty-level.

Within a six mile radius of the project site, year 2000 U.S. Census data was used at a census block group level to detect the below-poverty-level population. At a census block group level, approximately 12.6% of the population was found to be below-poverty-level, consistent with range provided in **Socioeconomics Table 4**. The number of individuals within a six-mile radius of the project site falls below 50% of its total population; additionally, the percent of individuals falling below-poverty-level in this area is less than the percentages for Kern, Los Angeles and San Bernardino Counties and Inyokern, and is not considered to be meaningfully greater than the below-poverty-level percentage for Ridgecrest (12.6 versus 12.3%).

Employment Characteristics

The preliminary estimates for November 2009 indicate that California had a total labor force of 18,314,700 people, with 16,084,300 persons employed, 2,230,400 persons unemployed, and an unemployment rate of 12.2% (EDD 2009a). **Socioeconomics Table 5** provides the preliminary employment and unemployment estimates for Kern, Los Angeles and San Bernardino Counties as of November 2009.

Socioeconomics Table 5
Preliminary Employment Estimates for Kern, Los Angeles and San Bernardino Counties (November 2009)

County	Labor Force	Employment	Unemployment	Unemployment Rate (Percent)
Kern County	375,800	319,100	56,700	15.1
Los Angeles County	4,916,900	4,317,700	599,200	12.2
San Bernardino County	870,800	750,300	120,500	13.8

Source: EDD 2009a

As of March 2008, the three industries employing the greatest number of people in Kern County included: government; trade, transportation and utilities; and, farming (EDD 2008). For the same time period, the three industries employing the greatest number of people in both Los Angeles County and San Bernardino County included trade, transportation and utilities, professional and business services, and government (EDD 2008). **Socioeconomics Table 6** provides the number of people employed, by trade, for these three counties.

Socioeconomics Table 6
Employment by Trade for Kern, Los Angeles and San Bernardino Counties

Industry	Kern County[1]		Los Angeles County[1]		San Bernardino County[1]	
	Persons Employed[2]	Percent of All Employed	Persons Employed[2]	Percent of All Employed	Persons Employed[2]	Percent of All Employed
Farming	58,700	19.7	6,900	0.2	13,800	1.1
Mining and Logging	10,900	3.7	4,400	0.1	1,200	0.1
Construction	15,900	5.3	142,000	3.5	85,100	7.0
Manufacturing	14,000	4.7	429,000	10.5	103,600	8.5
Trade, Transportation & Utilities	44,100	14.8	798,400	19.6	289,700	23.8
Information	2,900	1.0	215,800	5.3	14,300	1.2
Financial Activities	8,900	3.0	230,600	5.7	45,000	3.7
Professional & Business Services	25,300	8.5	580,800	14.3	135,400	11.1
Educational & Health Services	25,800	8.7	510,800	12.6	133,200	10.9
Leisure & Hospitality	21,400	7.2	396,400	9.7	125,400	10.3
Other Services	7,200	2.4	145,900	3.6	39,800	3.3
Government	62,600	21.0	607,000	14.9	231,200	19.0
Total - All Industries	297,700	100	4,068,000	100	1,217,700	100

Source: EDD, 2008

1 Data for Kern County: Bakersfield Metropolitan Statistical Area; data for Los Angeles County: Los Angeles-Long Beach-Glendale Metropolitan Statistical Area; data for San Bernardino County: Riverside-San Bernardino-Ontario Metropolitan Division.

2 Data not adjusted for seasonality. Benchmark March 2008 data.

At a local level, the ten principal employers within the Ridgecrest area include: the CLNWC (approximately 3,213 civilian employees and 880 military personnel); Searles Valley Minerals (approximately 625 employees); Sierra Sands Unified School District (approximately 620 employees); Ridgecrest Regional Hospital (approximately 340 employees); Wyle Laboratories (approximately 280 employees); SA-Tech (approximately 187 employees); WalMart (approximately 184 employees); Cerro Coso Community College (approximately 175 employees); Desert Area Resources & Training (approximately 164 employees); and, AltaOne Federal Credit Union (approximately 161 employees) (Ridgecrest Chamber of Commerce 2009).

Housing

Permanent and Temporary Housing

Permanent housing estimates as of January 2009 for the tri-county socioeconomics study area are presented in **Socioeconomics Table 7**. The total number of housing units ranged between 3,418,698 for Los Angeles County and 279,769 units for Kern County, with vacancy rates ranging between 4.21% and 11.57%.

Socioeconomics Table 7
Housing Units and Vacancy Rates, January 2009

County	Total Units	Single Family	Multiple Family	Mobile	Number Occupied	Vacancy Rate (Percent)
Kern County	279,769	204,124	49,378	26,267	252,246	9.85
Los Angeles County	3,418,698	1,891,862	1,470,122	56,714	3,274,667	4.21
San Bernardino County	690,234	515,492	129,712	45,030	610,352	11.57

Source: DOF, 2009c

At a local scale, within an estimated 60 linear mile radius of the project site, there are eight principal population centers, including Ridgecrest, Tehachapi, Inyokern, California City, Mojave, Boron, the Lake Isabella/Kernville/Wofford Heights area and the Randsburg/Johannesburg area. For these locations, California Department of Finance housing data (January 2009) is available for the incorporated cities of Ridgecrest, Tehachapi and California City. Combined, these cities have a total of 20,732 permanent housing units, with 18,496 units occupied and vacancy rates of 14.49% (California City), 8.52% (Ridgecrest) and 13.02% (Tehachapi) (DOF, 2009c).

Within the immediate vicinity of Ridgecrest there are 16 hotels with property information available, as well as several hotels and extended-stay facilities for which visitor capacity is not available. The 16 hotels for which information was available have a combined accommodation capacity of approximately 986 rooms and suites (Discover Kern County: California's Golden Empire 2009 and Tripadvisor 2009). In addition, the Navy Gateway Inn & Suites provides visitor quarters for the CLNWC (NAWCWD 2009). Within an approximate 60 linear mile radius of the project site, but not including the Ridgecrest area, there are over 35 hotels, motels and other lodging accommodations; the hotels for which information was available via internet searches have a combined capacity of 443 rooms and suites (Google Earth 2009, Tripadvisor 2009).

Property Values

Beginning in mid-to-late 2006 and early 2007, a decline in residential property values began to occur throughout California; it appears, though, that home property values in several counties started stabilizing in the first through third quarters of 2009 (California Association of Realtors 2009, City-Data.com 2009). As related to multi-family residential units, staff could not identify multiple data sources that consistently categorized owner-owned housing units in the same manner, and thus could not establish the 2008 or 2009 value of these types of residential homes with confidence. Additionally, staff conducted an extensive review of numerous real estate and demographic/housing data

sources for 2008 and 2009 owner-owned, single-family residential home values and found a substantial amount of variation between the data sources. However, based upon the data sources reviewed, staff concludes that the data presented in **Socioeconomics Table 8** provides a reasonable range of estimates for the value of owner-owned, single-family residential homes. As available, data for the ten principal population centers within a 60 linear mile radius of the proposed project site is included in **Socioeconomics Table 8**.

Socioeconomics Table 8
Range of Estimated Median Value of Owner-Owned Residential Homes

Location	Housing Type		
	House or Condominium 2008[1]	New and Existing Single Family Homes and Condominiums 2008[2]	Owner-Occupied Homes 2006-2008[3]
Kern County	$222,400	$190,000	$244,000
Ridgecrest	$170,407	$180,000	$190,600
Tehachapi	$216,430	$240,000	N/A
California City	$200,508	$120,000	N/A
Mojave	$138,565	$75,000	N/A
Boron	N/A	$75,000	N/A
Inyokern	$167,173	$49,500	N/A
Lake Isabella	$145,530	$146,250	N/A
Kernville	$274,144	$322,500	N/A
Wofford Heights	$162,447	$230,000	N/A
Randsburg/Johannesburg	N/A	N/A	N/A
Los Angeles County	$525,100	$400,000	$564,900
San Bernardino County	$331,400	$225,000	$366,600

[1] Source: City-Data.com 2009
[2] Source: DQNew.Com Real Estate News and Data 2009.
[3] Source: U.S. Census Bureau 2009
NA Data not available

Public Services

Physical impacts to public services and facilities are usually associated with population in-migration and growth in an area, which increases the demand for a particular service, leading to the need for expanded or new facilities. Therefore, public services data for law enforcement, hospitals and emergency response services, schools, and parks and recreation are provided below. The analysis of impacts related to landfills is addressed in **WASTE MANAGEMENT** and impacts associated with waste water and water supply services is discussed in **SOIL AND WATER RESOURCES**.

Law Enforcement

Law enforcement and police protection in the proposed project area falls under the authority and jurisdiction of the Kern County Sheriff's Office. The closest Sheriff's station to the proposed project site is the Ridgecrest Substation, located at 128 East Coso Street (Kern County Sheriff's Office 2009). The Ridgecrest Substation provides law enforcement services to the residents of Ridgecrest, China Lake Acres, Inyokern and Walkers Pass, as well as the historic mining communities of Garlock, Randsburg, Johannesburg, and isolated mining camps in the El Paso Mountains south of Inyokern (Kern County Sheriff's Office 2009). The Ridgecrest Substation has one sergeant, one senior deputy sheriff, and eleven deputy sheriffs. The deputies handle patrol duties and provide security to the two Ridgecrest Superior Courts; the Ridgecrest Jail is also staffed with one senior detention deputy sheriff and four detention deputy sheriffs (Kern County Sheriff's Office 2009). The Ridgecrest Substation is additionally supported by an unpaid volunteer reserve organization that includes nine active reserve deputies (Kern County Sheriff's Office 2009).

The proposed project area is also within the boundaries of the California Highway Patrol's (CHP's) Inland Division, and adjacent to the boundaries of the CHP's Central Division (CHP 2009a and 2009b). The Inland Division has 11 Area Offices, nine Resident Posts and one Transportation Management Center; it is manned by approximately 602 uniformed officers and 196 non-uniformed personnel (CHP 2009a). As related to the proposed project site, the closest Area Office is the Mojave Area Office, located at 1365 Highway 58 in Mojave (CHP 2009a). The Central Division has 15 Area Offices, six Resident Posts, and two Commercial Inspection Facilities; the Division has a staff of approximately 667 uniformed officers and 226 non-uniformed personnel (CHP 2009b). The closest Central Division facility to the proposed project site is the Bakersfield Area Office, located at 4040 Buck Owens Boulevard in Bakersfield (CHP 2009b).

Fire Protection

Fire protection for the proposed project area is provided by the Kern County Fire Department (KCFD). The KCFD serves the unincorporated areas of Kern County and the cities of Arvin, Delano, Maricopa, McFarland, Ridgecrest, Shafter, Taft, Tehachapi and Wasco (KCFD 2009). The KCFD has 46 fire stations throughout Kern County and additionally has 14 Mutual Aid Agreements with neighboring fire suppression organizations to further strengthen its emergency response services (KCFD 2009). The KCFD is staffed by an estimated 546 uniformed personnel, 157 on-duty strength personnel, 79 non-uniformed (civilian) personnel, and 100 extra help personnel (KCFD 2009). The KCFD provides: fire suppression; emergency medical services; hazardous materials mitigation; fire prevention; rescue; air operations; training and public education; arson investigation; and, apparatus maintenance (KCFD 2009). **Socioeconomics Table 9** lists the KCFD closest stations to the proposed project site and their respective addresses and response areas. Please refer to the **WORKER SAFETY AND FIRE PROTECTION** section of this document for a comprehensive analysis of safety measures.

Socioeconomics Table 9
Kern County Fire Department Stations Servicing the Proposed Project Area

Station Name/Number	Address	Response Area (Square Miles)
Ridgecrest Heights, No. 77	815 West Dolphin Avenue Ridgecrest	60
Ridgecrest, No. 74	139 East Las Flores Ridgecrest	8
Inyokern, No. 73	6919 Monache Mountain Avenue Inyokern	431
Randsburg, No. 75	26804 Butte Avenue Randsburg	317

Source: KCFD 2009

Hospitals and Emergency Medical Response

The proposed project area falls under an "Exclusive Operating Area" for emergency medical response services that are provided by Liberty Ambulance Service (Kern County Emergency Medical Services Department 2009). The base of operations for Liberty Ambulance Service within the proposed project area is located at1325 West Ridgecrest Boulevard in Ridgecrest (Kern County Emergency Medical Services Department 2009). Liberty Ambulance Service provides ambulance services and medical monitoring and communications, and transports patients to an appropriate hospital based upon injury type and the availability of space/capacity at local hospitals and medical care facilities (AECOM Environment 2009a).

Within an estimated 60 linear miles of the proposed project site there are three hospitals. **Socioeconomics Table 10** provides a summary of these facilities and their proximity to the project site.

Socioeconomics Table 10
Hospitals within an Approximate 60 miles of the Project Site

Facility	Proximity to Project Site (Linear Miles)	Summary of Available Services
Ridgecrest Regional Hospital	7	Licensed 80-bed facility, including four in intensive care beds. Medical services include: cardiopulmonary and respiratory care; critical care; emergency care services; home health; clinical laboratory; maternal/child/family care; surgical and outpatient services; radiology; rehabilitation services; and, telemedicine.
Tehachapi Hospital	54	Licensed 24-bed ambulance receiving hospital. Medical services include: emergency and acute care services; long-term care; ultrasound; mammography; radiology; clinical laboratory; respiratory therapy; and, pediatric care.
Kern Valley Hospital	37	Licensed 74-bed ambulance receiving hospital, including three intensive care beds. Medical services include: emergency and acute care services; clinical laboratory; pharmacy; radiology; rehabilitation services; respiration therapy; and rural health care.

Sources: Ridgecrest Regional Hospital 2009; Tehachapi Valley Healthcare District 2009; Kern Valley Healthcare District 2009; Google Earth 2009; AECOM Environment 2009a.

In addition to the above, within an estimated 70 linear miles of the project site there are numerous other licensed hospitals with emergency and acute care services and in- and out-patient services including, but not limited to, the Barstow Community Hospital (Barstow), Antelope Valley Hospital and Medical Center (Lancaster), and Kern Medical Center, Bakersfield Memorial Hospital and Mercy Hospital (Bakersfield) (AECOM Environment 2009a, Google Earth 2009).

Schools

Public education services in the project area are provided by the Sierra Sands Unified School District (SSUSD). As of July 2009 the SSUSD had a total student enrollment of 5,509 students and operated six elementary schools (Kindergarten [K] through 5th Grade), two middle schools (6th through 8th Grades), one high school, one continuation high school (9th through 12th Grades) and one community day school (8th through 12th Grades) (AECOM Environment 2009a, California Department of Education 2009). **Socioeconomics Table 11** provides a summary of the schools and student enrollment of the SSUSD.

Socioeconomics Table 11
Summary of School and Enrollment of the Sierra Sands Unified School District

School Name	Grades	Location	Student Enrollment
Faller Elementary	K-5	1500 Upjohn Avenue, Ridgecrest	490
Gateway Elementary School	K-5	501 S. Gateway Boulevard, Ridgecrest	505
Inyokern Elementary School	K-5	6601 Locust Avenue, Inyokern	203
Las Flores Elementary School	K-5	720 Las Flores Avenue, Ridgecrest	477
Pierce Elementary School	K-5	674 N. Gold Canyon, Ridgecrest	378
Rand Elementary School	K-5	37400 Saint Elmo Street, Johannesburg	8
Richmond Elementary School	K-5	1206 Kearsarge Avenue, Ridgecrest	447
James Monroe Middle School	6-8	340 West Church Avenue, Ridgecrest	545
Murray Middle School	6-8	921 E. Inyokern Road, Ridgecrest	683
Burroughs High School	9-12	500 French Avenue, Ridgecrest	1,623
Mesquite High School	9-12	140 Drummond Avenue, Ridgecrest	144
Sierra Sands Community Day School	8-12	348 Rowe Street	6

Source: AECOM Environment 2009a, California Department of Education 2009

Parks and Recreation

Regionally, the project site falls within the boundaries of the California Desert Conservation Area and is managed by the BLM's Ridgecrest Field Office. The Ridgecrest Field Office is responsible for the management of thousands of miles of trails and access routes for 4 wheel-drive vehicles, all terrain vehicles, motorcycles, mountain bikes, equestrian use and hiking, as well as 16 Wilderness Areas, two Wilderness Study Areas, and 19 Areas of Critical Environmental Concern (BLM, 2008). According to the BLM's Ridgecrest Field Office internet site, the top ten points of interest surrounding the project site include Fossil Falls, the Owens Peak Wilderness, Short Canyon, Trona Pinnacles National Natural Landmark, the Rademacher Hills Trail System, the Spangler,

Dove Springs and Jawbone Off Highway Vehicle (OHV) areas, the Desert Tortoise Natural Area and Watchable Wildlife Area, and Pacific Crest National Scenic Trail (traversing both BLM and U.S. Forest Service lands) (BLM 2009).

At a regional scale the project area is also situated east/southeast of Sequoia National Forest, which provides for a variety of recreational activities including trails for hiking, backpacking, horseback riding, Off Highway Vehicles (OHVs) and mountain biking, developed and dispersed campgrounds, boating, fishing, water-skiing, swimming, whitewater rafting, kayaking, downhill skiing and snowboarding, cross-country skiing, snowshoeing and snowmobiling (U.S. Forest Service 2009). At further distances (e.g., greater than a 60-mile linear radius), the project area is also surrounded by Death Valley National Park to the northeast, and Kings Canyon and Sequoia National Parks to the northwest.

State recreational facilities within an estimated 60 linear mile radius of the project site include Red Rock Canyon State Park, located approximately 25 miles northeast of Mojave, and Tomo-Kahni State Historic Park, accessed from the Tomo-Kahni Resource Center in Tehachapi (California State Parks 2009).

At a local scale, the project site itself is considered "multi-use" land by the BLM and falls within the boundaries of the West Mojave Off-Road Vehicle Designation Project (AECOM Environment 2009a, BLM 2010). Within the project footprint there are designated OHV trails and the project site is used for organized equestrian and OHV group events as well as mountain biking, horseback riding, hiking, running, camping, rock hounding/mineral collection, hunting and target shooting, and wildlife and wildflower observation (AECOM Environment 2009a). Recent BLM visitation statistics for the project site were not available; however, the El Paso Wilderness Area is located approximately two linear miles southwest of the project site (BLM 2009). The most common recreational activities within this area include hunting upland birds, OHV trail use, camping, viewing cultural resources sites, camping, hiking and target practice (AECOM Environment 2009a). Additionally, the Boral Corral Pit, located west of the project site is commonly used by the general public for recreational purposes, including rock hounding and target practice (AECOM Environment 2009a). For the year October 1, 1007 through September 30, 2008, recreational visitor days for four sites within the El Paso Management Area ranged between 17 (Dispersed - El Paso Mountains [driving for pleasure]) and 12,002 (Dispersed - El Paso Mountains [camping]) (AECOM Environment 2009).

As noted previously, the closest population center to the project site is the City of Ridgecrest. Public recreational facilities and parks within Ridgecrest include: Freedom Park (19.8 acres); Helmers Park (5 acres); James M. Pearson Memorial Park (4.5 acres); the Kerr McGee Community Center (gymnasium, two racquetball courts, fitness equipment room, aerobics room, showers, lockers, preschool, banquet rooms, meeting rooms and kitchen; the Kerr McGee Youth Sports Center (11.7 acres of various playing fields); Leroy Jackson Park and Leroy Jackson Park Sports Complex (over 56 acres of park and playing fields); Ridgecrest Senior Center; Ridgecrest Skate Park; Sergeant John Pinney Memorial Pool; and, Upjohn Park (6 acres) (City of Ridgecrest 2009). Please refer to the **LAND USE, RECREATION, AND WILDERNESS** section of this document for a complete analysis of impacts and proposed mitigation for recreation.

Fiscal Revenue

The primary taxing agency applicable to the proposed project is Kern County. Kern County's fiscal year extends from July 1st of one year to June 30th of the following year; as of July 23, 2008 (near the end of fiscal year 2008), Kern County's net assets equaled approximately $1.68 billion, which represents a net increase of approximately $73 million in comparison to the end of fiscal year 2007, which had net assets of approximately $1.58 billion (County of Kern, 2008a).

Socioeconomics Table 12 provides a summary of Kern County's revenues and expenditures for 2008-2009 fiscal year. As indicated in **Socioeconomics Table 12**, intergovernmental revenues (41%), taxes (22%), and other financing sources (14%) ranked first through third, respectively, as Kern County's greatest sources of revenue (County of Kern 2008b). For the same fiscal year, public protection (37%), public assistance (27%) and health and sanitation (15%) ranked first through third, respectively, for Kern County's greatest expenditures (County of Kern 2008b).

Socioeconomics Table 12
Summary of Kern County Revenues and Expenditures for Fiscal Year 2008-2009

Revenues & Expenditures	Amount	Percent of Total
Revenues		
Taxes	$373,326,922	22%
Licenses, Permits and Franchises	$20,197,021	1%
Fines, Forfeitures and Penalties	$23,477,539	1%
Revenue from Use of Money and Property	$24,694,654	1%
Intergovernmental Revenues	$669,248,787	41%
Charges for Services	$167,310,921	10%
Miscellaneous Revenues	$18,416,656	1%
Other Financing Sources	$243,580,766	14%
Balances from Prior Year	$126,871,128	8%
Cancellation of Prior Year Reserves/Designations	$15,840,075	1%
Revenues Total	$1,682,964,469	100%
Expenditures		
General Government	$153,422,702	9%
Public Protection	$615,633,104	37%
Public Ways and Facilities	$83,051,389	5%
Health and Sanitation	$247,558,856	15%
Public Assistance	$461,103,573	27%
Education	$10,466,703	1%
Recreation and Cultural Services	$14,748,928	1%
Debt Service	$8,542,697	1%
Appropriations for Contingency-General Purpose	$12,655,364	1%
Provisional for Reserves/Designations	$75,781,153	5%
Expenditures Total	$1,682,964,469	100%
Revenues Minus Expenditures Total	$0	---

Source: County of Kern 2008b

C.8.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff reviewed the RSPP socioeconomics section of the AFC (AFC Section 5.11), the applicant's data adequacy supplement to the socioeconomics section of the AFC, dated October 26, 2009 (AECOM Environment 2009b), and collected and reviewed other socioeconomic data from various governmental agencies, trade associations, and other public and private organizations and entities to form the following socioeconomic impact analysis and conclusions.

Construction

Population and Employment

It is anticipated that construction of the proposed RSPP would start in December 2010 and require 28 months to complete, with commercial operation beginning in mid 2013. It is estimated that the average construction workforce would be 405 persons, and that a peak construction workforce of 633 persons would occur in the 11th month of construction.

As noted in Section C.10.4.1, research shows that construction workers may commute as much as two hours one way from their place of residence rather than relocate for employment purposes (EPRI 1982). Staff accepts this assumption and the applicant's estimate that the project's construction work force would be drawn in large part from the local area (e.g., Ridgecrest and Kern County), and to a more limited extent from Los Angeles and San Bernardino Counties (AECOM Environment 2009a). Construction workers beyond a two-hour commute of the project site would likely relocate temporarily, but would be expected to return to their homes on the weekends as construction of the project would not provide a permanent source of employment.

Socioeconomics Table 13 provides the estimated maximum number of construction workers, by occupation/trade, that would be required for construction of the RSPP and the projected number of construction workers, by occupation/trade within Kern, Los Angeles and San Bernardino Counties.

Socioeconomics Table 13
Project Construction Workforce Requirements by Occupation/Trade and Projected Available Construction Workforce by Occupation/Trade for Kern, Los Angeles and San Bernardino Counties

Occupation/Trade	Maximum Number of Workers Needed[1]	Projected Available Workforce 2006 and 2016[2]		
		Kern County[3]	Los Angeles County[3]	San Bernardino County[3]
Surveyor	19	160-210	940-1,060	580-700
Operator[4]	84	1,500-1,570	4,410-4,780	4,790-5,460
Laborer	145	4,860-5,570	31,330-34,810	27,930-32,080
Truck Driver[4]	30	7,290-8,590	64,420-72,460	34,210-39,980
Oiler[4]	10	840-970	9,260-9,960	5,090-5,950
Carpenter	60	2,740-3,060	28,070-30,050	28,850-32,390
Boilermaker	11	110-130	1,700-1,750[4]	980-1,040[4]
Paving Crew	23	100-110	790-870	630-720
Pipefitter[4]	231	1,340-1,530	12,090-12,900	4,630-5,330
Electrician	84	2,350-2,580	13,040-13,700	6,740-7,600
Cement Finisher[4]	86	990-1,100	4,150-4,530	4,110-4,690
Ironworker	30	250-260	1,700-1,750[4]	980-1,040[4]
Millwright	17	130-160	200-210	160-190
Tradesman	48	19,190-21,310	143,280-153,890	116,810-132,160
Project Manager[4]	3	12,170-13,840	178,500-191,400	43,830-49,700
Construction Manager	3	1,050-1,250	10,320-11,670	4,380-5,110
Asst. Project Manager[4]	3			
Support[4]	3	2,460-2,820	15,490-16,440	10,990-12,380
Support Assistant[4]	3			
Engineer	10	4,230-4,720	54,350-57,020	7,280-8,580
Timekeeper	3	460-480	5,710-5,680	2,220-2,330
Administrator[4]	6	6,290-6,780	150,520-161,930	72,290-81,160
Welder[4]	1	1,110-1,430	8,410-8,890	3,960-4,640

[1] Maximum number of a specific type of tradesmen needed in any given single month for the entire 28-month construction period (Source: AFC Table 5.11-15).

[2] Projections range between 2006 and 2016, with the first number in each County column representing the 2006 projection and the second number representing the 2016 projection (EDD, 2009b).

[3] Data for Kern County: Bakersfield Metropolitan Statistical Area; data for Los Angeles County: (Los Angeles-Long Beach-Glendale Metropolitan Division; data for San Bernardino County: Riverside-San Bernardino-Ontario Metropolitan Statistical Area (EDD 2009b).

[4] For those occupations where multiple trades are grouped together, or a specific occupational category for the workers listed in AFC Table 5.11-15 could not be identified, the following occupational categories, as used by the California Employment Development Department, were applied:

Occupation/Trade	Code(s)	Occupational Title
Operators	47-2073	Operating Engineers and Other Construction Equipment Operators
Truck Drivers	53-3032	Truck Drivers, Heavy and Tractor-Trailer
	53-3033	Truck Drivers, Light or Delivery Services
Oiler	47-4000	Other Construction and Related Workers
	47-4099	Construction and Related Workers, All Other
Pipefitter	47-2152	Plumbers, Pipefitters, and Steamfitters
Cement Finisher	47-2051	Cement Masons and Concrete Finishers
Project Manager	11-3000	Operations Specialties Managers
	11-9000	Other Management Occupations
Asst. Project Manager,	47-1000	Supervisors, Construction and Extraction Workers
Support & Support Assistant	47-1011	First-Line Supervisors/Managers of Construction Trades
Administrator	43-6000	Secretaries and Administrative Assistants
	43-9199	Office and Administrative Support Workers, All Other
Welder	51-4121	Welders, Cutters, Solderers, and Brazers
Boilermaker	47-2221	Structural Iron and Steel Workers (Los Angeles & San Bernardino Counties)

Overall, with the exception of the project's demand for millwrights (3.47% of the total available trade-specific workforce), surveyors (1.13% of the total available trade-specific workforce), pavers (1.51% of the total available trade-specific workforce), pipefitters (1.28% of the total available trade-specific workforce) and ironworkers (1.02% of the total available trade-specific workforce), the project would require less than 1% of any given trade-specific workforce for the year 2006 projections. With all three counties combined, using the year 2016 projections, the project would place a maximum demand of approximately 3.04% of the millwright labor pool, 1.35% of the paving crew labor pool and 1.17% of the pipefitter labor pool; using this data set, the project would demand less than 1% of all other all other trade-specific workforces.

As noted previously, the project would require a maximum construction workforce of 633 persons in construction month 11. As shown in **Socioeconomics Table 6**, for the year 2008 Kern County had a construction workforce of 15,900 persons and Los Angeles and San Bernardino Counties has construction workforces of 142,000 persons and 85,100 persons, respectively; combined these three counties had a total construction workforce of 243,000 persons. As such, the maximum construction workforce required for the project would represent approximately 0.26% of the total construction labor pool. For Kern County's construction workforce alone, the maximum construction workforce required for the project would represent approximately 3.98% of the total construction labor pool, and for Los Angeles and San Bernardino Counties the project's maximum demand would represent approximately 0.46% and 0.74%, respectively, of each county's total construction workforce. Because the number of construction workers required for the project represents such a small portion of the total available construction labor force, both locally and regionally, no impacts to the employment distribution within the socioeconomics study would occur, either directly or indirectly.

According to the applicant's AFC data supplement for socioeconomics (AECOM Environment 2009b), it is estimated that during construction up to 25% of the total construction workforce may relocate temporarily to the project area; however, they would be expected to commute home on the weekends. Assuming a 25% relocation rate and an average construction workforce of 405 employees, the project could result in up to 101 workers staying in the local project area during the work week. Under the same 25% relocation rate, during the project's peak construction period in month 11, up to 158 construction workers could reside temporarily in the local project area. As noted in Section C.10.4.1, the City of Ridgecrest has an approximate population of 27,613 people; therefore, during construction the total net temporary increase in the local population would average 0.37% and peak at 0.57%. Because the net population increase would be temporary in nature (approximately 28 months) and less than 1% of the total local population, direct and indirect population impacts due to temporary in-migration would be less than significant or negligible.

Housing

Permanent and Temporary Housing

The proposed RSPP would be located on vacant land; therefore, construction of the project itself would not result in the physical removal or displacement of any housing

units that would require replacement elsewhere. Due to its temporary nature, the construction workforce needed for the project would not place a demand permanent housing; as such impacts on permanent housing are addressed under Operation.

During construction it is estimated that the average project workforce would be 405 persons, and that the peak project workforce would be 633 persons in construction month 11. During construction it is anticipated that approximately 101 construction workers would temporarily relocate to the project area, typically returning to their place of permanent residence on the weekends.

As outlined in Section C.10.4.1, for the City of Ridgecrest and the cities and communities within an approximate 60 linear mile radius of the project site combined, it is estimated that there are over 1,400 hotel, motel and extended-stay rooms and suites available for temporary lodging. Although the demand for temporary lodging within the immediate Ridgecrest area is high due to its proximity to the CLNWC, assuming an average occupancy rate of 75% (or 740 rooms and suites out of an available 986 rooms and suites) there would still be an estimated 246 lodging rooms available at any given time. This local capacity, in combination with temporary lodging capacity within an approximate 60-minute commute of the project site, would be sufficient to meet the temporary housing demands of project construction. No direct or indirect adverse impacts would occur.

Property Values

Declines in home property values are linked to numerous federal, State, regional and local variables, both individually and collectively, such as (but not limited to): recessions; short- and long-term population growth; increases and declines in the demand for goods and services; cost of living; unemployment rates; and, the availability of mortgage credit (Weiher 2009). Overall, real home property value declines tend to occur over long periods of time. Although recent (2006 - 2009) declines in real home property values due to the national recession have occurred over relatively short periods of time (as little as approximately 1.75 to 2.0 years), for the period 1975 to 2009 the duration of real home market price declines has occurred, at a national average, over a median period of 3.75 years (for cities) to 7.0 years (for states) (Weiher 2009). Due to the extended period over which home properties tend to decline (and recover), within the context of this analysis the assessment of property values is considered to be most appropriately placed under Operation, below.

Public Services

Law Enforcement

The Kern County Sheriff's Office, Ridgecrest Substation, provides police protection and public safety services within the project area. A security fence would be erected around the entire perimeter of the construction area, which would be expected to deter vandalism and theft. As outlined in Section C.10.4.1, the Ridgecrest Substation is manned by one sergeant, one senior deputy, eleven deputy sheriffs nine active reserve deputies. The area also falls under the jurisdiction and patrol of the CHP's Inland Division, which is manned by approximately 602 uniformed officers. Construction of the RSPP would not be expected to substantially impact criminal activity or other activities

requiring law enforcement. Additionally, the majority (75%, or an average of approximately 304 out of 405 persons) of the construction labor force would be expected to commute and would not result a long-term population increase that could compromise law enforcement officer ratios. As such, direct and indirect construction-related impacts would be less than significant.

Fire Protection

A Construction Fire Protection and Prevention Plan would be developed and followed throughout all phases of construction, including adherence to all construction fire prevention regulations identified in Title 8 of the California Code of Regulations (CCR) Section 1920 et seq.; additionally, the facility's permanent fire protection system would be put into use during construction as soon as practicable (AECOM Environment 2009a). Prior to the availability of this system, fire extinguishers and other portable firefighting equipment would be available on site. All applicable equipment and procedures used during construction would be California Occupational Safety and Health Administration (Cal/OSHA) compliant (AECOM Environment 2009a). Therefore, construction of the project would not be expected to result in a significant adverse impact, either directly or indirectly, to fire protection services. Please refer to **WORKER SAFETY AND FIRE PROTECTION** for additional information related to fire protection services.

Hospitals and Emergency Medical Response

As addressed in Section C.10.4.1, the project site falls within the response area of Liberty Ambulance Service, which, within the local area, operates out of Ridgecrest. Within a 60 linear mile radius of the project site there are three licensed hospitals that provide emergency and acute care services and in- and out-patient services, including the Ridgecrest Regional Hospital, and numerous other licensed hospitals and medical care facilities located within 70 linear miles of the project site.

During construction, workers would be exposed to several types of hazards that could result in both minor and severe injury due to such activities as heavy equipment operation, working with hazardous energy sources, electrical systems and flammable and combustible liquids, and exposure or overexposure to hazardous gases, vapors, dusts and fumes (AECOM Environment 2009a). During construction the average project workforce would be 405 workers and the peak workforce during month 11 would be 633 workers.

To minimize worker injuries, as part of project design, an Injury and Illness Prevention Plan would be developed and implemented and all workers would be required to adhere to it (AECOM Environment 2009a). Additionally an Emergency Action Program and Plan, Personal Protective Equipment Program and Safety Training Program would be implemented to minimize injuries and appropriately respond, as needed, to emergency medical situations. With full implementation of these plans and programs, and given the availability of medical and emergency medical response facilities and services within the local and regional project area, staff concludes that no significant adverse impacts, either directly or indirectly, would occur during construction. Impacts would be less than significant or none. Please refer to **WORKER SAFETY AND FIRE PROTECTION** for additional information related to hospitals and emergency medical response services.

Schools

As outlined in Section C.10.4.1, the project area falls within the boundaries of the SSUSD, which includes six elementary schools, two middle schools, one high school, one continuation high school and one community day school. During construction it is estimated that up to 101 workers could temporarily relocate to the project area; however, these workers would be anticipated to return to their place of permanent residency on the weekends and not relocate their families to the project area. Therefore, no impacts to the SSUSD's schools would be anticipated to occur during construction.

Education Code section 17620 authorizes school districts to levy a fee against construction within their districts. If implemented, the RSPP would be required to pay a school impact fee to the SSUSD. The school impact fee for non-residential projects in the SSUSD is $0.47 per square foot of new floor space. Based on a total square footage of 119,926 square feet, office and warehouse space, the project would be required to pay a total school impact fee of approximately $56,400 to the SSUSD (AECOM Environment 2009a). This one-time fee would be considered a direct beneficial impact.

Parks and Recreation

As discussed in Section C.10.4.1, the project site is located on lands managed by the BLM and falls within the boundaries of the West Mojave Off-Road Vehicle Designation Project; the proposed project site is also used for organized equestrian and OHV group events, mountain biking, horseback riding, hiking, running, camping, rock hounding and mineral collection, hunting and target shooting, and wildlife and wildflower observation. The project site is additionally an estimated two miles southwest of the El Paso Wilderness Area the Boral Corral Pit, also used for recreational purposes is located west of the project site. In addition, as outlined in Section C.10.4.1 there are several federal and State recreational facilities within an estimated one-hour commute of the project site and the City of Ridgecrest also operates several public parks and recreational facilities.

Construction activities would preclude use of the project site for recreational purposes. Closure of the site to recreational uses would be expected to cause increased recreational uses in other areas. However, due to the large number of public recreational areas (including OHV and multi-use trails) within the both the regional and local project area, increases in demand at other parks and recreational areas and facilities would not be expected to substantially degrade overall public recreational opportunities, niches, systems or experiences . Direct and indirect impacts would be adverse but less than significant. Please refer to the **LAND USE, RECREATION AND WILDERNESS** section of the PSA for an additional discussion of recreational resources and uses.

During construction the project would require an average workforce of 405 persons with up to 101 workers relocating to the project area in a temporary basis, typically returning to their permanent place of residency on the weekends. This minor and temporary increase in the local population would not be anticipated to appreciably increase the demand for federal, State or local recreational resources. Direct and indirect impacts due to the project's construction workforce would be less than significant or none.

Economic Impacts

Construction of the project would have an estimated total payroll of $53.3 million and an approximate annual payroll of $22.8 million (AECOM Environment 2009a). According to the applicant's data adequacy supplement to the socioeconomics section of the AFC (AECOM Environment 2009b), capital costs (or expenditures) for construction of the project would be an estimated one billion dollars, of which local construction expenditures would be expected to total $15,000,000 (or 1.5%) ($6.4 million annually) and non-local construction expenditures would be approximately $985,000,000 or 98.5%.

As noted previously, construction would be expected to create an average of 405 jobs, peaking at 633 direct jobs in construction month 11. These direct jobs would create both indirect and induced secondary employment. Indirect employment is defined as employment that is generated by a project's purchase of goods and services. Induced employment is defined as employment that is generated by the purchase of goods and services by the businesses that are indirectly supported by a project.

The applicant used the IMPLAN Professional™ to estimate economic impacts within Kern, Los Angeles and San Bernardino Counties. IMPLAN Professional™ is an economic impact modeling tool that uses region-specific input and output accounts by industry to estimate secondary impacts of economic stimuli (AECOM Environment 2009a). Secondary impacts include (1) indirect impacts that occur due to the purchase of goods and services by firms involved with project construction and operation, and (2) induced impacts, which result from household spending. Secondary impacts can occur in the form of employment, income, output, and taxes (AECOM Environment 2009a).

For the purpose of the economic model, the following project expenditures, in rounded values, were assumed: annual payroll ($22,841,795); and, annual local expenditures ($6,428,571) (AECOM Environment 2009a). Based on these assumptions, for the project's 28 month construction phase the economic model projected the following expenditures within, and revenues for, Kern, Los Angeles and San Bernardino Counties combined (in rounded values) (AECOM Environment 2009a):

- Direct Expenditures: $23,000,000
- Indirect Regional Revenues: $18,000,000
- Induced Regional Revenues: $18,000,000
- Total Annual Expenditures and Revenues: $59,000,000

Using the same assumptions, during construction the project would, on an annual basis, result in the following average number of jobs created within Kern, Los Angeles and San Bernardino Counties combined (AECOM Environment 2009a):

- Direct (Project) Jobs: 405 Workers
- Indirect Jobs: 204 Workers
- Induced Jobs: 229 Workers
- Total Jobs Created (Directly, Indirect and lnduced): 838 Workers

The additional expenditures, revenues and jobs created in Kern, Los Angeles and San Bernardino Counties during project construction would result in beneficial impacts, both directly and indirectly, at regional and local scales.

Operation

Population and Employment

Operation of the project would require an estimated 84 permanent employees, including operations and power block routine maintenance staff, solar field project and maintenance staff, clerical and technical staff, and administrative and management staff. According to the applicant's AFC data supplement for socioeconomics (AECOM Environment 2009b), it is estimated that 63 of the project's permanent employees would be local and 21 would likely be hired from outside the local area. The local area includes those cities and communities within a 30-minute commute time of the project site, as well as all cities and communities in Kern County with populations over 20,000 individuals and all cities with populations over 40,000 individuals in Los Angeles and San Bernardino Counties that are within a two-hour drive time of the Project site. As shown in **Socioeconomics Table 5**, the total combined labor force for Kern, Los Angeles and San Bernardino Counties in November 2009 was 6,163,500 people, with an estimated 5,387,100 people employed and 776,400 people unemployed. The project's permanent demand on the combined labor force for the tri-county area would thus be 0.0014%. The project's demand on the combined labor force and distribution for the socioeconomics study area would be negligible; no direct or indirect impacts would occur.

It is anticipated that all of the project's operational employees would relocate to the project area. Research shows that operational workers will commute as much as one hour, or approximately 60 miles to a power plant site from their homes rather than relocate (EPRI 1982). The City of Ridgecrest has a population of approximately 27,613 people, and, as outlined in Section C.10.4.1, the estimated populations for the other local cities and communities within an estimated 60 linear miles of the project site are as follows: Tehachapi - 10,957 people; California City - 8,385 people; Mojave - 3,836 people; Boron - 2,025 people; Inyokern - 984 people; Lake Isabella - 3,315 people; Kernville - 1,736 people; Wofford Heights - 2,276 people; Randsburg - 77 people; and, Johannesburg - 176 people.

According to the U.S. Census Bureau 2006-2008 three year survey estimates, the average household size for an owner occupied home is 3.01 persons, and the average size for a rented home is 2.8 persons (U.S. Census Bureau 2009). Using an average of three persons per household, and assuming a "worst case" scenario of all 84 permanent employees relocating to within a one-hour commute of the project site, there would be an in-migration of approximately 252 people. For the City of Ridgecrest this would represent a permanent population increase of 0.9%. For Ridgecrest and the other communities and cities within 60 miles of the project site combined (a total population of 61,380 persons), the net population increase due to operation of the project would be 0.41%. A net population increase of less than 1%, within the direct vicinity of Ridgecrest and the larger 60 linear mile radius of the project site, would not result in significant adverse impacts; direct and indirect impacts would be less than significant or none.

Housing

Temporary and Permanent Housing

Operation of the project would require 84 permanent employees. Assuming a "worst case" scenario where all 84 employees relocate to within a one-hour commuting distance of the project site, and each employee has an average family (household) size of three persons, operational activities would result in the demand for a maximum of 84 housing units for an estimated 252 persons.

For Kern, Los Angeles and San Bernardino Counties combined, there are approximately 4,388,701 permanent housing units, with an estimated 4,137,265 occupied and 251, 436 unoccupied; the permanent housing rates for these counties are 4.21% for Los Angeles County, 9.85% for Kern County and 11.57% for San Bernardino County. Within a 60 linear mile radius of the project site there are an estimated 20,732 permanent housing units, with 18,496 units occupied, 2,236 units unoccupied, and vacancy rates range between 8.52% (Ridgecrest) and 14.49% (California City).

The traditional tool for measuring permanent housing demand is vacancy rates (California Department of Housing and Community Development [CDHCD] 2000). Low vacancy rates indicate a shortage of housing; high vacancy rates indicate a surplus. In general, the desirable housing vacancy rate in a community is considered to be 5.0% (CDHCD 2000). When vacancy rates drop below 5.0%, the demand for housing exceeds the supply of housing and when the rate rises above 5.0% the number of existing housing units generally exceeds demand. As indicated above, with the exception of Los Angeles County as a whole, the vacancy rates associated with the socioeconomics study area are well above the 5.0% threshold, and the vacancy rates within an estimated one-hour commute of the project site housing vacancy rates are also above the 5.0% threshold. Therefore, staff concludes that there would be no significant adverse impact, directly or indirectly, due to operation of the project. Impacts would be less than significant or none. The long-term permanent demand for housing under the operational phase would have a negligible, positive impact on the area’s housing stock that would not necessitate new construction (nor place any noticeable competitive demands on market) because of existing ample supply, and because the majority of operational staff are expected to be permanent residents of the three county area and would not contribute to incremental long-term demand for housing.

Property Values

The closest residential neighborhood to the project site is located approximately 0.75 to 1.0 mile east of the proposed project site, with other residential neighborhoods located approximately 2.5 to 3.25 miles northeast and north, respectively, of the project site (Google Earth 2009). No population projection data through the year 2040, which includes the timeframe for the RSSP's estimated operational life (30 years), is available for the City of Ridgecrest or Inyokern or China Lake Acres. However, between 2008 and 2009 the population of the City of Ridgecrest grew by 1.4% (DOF 2009a), and, as outlined in **Socioeconomics Table 2**, Kern County's population is anticipated to grow by 19.7% over the next decade, and by rates ranging between 18.9 and 20.8% between 2030 and 2050.

Based upon the anticipated population increase for Kern County over the next four decades, and the local area's relatively stable economic employment base due to its proximity the CLNWC, the City of Ridgecrest and the communities of Inyokern and China Lake Acres area would be reasonably expected to maintain their current rates of growth in the future. As such, existing local property values would not be expected to sharply decline solely in response to recent local economic and population conditions.

Energy Commission's 2003 Environmental Performance Report addressed property values as related to energy-related facilities (CEC 2003). Staff found that community members and land developers often express concern about facilities such as power plants and transmission lines reducing their property values. Rural residents often note that a proposed power plant or transmission line would ruin the view and overall scenic location of their homes, with a corresponding drop in property values. Similarly, developers of planned residential areas often express concern that their planned development projects would have little appeal and market value if an energy facility were built nearby. Staff concluded that while considerable anecdotal evidence has been put forward for such an impact, there is little solid evidence indicating actual impacts (CEC 2003).

In the Energy Commission's 2005 Environmental Performance Report of California's Electrical Generation System (CEC 2005) staff found that proximity impacts potentially affecting property values, as related to energy-related facilities, include health hazard risks to persons and obstruction of views. Staff noted that a number of studies cite several examples of proximity impact analyses, and that the findings of these studies "yield an equivocal conclusion" that energy facilities may result in negative economic impacts. However, in the 2005 Report staff also noted other studies found that no economic impacts occur in response to the placement and operation of power generating facilities; staff thus concluded that there is no clear and consistent association with diminished economic impacts to property values (CEC 2005). As related to solar facilities, in the 2005 Report staff found that "it is unknown at this time what effect large utility owned solar energy facilities would have on surrounding property values, as there are very few of these types of facilities in existence at this time" (CEC 2005).

Based upon the above, while there is a possibility that a significant adverse socioeconomic impact on property values could occur, definitive data does not exist for such an analysis. Therefore, it is not possible for staff to reach a conclusion on the RSPP's potential impacts on property values, either directly or indirectly.

Public Services

Law Enforcement

During operation the perimeter of the project's solar fields and support facilities would be secured with a combination of chain link and wind fencing. Chain link metal-fabric security fencing, 8 feet tall, with one-foot barbed wire or razor wire on top would be installed along the north and south sides, and thirty-foot tall wind fencing, composed of A-frames and wire mesh, would be installed along the east and west sides of each solar field (AECOM Environment 2009a). Security precautions would also include controlled access gates and lighting (AECOM Environment 2009a). Operation of the project would

require a permanent workforce of 84 persons, all of whom would be expected to live within a one-hour commuting distance of the project site and some of whom would be hired from the local area; as such, the permanent workforce needed for operation would not appreciably increase the local population (0.41% regionally and 0.9% locally) or trigger the need for additional law enforcement personnel. Therefore, staff concludes that there would be no significant adverse socioeconomic impacts, either directly or indirectly, on law enforcement resources due to operation of the RSPP. Impacts would be less than significant or none.

Fire Protection

Fire protection during operation would include measures relating to safeguarding human life, preventing personnel injury, preserving property, preserving wildlife, and minimizing downtime due to fire or explosion (AECOM Environment 2009a). The project's fire suppression systems would be subject to review and approval by the KCFD and designed by a California-registered Fire Protection Engineer (AECOM Environment 2009a). Fire protection equipment would also be installed and maintained in accordance with applicable National Fire Protection Association standards and recommendations and designed and operated in conformance with Uniform Fire Code requirements (AECOM Environment 2009a). The KCFD also would also perform routine fire and life safety inspections, including the review and approval of programs for regular equipment audits and servicing and for the training of employees in fire protection procedures. The facility would additionally be equipped with its own fire suppression water supply. Therefore, staff concludes that operation of the project would not result in significant adverse impacts to fire protection services, either directly or indirectly. Please refer to **WORKER SAFETY AND FIRE PROTECTION** for additional information regarding the project's fire prevention and suppression tactics and plans.

Hospitals and Emergency Medical Response

During operation the project would require 84 permanent employees. To minimize worker injuries, as part of project design, an Injury and Illness Prevention Plan would be developed and implemented (AECOM Environment 2009a). Additionally, operation of the project would include the development and implementation, as needed, of an Emergency Action Program and Plan and a Personal Protective Equipment Program and Safety Training Program to minimize the potential for injuries and appropriately respond to emergency medical situations. With full implementation of these plans and programs in conjunction with the availability of medical and emergency medical response facilities and services within both the local and regional project area, no significant adverse impacts, either directly or indirectly, would occur. Please refer to **WORKER SAFETY AND FIRE PROTECTION** for additional information regarding the project's worker safety plans and protocols.

Schools

During operation the project would require 84 permanent employees. Assuming a "worst case" scenario of all 84 employees relocating to the immediate Ridgecrest area, and an average of one to two school-age children per permanent employee, enrollment of the SSUSD would increase by 84 to 168 students. The SSUSD has confirmed that it currently has excess student capacity, and is in the process of modernizing its existing

facilities; the SSUSD has indicated that the project's potential increase in student size due to project operation could be readily accommodated (Burson 2010). As such, no impacts, either directly or indirectly, would occur to the SSUSD due to operation of the project.

Parks and Recreation

During operation, a permanent workforce of 84 persons would be required. Using an average of three persons per household, and assuming that all 84 permanent employees relocate to within a one-hour commute of the project site, there would be an in-migration of approximately 252 people. For the City of Ridgecrest this would represent a permanent population increase of 0.9%. For Ridgecrest and the other communities and cities within 60 miles of the project site combined (a total population of 61,380 persons), the net population increase due to operation of the project would be 0.41%. A permanent population increase of less than 1% is not considered a substantial amount of growth. As such, staff concludes that at both local and regional scales, operation of the project would not place an appreciable demand on federal, State or local public recreational areas, opportunities or facilities as related to Socioeconomics. No significant adverse impacts, directly or indirectly, would occur. Please refer to refer to the **LAND USE, RECREATION AND WILDERNESS** section of the PSA for an additional discussion of recreational resources and uses.

Fiscal Effects

During operation the project would be expected to result in annual regional purchases of approximately $2.7 million for materials, supplies, equipment and services (AECOM Environment 2009a). Based upon the results of the project's economic modeling, during operation the project would be expected to result in the following annual expenditures within, and revenues for, Kern, Los Angeles and San Bernardino Counties combined (in rounded values) (AECOM Environment 2009a):

- Direct Expenditures: $3,000,000;
- Indirect Regional Revenues: $4,000,000;
- Induced Regional Revenues: $3,000,000; and,
- Total Annual Expenditures and Revenues: $10,000,000

Assuming a sales tax rate of 8.25%, as is applied within Kern County, these project-related operational expenditures would generate approximately $220,000 in annual sales tax revenue (AECOM Environment 2009a). The 8.25% Kern County sales tax is divided into 7.25% for the State and 1.00% for Kern County.

In addition to the above, operation of the project would be expected to result in the creation of 154 jobs annually, including 84 direct project jobs, 38 indirect jobs, and 32 induced jobs (AECOM Environment 2009a).

The proposed project's property value is estimated to be approximately $1 billion (AECOM Environment 2009a). However, the RSPP is expected to be 100% property tax exempt as part of Section 73 of the California Revenue and Tax Code for solar systems. Although the U.S. Department of the Interior's Payment in Lieu of Taxes program does

provide Kern County with funding for "normal and customary" response for police and fire protection and emergency response, because the project site is located on federal land managed by the BLM and it is exempt from local property taxation (Oviatt 2010).

Project Closure and Decommissioning

The planned operational life of the RSPP is 30 years; however the Applicant has indicated that the facility could operate for a longer or shorter period of time, depending on economic conditions and other circumstances (AECOM Environment 2009a). The Applicant has additionally indicated that closure of the facility could range between the "mothballing" of all equipment and structures to their complete decommissioning and removal (AECOM Environment 2009a). Although no specific plans are yet in place for permanent closure, the Applicant has committed to 24-hour security surveillance of the site following facility shut-down and the preparation of Project Decommissioning Plan for review and approval by the California Energy Commission and BLM that would include site restoration and revegetation, facility component recycling, the resale of unused materials, collection and disposal of hazardous wastes and conformance with all applicable LORS (AECOM Environment 2009a). Due to the lack of any specific plans for permanent closure at this time, for the purposes of this analysis staff has assumed a scenario somewhat similar to construction, wherein an average decommissioning and removal workforce of approximately 405 employees would be needed for up to 28 months. As with construction it is additionally assumed that this workforce would be drawn from Kern, Los Angeles and San Bernardino Counties.

Population and Employment

Socioeconomics Table 2 and **Socioeconomics Table 13** provide, respectively, population projections through the year 2050 and employment projections, by construction/decommissioning trade, through the year 2016. Both population and employment would be anticipated to continue to grow in the reasonably foreseeable future.

As with construction it is estimated that 25% of total decommissioning and closure workforce may relocate temporarily to the local project area; however, they would be expected to commute home on the weekends. Assuming a 25% relocation rate and an average construction workforce of 405 employees, the project could result in up to 101 workers staying in the local project area during the work week. As noted in **Socioeconomics Table 2**, in the year 2040 Kern County is anticipated to have a population of 1,707,239. Although population projections for the year 2040 for the City of Ridgecrest are not available, assuming an average growth rate of 21% per decade (the average growth rate for Kern County between 2010 and 2040) and a base 2000 population of 27,613, in the year 2040 Ridgecrest would have a population of approximately 59,191 people. Therefore, decommissioning and closure would increase the population in the vicinity of Ridgecrest by 0.2%. Because this population increase would be temporary in nature (no more than an estimated 28 months) and less than 1% of the total population, direct and indirect population impacts due to temporary in-migration would be less than significant or none.

Construction workforce projections for the year 2040 are not available. However, based upon the data provided in **Socioeconomics Table 13**, the average projected rate of

growth for construction workers over the 2006 to 2016 period is approximately 11%. Although the trade-specific types of workers for decommissioning and closure would not be expected to be the same as for construction, using the base construction workforce data provided in **Socioeconomics Table 6**, and an average increase in the construction workforce of 11% per decade, for the year 2040 the available construction workforce for Kern, Los Angeles and San Bernardino Counties would be approximately 332,334 people combined. Assuming an average workforce of 405 employees, closure and decommissioning would thus represent approximately 0.1% of the total tri-county projected construction workforce. For Kern County alone the workforce needed for decommissioning would be approximately 1.8% of the total projected construction workforce and 0.2 and 0.3% of the projected construction workforce alone for Los Angeles and San Bernardino Counties, respectively. As such, it is projected that there would be sufficient workforce available for full facility closure and decommissioning. No direct or indirect impacts would occur.

Housing

As with construction, the majority of the decommissioning and closure workforce would be anticipated to commute to the project site. However, it has been assumed that up to 101 workers may temporarily relocate to the project area during the work week for up to 28 months. As noted above, the tri-county area is projected to grow over the next four decades, and it is reasonably assumed that Ridgecrest and the other cities and communities within a one-hour commute of the project site will grow as well. As addressed for project construction, there is currently adequate temporary housing in the project area to accommodate an in-migration of up to 101 workers, and the availability of future temporary housing would be expected to be maintained or expand. Therefore, no direct or indirect impacts to either temporary or permanent housing would occur due to closure and decommissioning.

Although it is not possible for staff to reach a conclusion regarding the RSPP's potential impacts on property values, full closure and decommissioning of the facility would revert the project site back to its existing conditions. In a fully restored but undeveloped state, staff would not expect that the project site would affect property values, either directly or indirectly. No impacts would be anticipated to occur.

Public Services

As addressed above, the local and regional populations of the project area are anticipated to grow over the projected operational lifetime of the RSPP. For the purposes of this analysis, it is reasonably assumed that public services as related to law enforcement, fire protection, hospitals and emergency medical response services, schools and public parks and recreation would be able to expand as needed to accommodate future population growth. Decommissioning and closure of the project would be similar to construction-related activities and, under current conditions, construction of the project would not result in any direct or indirect significant adverse impacts to public services. As such, the activities and workforce required for decommissioning and closure would not be expected to significantly impact future levels of public services. Following the completion of all decommissioning and closure activities there would be no demand placed on public services. Direct and indirect impacts would be anticipated to be less than significant or none.

Fiscal Effects

Staff cannot speculate as to the long-term economic and fiscal effects that closure and decommissioning activities would have on the socioeconomics study area because future conditions are unknown. However, upon permanent closure the beneficial fiscal impacts of the project, such as worker payroll and project expenditures and associated sales taxes would no longer occur.

C.8.4.3 CEQA LEVEL OF SIGNIFICANCE

As addressed in Section C.10.4.2, direct and indirect socioeconomic impacts associated with implementation of the proposed project would be less than significant or none.

C.8.5 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project site. This alternative would eliminate land disturbances by approximately 42%. It would consist of 167 solar collector array loops occupying approximately 1,135 acres of land.

The Northern Unit Alternative would transmit power to the grid through the planned Southern California Edison 230-kV substation. As with the proposed project, the power block would remain north of Brown Road, and would include all operational power facilities, structures, transmission lines and related electrical system, as well as potable and treated water tanks and auxiliary equipment. The transmission line alignment for this alternative would be 3,900 feet, and would connect to a switchyard adjacent to the existing SCE 230kV transmission line. In addition, the site would require access roads, a parking lot, a bio-remediation unit and a main office building, all of which would be north of Brown Road. This alternative's water supply pipeline would remain at the same location as under the proposed project.

C.8.5.1 SETTING AND EXISTING CONDITIONS

For the purposes of socioeconomic resources and attributes, the local and regional setting for the Northern Unit Alternative would be that same as described in Section C.10.4.1 for the proposed project.

C.8.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This alternative would reduce the project site by an estimated 42%, and would also result in a 58% reduction in the amount of electricity generated. In comparison to the propose project, this alternative's smaller facility size and output would be expected to require a smaller construction workforce and shorter timeline construction, a smaller operational workforce, and a smaller decommissioning and closure workforce and shorter closure schedule. Therefore, there would be a corresponding reduction in the number of people temporarily or permanently added to the local population base, less demand on local and regional employment pools, less need for temporary and permanent housing, and less demand for public services. Additionally, it would be

expected that there would be less contribution to direct, indirect and induced expenditures and revenues, including government revenues generated from sales taxes.

As discussed in section C.10.4.2, the proposed project would not result in any significant adverse impacts on socioeconomic resources and attributes, either directly or indirectly. Because the Northern Unit Alternative would result in a proportionately smaller facility, its construction, operation and closure would decrease the magnitude and/or duration of the proposed project's impacts to socioeconomic resources and attributes. As such, under this alternative no significant adverse socioeconomic impacts would occur, either directly or indirectly. However, as noted above, this alternative would result in correspondingly smaller fiscal benefits due to its reduced size.

C.8.5.3 CEQA LEVEL OF SIGNIFICANCE

As discussed above in Section C.10.5.2 and similar to the proposed project, impacts to socioeconomic resources and attributes resulting from implementation of the Northern Unit Alternative would be less than significant or none.

C.8.6 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would be a 104 MW solar facility located within the boundaries of the proposed project site. The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of approximately 104 MW. It would occupy approximately 826 acres of land.

The Southern Unit Alternative would transmit power to the grid through the proposed project's planned substation. The power block, spanning approximately 18 acres, would remain north of Brown Road and would include all operational power facilities, structures, transmission lines and related electrical systems, potable and treated water tanks, and auxiliary equipment. The proposed transmission line alignment would be 3,900 feet and would connect to the proposed switchyard adjacent to the SCE's existing 230kV transmission line. In addition, the site would require access roads, a parking lot, a bio-remediation unit and a main office building all of which would be north of Brown Road. This alternative's 16.3-acre water line would remain at the same location as under the proposed project. Similar to the proposed project, the Southern Unit Alternative would require the relocation of the two existing SCE transmission lines.

C.8.6.1 SETTING AND EXISTING CONDITIONS

For the purposes of socioeconomic resources and attributes, the setting and existing conditions of the Southern Unit Alternative would be identical to those described for the proposed project, as provided in Section C.10.4.1.

C.8.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This alternative would be smaller in site size and generate less electricity than either the proposed project or the Northern Unit Alternative. As such, this alternative would result in a comparable reduction in the number of workers needed for construction, as well as a shortened construction schedule, a smaller operational workforce, a reduced closure and decommissioning workforce and shortened schedule for closure and

decommissioning. The reduction in this alternative's need for temporary and permanent employees would decrease short- and long-term additions to the local population base, place less demand on local and regional employment pools, lessen the need for temporary and permanent housing, and lessen the demand for public services. Additionally, it would be anticipated to result in a reduction of direct, indirect and induced expenditures and revenues, including government revenues generated from sales taxes.

As addressed in Section C.10.4.2, implementation of the proposed project would not result in any significant adverse socioeconomics impacts. Due to its smaller scale in terms of size and power output, implementation of the Southern Unit Alternative would have a correspondingly smaller influence on the magnitude and/or duration of identified socioeconomics impacts in comparison to the proposed project. Consequently, the Sothern Unit Alternative would not result in any significant adverse socioeconomic impacts. It is noted, however, that this alternative, in comparison to the proposed project, would have correspondingly smaller direct, indirect and induced fiscal benefits due to its reduced size.

C.8.6.3 CEQA LEVEL OF SIGNIFICANCE

As discussed in Section C.10.6.2, above, and similar to the proposed project and Northern Unit Alternative, impacts to socioeconomic resources and attributes resulting from the Southern Unit Alternative would be less than significant or none.

C.8.7 ORIGINAL PROPOSED PROJECT ALTERNATIVE

The Original Proposed Project Alternative would consist of 278 solar array loops with a net generating capacity of approximately 250 MW. It would occupy approximately 1,760 acres of land, including an estimated 755 acres north of Brown Road and 685 acres south of Brown Road. It would require a shorter transmission interconnection (1,250 feet) in comparison to the proposed project's interconnection of 3,900 feet.

Similar to the proposed project, the Original Proposed Project Alternative would transmit power to the grid through the planned SCE 230-kV substation located near the proposed project site and would require infrastructure including a main office building, power block, water line, transmission line, switch yard, access roads, parking area, bio-remediation unit and maintenance building. In contrast to the proposed project, the bioremediation unit would be located north of Brown Road, within the proposed project's footprint. The power block and ancillary facilities would be located south of Brown Road as would the transmission line and switch-yard. The Original Proposed Project Alternative would also require relocation of the two existing SCE transmission lines.

C.8.7.1 SETTING AND EXISTING CONDITIONS

For the purposes of socioeconomic resources and attributes, the setting and existing conditions for this alternative would be identical to those described for the proposed project, as provided in Section C.10.4.1.

C.8.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The nominal output of this alternative is identical to the proposed project; additionally, its physical size is only slightly less than the proposed project and its related transmission, integration and water supply needs are nearly the same as proposed project. As such, this alternative's construction, operational and decommissioning and closure requirements would be essentially the same as for the proposed project. Consequently, its socioeconomic impacts on population and employment, housing and property values, public services and local fiscal revenues would be anticipated to be nearly identical to the proposed project.

As addressed in Section C.10.4.2, implementation of the proposed project would not result in any significant adverse socioeconomic impacts. As implementation of this alternative would be nearly the same as the proposed project, its associated impacts on socioeconomic resources and attributes would be essentially the same. Direct and indirect impacts would be less than significant or none.

C.8.7.3 CEQA LEVEL OF SIGNFICANCE

As discussed in Section C.10.7.2, above, and similar to the proposed project, impacts to socioeconomic resources and attributes resulting from the Original Proposed Alternative would be less than significant or none.

C.8.8 NO PROJECT/NO ACTION ALTERNATIVE

Under the No Project/No Action Alternative the RSPP would not be implemented. There would be no grading of the site, no land disturbance and no and no installation of power generation and transmission equipment.

C.8.8.1 SETTING AND EXISTING CONDITIONS

For the purposes of socioeconomics, the setting and existing conditions for this alternative would be identical to those described for the proposed project, as provided in Section C.10.4.1.

C.8.8.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Under the No Project/No Action Alternative no project-related activities would occur and there would be no corresponding effects on any socioeconomic attributes of the project area, either locally or regionally. As such, no impacts would occur; existing conditions, as described in Section C.10.4.1 would not change. It is noted, however, that under the No Project/No Action Alternative none of the beneficial fiscal effects associated with implementation of the proposed project would occur.

C.8.8.3 CEQA LEVEL OF SIGNIFICANCE

As noted in Section C.10.8.2, under the No Project/No Action Alternative no impacts to socioeconomic resources and attributes would occur.

C.8.9 COMPARISON OF ALTERNATIVES AND PROPOSED PROEJCT

As outlined in Sections C.10.4 through C.10.8, none of the project alternatives, including the proposed project, would result in significant adverse impacts to socioeconomic resources and attributes; all direct and indirect impacts would be less than significant or none.

The magnitude and duration of the potential impacts associated with the proposed project and the Original Proposed Project Alternative would be nearly the same, as their implementation would require very demands and activities for construction, operation and closure. Because these two alternatives would be almost of the same size and generate equal amounts of energy, their direct, indirect and induced fiscal benefits, in terms of local and regional revenues and sales taxes due to project-related purchases would also be substantially the same. There would be no appreciable difference between these two alternatives.

The Northern Unit Alternative and the Southern Unit Alternative represent smaller versions of the proposed project and the Original Proposed Project Alternative. As such, their associated effects on local and regional socioeconomic variables, including population and employment, housing and public services would be proportionately reduced in terms of magnitude and duration. For example, a decrease in the time needed for completion of construction and a smaller construction workforce would result in a smaller number of people temporarily relocating to the project area, thereby decreasing demands on temporary housing. Due to the reduced site size and operational output of these alternatives, there would also be, in comparison to the proposed project and the Original Proposed Project Alternative, a corresponding reduction in the direct, indirect and induced fiscal benefits of the project. Because the Southern Unit Alternative is slightly smaller in size, in terms of both physical breadth and output, it would be anticipated to have slightly lessened effects on socioeconomic resources and attributes, as related to magnitude and duration, in comparison to the Northern Unit Alternative.

The No Project/No Action Alternative would not result in any adverse or beneficial impacts to socioeconomic resources and attributes. Existing conditions of the project area, both locally and regionally, would remain the same. It is noted, however, that if one of the project alternatives is not implemented, other renewable and non-renewable power plants would have to be constructed to serve the demand for electricity. Although staff cannot predict the location of these other facilities or what their construction, operational and closure requirements would be, it can be reasonably assumed that they would likely result in similar types of impacts to socioeconomic resources as the proposed project and the Northern Unit, Southern Unit and Original Proposed Project Alternatives. If the No Project/No Action Alternative were to be implemented, there would also be no net contribution to the State's mandated renewable energy portfolio.

Socioeconomics Table 14 provides a summary comparison of the project alternatives.

Socioeconomics Table 14
Comparison of Proposed Project and Alternatives

Impact	Proposed Project (250MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250MW)	No Action/No Project
Induce Substantial Population Growth	Less than significant impact or none. Construction and closure would result in a population increase of 0.37 to 0.57% temporarily. Operation would result in an estimated maximum population increase of 0.41%.	Same as proposed project; however, due to reduced size, the construction, operational and closure workforces and activities needed would proportionately lessen the duration and magnitude of impacts.	Same as proposed project and Northern Unit Alternative; however, due to increasingly reduced size, the construction, operational and closure workforces and activities needed would proportionately further decrease the duration and magnitude of impacts.	Same as proposed project.	No impact.
Displace Substantial Numbers of People and/or housing	Less than significant impact or none. Construction, operation and closure would not displace any people or housing. Adequate temporary and permanent housing capacity exists in project area to accommodate construction, operation and closure.	Same as proposed project; however, due to reduced size, the construction, operational and closure workforces and activities needed would proportionately lessen the duration and magnitude of impacts.	Same as proposed project and Northern Unit Alternative; however, due to increasingly reduced size, the construction, operational and closure workforces and activities needed would proportionately further decrease the duration and magnitude of impacts.	Same as proposed project.	No impact.

Impact	Proposed Project (250MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250MW)	No Action/No Project
Adversely Impact Acceptable Levels of Public Service	Less than significant impact or none. Adequate capacity/service levels exist to accommodate construction, operation and closure.	Same as proposed project; however, due to reduced size, the construction, operational and closure workforces and activities needed would proportionately lessen the duration and magnitude of impacts.	Same as proposed project and Northern Unit Alternative; however, due to increasingly reduced size, the construction, operational and closure workforces and activities needed would proportionately further decrease the duration and magnitude of impacts.	Same as proposed project.	No impact.
Substantially Change Local Employment	Beneficial impact. Construction, operation and closure would not exceed or substantially burden existing or projected available labor pools. Temporary and permanent workforces would positively impact local and regional employment rates.	Same as proposed project; however, due to reduced size, the construction, operational and closure workforces and activities needed would proportionately lessen the duration and magnitude of beneficial impacts.	Same as proposed project and Northern Unit Alternative; however, due to increasingly reduced size, the construction, operational and closure workforces and activities needed would proportionately further decrease the duration and magnitude of beneficial impacts.	Same as proposed project.	No impact. No beneficial impacts to local and regional employment rates would occur.
Substantially Change Local Business or Government Revenues	Beneficial impact. Construction, operation and closure would substantially contribute to local business and government revenues.	Same as proposed project; however, due to reduced size, the construction, operational and closure workforces and activities would proportionately lessen the duration and magnitude of impacts.	Same as proposed project and Northern Unit Alternative; however, due to increasingly reduced size, the construction, operational and closure workforces and activities needed would proportionately further decrease the duration and magnitude of beneficial impacts.	Same as proposed project.	No impact. No beneficial impacts to local business and government revenues would occur.

C.8.9 CUMULATIVE IMPACTS

Cumulatively considerable impacts address the incremental effects of an individual project that are significant when viewed in connection with the effects of other past, current projects, and probable future projects (California Code Regulation, Title 14, section 15130). Per NEPA's regulations, cumulative effects can result from individually minor but collectively significant actions taking place over a period of time (40 CFR §1508.7).

There is the potential for substantial future development throughout southern California and the high desert region. This section first defines the geographic area over which cumulative impacts related to socioeconomic resources could occur. The analysis itself then describes the potential for cumulative impacts to occur as a result of implementation of the RSPP project along with the listed local and regional past, present and reasonably foreseeable projects identified within cumulative project area for socioeconomic resources. The analysis of cumulative impacts is based on information provided in Section B.3, Cumulative Scenario, including:

- **Cumulative Impacts Table 1A**, Renewable Energy Projects in the BLM California Desert District;
- **Cumulative Impacts Table 1B**, Renewable Energy Projects on State and Private Lands in California Desert District Counties ;
- **Cumulative Impacts Table 2**, Existing Projects in the Ridgecrest Area;
- **Cumulative Impacts Table 3**, Future Foreseeable Projects in the Ridgecrest Area;
- **Cumulative Impacts Figure 1**, Renewable Energy Applications in the California Desert District;
- **Figure Cumulative Impacts 2**, Renewable Energy Applications in the Ridgecrest District Area; and,
- **Cumulative Impacts Figure 3**, Existing and Future/Foreseeable Projects in the Ridgecrest Area.

C.8.9.1 GEOGRAPHIC EXTENT

The proposed project is located in northeastern Kern County, and its construction and operational workforces would be expected to be drawn largely from Kern, Los Angeles and San Bernardino Counties. Permanent workers over an estimated 30 year project lifetime would be anticipated to reside within a one-hour commuting distance of the project site, and approximately 75% of the workers needed for construction would be expected to live and reside within a daily commuting distance of the project site; as addressed in Section C.10.4.2, the existing labor force for the tri-county area can readily accommodate these assumptions.

As illustrated in **Cumulative Impacts Figures 1** and **2**, the majority of renewable energy projects proposed in the high desert region (including portions of both the BLM California Desert District and the BLM Ridgecrest District Area) are located in Kern and San Bernardino Counties. For the same region, the majority of renewable energy

projects located on private and State lands are located in Kern, Los Angeles and San Bernardino Counties, as listed in **Cumulative Impacts Table 1B**.

At a local scale, nine existing and future development projects have been identified, the largest of which is the China Lake Naval Weapons Air Center Base Realignment and Closure (BRAC) project, which could create 4,085 new jobs and the construction of potentially up to 2,700 new homes to accommodate growth. Similar to the proposed project, the effects of these projects would be expected to impact most directly the Ridgecrest area and Kern, Los Angeles and San Bernardino Counties.
Because the proposed project's direct and indirect effects are anticipated to have the greatest influence over the socioeconomic resources and attributes of Kern, Los Angeles, and San Bernardino Counties, and because the other past, present and reasonably foreseeable projects outlined in **Cumulative Impacts Tables 1A** though **3** and **Cumulative Impacts Figures 1** though **3** would also be expected to draw upon the same socioeconomic resources and attributes of Kern, Los Angeles and San Bernardino Counties, the study area for this cumulative impact analysis is the same as for the proposed project and its alternatives, as addressed in Sections C.10.4 through C.10.8.

C.8.9.2 CUMULATIVE IMPACT ANALYSIS

Existing Cumulative Conditions

Cumulative Impacts Table 2 provides the past and present (existing) projects identified within the vicinity of Ridgecrest. In addition to **Cumulative Impacts Table 2** it is noted that the City of Ridgecrest is currently experiencing significant hotel construction; however, these development projects are expected to be completed in early to mid-2010 and prior to the potential start date of the RSPP. Therefore, they have not been included in **Cumulative Impacts Table 2**.

As addressed in Section C.10.4.2, the proposed project would not have direct or indirect significant adverse impacts on socioeconomic resources and attributes, either locally or regionally. For the purposes of the project's impact analysis, the existing operations of the CLNWC have been considered and the additional hotels that are currently either under construction or near completion in the Ridgecrest area would further expand the availability of temporary housing, thereby further reducing the proposed project's incremental demand on temporary housing resources during construction and closure.

The proposed project's incremental contribution to population growth, employment, housing, public services would be less than significant or none, and its incremental contribution to local business and government revenues would be beneficial. Therefore the proposed project would not have the potential to combine with other past and present projects in a manner that would create cumulatively significant adverse impacts.

Future Foreseeable Projects

Cumulative Impacts Tables 1A, **1B** and **3** and **Cumulative Impacts Figures 1**, **2** and **3** provide the future foreseeable projects identified for the proposed project. Within the entire BLM California Desert District there a total of 124 solar and wind energy projects have been proposed for construction and operation. Of this total, 21 are proposed within

the BLM Ridgecrest District. On private and state lands 24 renewable energy projects are proposed in Kern, Los Angeles and San Bernardino Counties, including seven solar and six wind energy projects in Kern County, four solar energy projects in Los Angeles County, four solar and two wind energy projects in San Bernardino County and one solar energy project that would be located on lands within both Kern and Los Angeles Counties. Within an estimated 22-mile radius of the proposed project site, there are nine proposed future projects, including one solar energy project (in addition to the proposed project), three wind energy projects, the BRAC project, a waste water treatment plant, two highway improvement projects and one large commercial (retail) development project.

For the same reasons as described for the proposed project, it is assumed that the other future foreseeable future projects within the cumulative impacts study area could be constructed, operated and decommissioned by the available existing and projected population and workforce of Kern, Los Angeles and San Bernardino Counties (please refer to **Socioeconomics Tables 2**, **5**, **6** and **13**). Therefore, at a regional scale, the combined increase in population growth due to implementation of all foreseeable future projects would be less than significant. At a local scale, the BRAC project would induce substantial population growth in the Ridgecrest area; however, the proposed project's incremental contribution to this combined growth would be less than 1% of the total existing population and therefore less than significant.

The future projects listed in **Cumulative Impacts Tables 1A**, **1B** and **3** would be located primarily on lands that are currently undeveloped, and thus would not displace substantial numbers of people or housing. Although the BRAC project would result in a substantial increase to the local population, it would also include the construction of new housing to meet demand. Therefore, less than significant housing impacts would be anticipated to occur. As addressed in Section C.10.4.2, the proposed project would not displace any existing homes or people. Therefore, it would not incrementally contribute to any cumulative housing impacts.

In May 2008 Kern County completed a Capital Improvement Plan (CIP) (MuniFinancial 2008) that presents the County's "best current understanding of the new public facilities that will be needed to serve...projected development through 2030." The CIP is considered a "working document" that will need to be reviewed and revised on a regular basis as Kern County’s public services and related facilities and infrastructure require change (MuniFinancial 2008). The CIP addresses County-wide public protection facilities, Sheriff patrol and investigation facilities, library facilities, animal control facilities, park facilities, fire facilities, waste management facilities, public health facilities, and general government facilities and their respective needs for improvement in response to population growth and demand (MuniFinancial 2008).

As addressed in Section C.10.4.2, staff has not identified any project-related significant adverse impacts to public services, including police and fire protection and emergency response services. In addition, the CIP does not indicate any specific plans or needs for improvement to public services or related infrastructure or facilities within the Ridgecrest area.

The Kern County Planning Department has indicated that its public services and related facilities and infrastructure are currently underfunded and would be significantly and adversely impacted by all new development in the future, including industrial development (Oviatt 2010). The Kern County Planning Department has additionally noted that for those future projects that would be located on federal lands, the impacts to Kern County's public services would be further exacerbated because they are exempt from local property taxes and thus do not provide local government revenues. The same type of property tax exemptions would apply to those elements of the BRAC project that are located within the boundaries of the CLNWC and those renewable energy projects located on federal lands. Although the Kern County Planning Department has noted that the BLM, through the U.S. Department of the Interior's Payment in Lieu of Taxes program, does provide funding for "normal and customary" fire and police protection and emergency response services, the county does not believe that this funding alone would adequately address the potential public services demands of industrial development on federal lands (Oviatt 2010).

The Kern County Planning Department has recommended the Energy Commission propose a condition of certification that would account for the RSPP's direct and indirect incremental contribution to impacts on public facilities and related public services. Kern County Planning Department recommends a condition of certification that would include a payment of $28,646,937 for public, law, and fire protection based on an estimated cost of $576.88 per each 1,000 square feet of the proposed project’s development.

At this time, staff does not have adequate information from Kern County to substantiate its concerns regarding the project’s potential to impact public services and facilities. Finally, in addition to staff’s conclusions that the proposed project would have no project-related significant adverse direct, indirect, or cumulative impacts to public services, police and fire protection and emergency response services, staff cannot impose a condition of certification on the project because Kern County has not shown how the developer fee would directly be related to the impacts of the proposed development giving rise to the fee, thereby ensuring the nature of the fee is proportional to the potential impacts of the proposed project.

Although several of the projects outlined in **Cumulative Impacts Tables 1A**, **1B** and **3** would be located on federal lands and thus exempt from local property taxes, similar to the proposed project, they would all result in temporary and long-term direct, indirect and induced local business revenues and government revenues generated from sales tax and employment. Therefore, combined cumulative impacts related to fiscal resources would be beneficial, as would the proposed project's contribution to them.

C.8.9.3 CUMULATIVE IMPACT CONCLUSION

The proposed project would not directly or indirectly cause or incrementally contribute to any significant adverse cumulative impacts related to population, employment, housing or business or government revenues.

C.8.10 COMPLIANCE WITH LORS

Staff has considered minority and below-poverty-level populations as identified in **Socioeconomics Figure 1** and **Socioeconomics Tables 3** and **4**, and has found no significant adverse impacts on any receptors, including environmental justice populations. In arriving at this conclusion, staff notes that its analysis complies with all directives and guidelines from the California Environmental Protection Agency's (Cal EPA's) Office of Environmental Health Hazard Assessment and the California Air Resources Board. Staff's assessment is biased toward the protection of public health and takes into account the most sensitive individuals in the population. Using extremely conservative (health-protective) exposure and toxicity assumptions, staff's analysis demonstrates that members of the public potentially exposed to toxic air contaminant emissions due to the project, including sensitive receptors such as the elderly, infants, and people with pre-existing medical conditions, would not experience any significant chronic or cancer health risk as a result of that exposure. Staff believes that it has incorporated every conservative assumption called for by State and federal agencies responsible for establishing methods for analyzing public health impacts. The results of that analysis indicate that there would be no direct, indirect or cumulatively significant adverse public health and safety impact to any population in the area. Therefore, given the absence of any significant health impacts, there are no disparate health impacts and there are no environmental justice issues associated with the proposed project or the alternatives addressed in this analysis. Please refer to **AIR QUALITY** and **PUBLIC HEALTH AND SAFETY** for additional information regarding this analysis and conclusion.

Staff concludes that construction and operation of the RSPP would be in compliance with all applicable and adopted LORS regarding long-term and short-term project impacts. Given the RSPP's projected 30-year life span, staff cannot speculate about LORS compliance for facility closure and decommissioning activities.

C.8.11 NOTEWORTHY PUBLIC BENEFITS

As outlined in Section C.10.4, the proposed project would result in local business and government revenues, which would be considered noteworthy overall economic benefits. **Socioeconomics Table 15** provides a summary of these benefits.

Socioeconomics Table 15
Noteworthy Economic Benefits

Project Construction	**Estimated Dollars (Rounded)**
Total Construction Payroll	$53,300,000
Annual Construction Payroll	$22,800,000
Annual Local Expenditures	$6,400,000
Total Annual Sales Tax Revenue	$530,000
Annual State Sales Tax Revenue	$466,000
Annual Kern County Sales Tax Revenue	$64,000
Direct Construction Expenditures for Kern, Los Angeles and Kern Counties (Annually)	$23,000,000
Indirect Regional Revenues (Annually)	$18,000,000
Induced Regional Revenues (Annually)	$18,000,000
Total Annual Impact	$59,000,000
Direct Jobs Created	405 Workers
Indirect Job Created	204 Workers
Induced Jobs Created	229 Workers
Total Jobs Created	838 Workers
Project Operation	**Estimated Dollars (Rounded)**
Annual Operational Payroll	$2,600,000
Annual Local Expenditures	$2,700,000
Total Annual Sales Tax Revenue	$222,000
Annual State Sales Tax Revenue	$195,000
Annual Kern County Sales Tax Revenue	$27,000
Direct Construction Expenditures for Kern, Los Angeles and Kern Counties (Annually)	$3,000,000
Indirect Regional Revenues (Annually)	$4,000,000
Induced Regional Revenues (Annually)	$3,000,000
Total Annual Impact	$10,000,000
Direct Jobs Created	84 Workers
Indirect Job Created	38 Workers
Induced Jobs Created	32 Workers
Total Jobs Created	154 Workers
School Impact Fee (Sierra Sands Unified School District)	$56,4000

The RSPP is expected to be 100% property tax exempt as part of Section 73 of the California Revenue and Tax Code for solar energy generating systems. Additionally, the RSPP would be located on federal lands managed by the BLM, which is also exempt from local property taxes.

C.8.12 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

Staff proposes no conditions of certification/mitigation measures.

C.8.13 CONCLUSIONS

Staff concludes that construction, operation and closure of the RSPP would not result in any direct or indirect unavoidable significant impacts or significant adverse impacts to socioeconomic resources. For the purposes of this analysis, these resources include population and employment, housing and public services (law enforcement, fire protection, hospitals and emergency medical response, schools and public parks and recreation) and fiscal revenues.

Staff additionally concludes that the project's construction, operation and closure would have beneficial impacts on local business revenues and would also generate sales-tax related revenues for the state and affected local jurisdictions.

Staff has confirmed that within a six-mile radius of the proposed project site there are "pockets" of minority and below-poverty-level populations that qualify as environmental justice populations; however, staff has not identified any direct, indirect or cumulatively significant adverse public health and safety impacts to such populations. Given the absence of any significant health impacts, no disparate health impacts have been identified.

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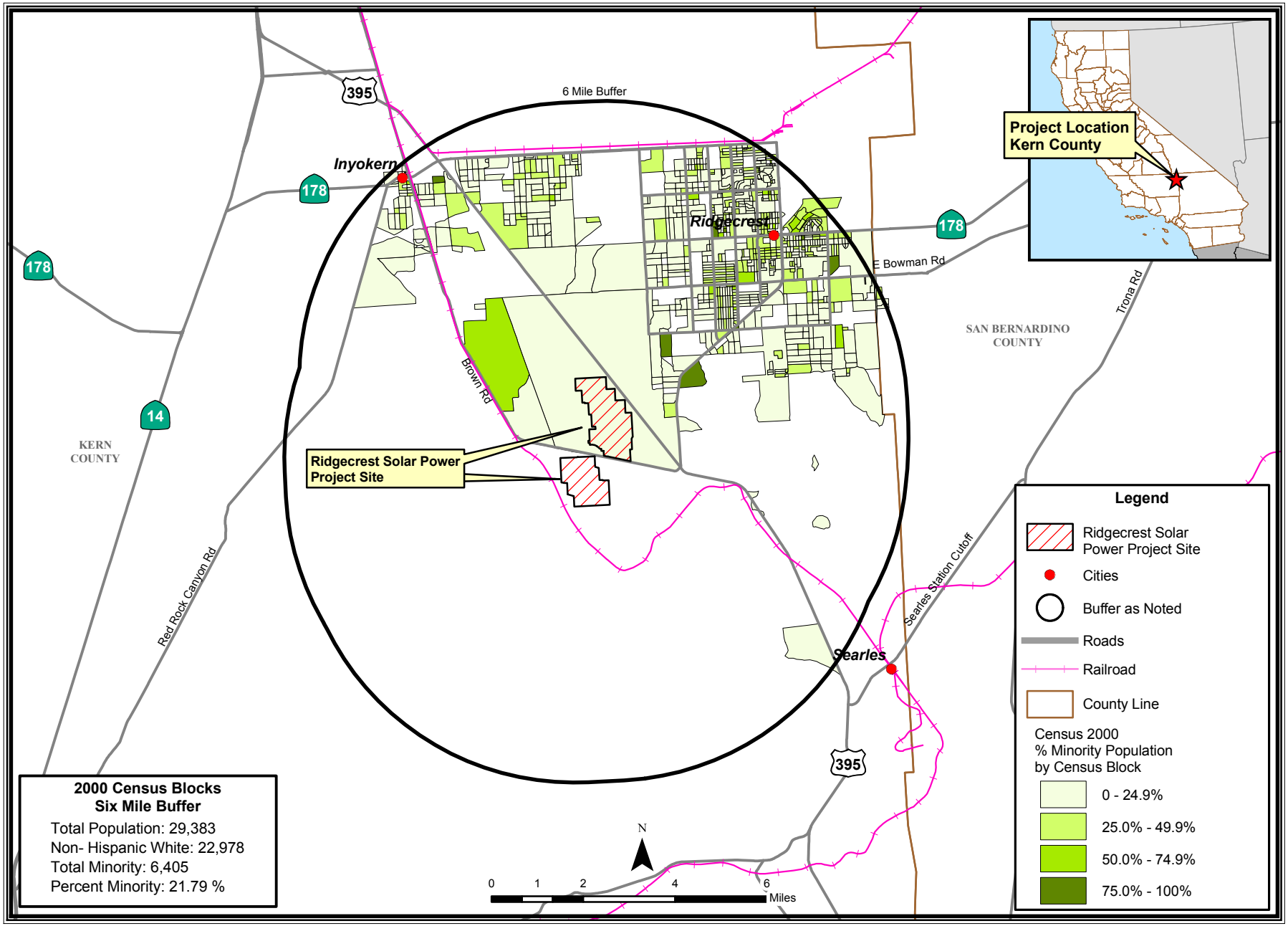
SOCIOECONOMICS - FIGURE 1

Ridgecrest Solar Power Project - Census 2000 Minority Population by Census Block - Six Mile Buffer



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Tele Atlas Data & Solar Millennium LLC - Census 2000 PL 94-171 Data - Matrix PL2

C.9 SOIL AND WATER RESOURCES

Testimony of Michael Donovan P.G., C.Hg., Michael Daly P.E.,
and John R. Thornton P.E.

C.9.1 SUMMARY OF CONCLUSIONS

With the information provided to date, California Energy Commission staff has determined that construction, operation, and decommissioning of the proposed Ridgecrest Solar Power Project (RSPP or proposed Project) could potentially impact soil and water resources. Where these potential impacts have been identified, Energy Commission staff, under the California Environmental Quality Act (CEQA) and Energy Commission regulations, has proposed mitigation measures as Conditions of Certification to reduce identified impacts to levels that are less than significant. The mitigation measures, as well as specifications for laws, ordinances, regulations and standards (LORS) conformance, are included herein as Conditions of Certification address the CEQA requirements for the Energy Commission's analysis and BLM's needs for a National Environmental Policy Act (NEPA) analysis. Staff's conclusions based on analysis of the information submitted to-date are as follows:

1. The proposed Project would be located on an alluvial fan where flash flooding and mass erosion could impact the Project. Project-related changes to the alluvial fan hydrology could result in impacts to adjacent land users. A Draft Drainage, Erosion, and Sedimentation Control Plan (DESCP) has been developed to mitigate the potential storm water and sediment project-related impacts. However, the calculations and assumptions used to evaluate potential storm water and sedimentation impacts are imprecise and have limitations and uncertainties associated with them. Given the uncertainty associated with the calculations, the magnitude of potential impacts that could occur cannot be determined precisely. Based on these factors, the proposed Project could result in impacts that would be significant with respect to CEQA significance criteria specified herein and NEPA significance criteria specified in 40 CFR 1508.27. Therefore, Conditions of Certification have been developed that define the requirements for reports, plans, monitoring, and inspection, as well as standards and procedures for implementing Best Management Practices during construction and operations.

2. The proposed Project would be located in an area with no designated entity responsible for maintaining integrity of the rerouted channels. Commission staff believes the Applicant should be required to establish a Channel Maintenance Program as indicated in Condition of Certification **SOIL&WATER-12**.

3. The project applicant proposes to use groundwater supplied by the Indian Wells Valley Water District (IWVWD). Water from IWVWD wells will be piped to an existing tank and transmitted via pipeline that will be built by the RSPP to the Project site. The IWVWD and the Project owner signed a Water Supply Agreement on October 29, 2009. IWVWD also issued a Will Serve Letter for water service. Water will be supplied to the project site from the Ridgecrest Heights B Zone water storage tank. A 16 inch diameter pipeline from the water storage tank shall be constructed in China Lake Boulevard southerly to Brown Road then westerly to the Project site. The

Project owner is responsible for the design, permitting and construction of all necessary facilities. IWVWD is in the process of annexing the Project site.

This analysis indicates that the IWVGB is already significantly overdrafted and the Projects pumping will exacerbate the overdraft condition. The Applicant has proposed a mitigation to offset the proposed construction and operation water demands. Condition of Certification **SOIL&WATER-2** and **3**, is expected to reduce the impact of the Project's water demand on the IWVGB to below the level of significance.

C.9.2 INTRODUCTION

The proposed action evaluated within this Staff Assessment (SA)/Draft Environmental Impact Statement (DEIS) is the construction and operation of the Ridgecrest Solar Power Project (RSPP, referred to herein as the Project), a proposed solar-thermal electricity generation facility located on public lands managed by the BLM in Kern County, California. The SA/DEIS represents a joint environmental review document developed by the CEC and BLM to evaluate potential impacts associated with the proposed action.

Solar Millennium, LLC proposes to construct, own, and operate the Project. The Project is a concentrated solar thermal electric generating facility with a 250 megawatt (MW) nominal capacity.

The Applicant has applied for a right-of-way (ROW) grant from BLM ROW for approximately 3,995 acres of relative flat desert terrain. The total area within the ROW that will be disturbed by Project construction and operation will be about 2,002 acres including existing transmission line relocation. The area inside the Project's security fence, within which all Project facilities will be located, will occupy approximately 1,454 acres of the ROW (SM, 2010a).

This SA/DEIS examines engineering, environmental, public health and safety aspects of the proposed project, based on the information provided by the applicant and other sources available at the time the SA/DEIS was prepared. The SA/DEIS contains analyses similar to those normally contained in an Environmental Impact Report (EIR) required by CEQA, as well as analyses required as part of an EIS prepared under the NEPA.

C.9.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

Significance criteria are based on those listed in CEQA Appendix G. Hydrology and water resources impacts would be significant if the project would:

- Violate any water quality standards or waste discharge requirements.
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a

lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation onsite/offsite.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite/offsite,
- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.
- Otherwise substantially degrade surface water or groundwater quality
- Place structures within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.

C.9.4 PROPOSED PROJECT

C.9.4.1 WATER USE

Construction

The Applicants propose to construct one generating unit over the course of 28 months. Total water consumption over the 28 months is anticipated to be 1,470 acre-feet (af). Water will be purchased from the Indian Wells Valley Water District (IWVWD) and trucked to the Project site. Water will be required for the following consumptive uses:

- Dust control for areas experiencing construction work as well as mobilization and,
- Dust control for roadways,
- Water for grading activities associated with both cut and fill work,
- Water for soil compaction in the utility and infrastructure trenches,
- Water for soil compaction of the site grading activities,
- Water for soil stockpile sites,
- Water for the various building pads, and
- Water for concrete pours on site.

The predominant use of water will be for grading activities, which will have a steady rate of work each month. The grading schedule for the site has been spread to cover the total construction period. This will mean that water use will be steady and without definable peaks. Average water use at the site is estimated to be about 561,000

gallons (1.7 af) per working day. Total construction water use for the duration of Project construction is estimated to be about 478 million gallons (1,470 af). Construction water will be sourced from IWVWD. Potable water during construction will be brought on site in trucks and held in day tanks.

Operation

The Project will use about 150 acre-feet per year (afy) of groundwater from the IWVWD for operational supply. This represents about 1.6% of the IWVWD's total annual production. Assuming continuous uninterrupted supply and continuous usage, a yearly volume of 150 af equates to an average pumping rate of about 90 gallons per minute (gpm). Peak water usage during the summer months is about 190,500 gallons per day (gpd) or about 130 gpm assuming continuous pumping. Water use during the winter months is estimated to be about 40,700 gpd or a pumping rate of about 30 gpm, assuming continuous use. Over the Project's 30-year life, water use will total about 4,500 af.

Water supplied by IWVWD will be used for:

- Solar mirror wash water to maintain solar collector efficiency,
- Domestic potable uses include drinking water, showering, toilets, hand washing, etc,
- Power cycle makeup water to supply the steam driving the steam turbine generators (this water is recycled and thus is not actually consumptive use),
- Ancillary equipment heat rejection, for cooling generators, pumps and other equipment, and
- Dust suppression.

Soil and Water Table 1 presents the anticipated water requirements associated with various uses for each month of the year. Estimates for water usage are based on:

- Solar mirror washing – experience at other locations with similar climatic conditions,
- Power cycle makeup water and ancillary heat rejection – expected monthly power production rates,
- Domestic potable use – number of employees and number of hours expected to be worked during the year (an average consumption of 37 gallons per person per day was assumed), and
- Dust suppression

Soil and Water Table 1
Estimated Water Usage – Total Project

Flow	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
gpm (average)	28.25	60.48	82.80	113.71	127.20	128.07	118.55	118.48	104.73	74.75	57.95	48.68
Acre-Feet	3.97	8.29	11.34	15.58	17.43	17.54	16.24	16.23	14.35	10.24	7.94	6.67

Source: SM 2009a

Water from the wells will be piped to an existing tank and transmitted via pipeline that will be built by the RSPP to the Project site. The well locations are shown on **Soil and Water Figure 1. Soil and Water Table 2** is a summary of the available information on these wells. The wells are currently used by the IWVWD as water supply wells for the district. Additional details for these wells are provided in SM 2009a, Appendix J.

Soil and Water Table 2
Completion Data for Water Supply Wells

Well Number	Well Construction		Screen Interval		Pumping Rate
	Ground Surface (ft msl)	Total Depth (ft bgs)	Top (ft bgs)	Bottom (ft bgs)	(gpm)
Well 18	2,540	1,020	560	1,000	470
Well 33	2,540	1,020	560	1,000	816
Well 34	2,570	955	550	865	1200
			895	935	

From the information provided, the total depth of the onsite wells range from 955 to 1,020 feet bgs. Wells vary from 16 to 20 inches in diameter and are gravel packed and screened from depths below 560 to 895 feet to the total depth of each well. The most recent water levels were collected during the annual groundwater sampling conducted by the IWVWD in 2008. The data collected during this effort indicates that the saturated thickness in these wells is between about 1,500 feet depending on the total depth of the well. The information provided by the IWVWD reveals that three wells are pumped at rates between 470 to 1,200 gpm (SM 2009a)

C.9.4.2 SETTING AND EXISTING CONDITIONS

Physiography

The Project site is located in the Indian Wells Valley, in Kern County, California. The Project site is immediately south of U.S. Highway 395 approximately five miles southwest of the city of Ridgecrest. The Indian Wells Valley is located in the southern end of the Basin and Range Province east of the Sierra Nevada, south of the Coso range, north of the El Paso Mountains, and west of the Argus Range. Indian Wells Valley is also situated between the Sierra Nevada Fault Zone to the west and the El Paso and Garlock faults to the south. The Valley is characterized by a broad alluvial basin of Cenozoic-age sedimentary and volcanic material overlying older plutonic and

metamorphic rocks. Quaternary lacustrine deposits are also found in the region as a result of playas in the northeastern portion of the valley (**Soil and Water Figure 2**). Indian Wells Valley is underlain with alluvial deposits up to 2,000 feet thick.

The Project site is located in the Mojave Desert which is classified as a “high desert”. It is a transition between the “hot” Sonoran Desert to the south and the “cold” Great Basin Desert to the north. Characteristic of a desert climate, the Mojave Desert has extreme daily temperature changes, low annual precipitation, strong seasonal winds, and mostly clear skies. The average annual precipitation is less than five inches with over 77% of the precipitation occurring between November and March. There is, however, a summer thunderstorm season from July to September with violent heavy precipitation that occasionally produces flash flooding. May and June are usually the driest months.

The Project site is located in the southeast portion of Indian Wells Valley. Topography at the site is relatively flat and slopes gently downward in a northwest direction at a gradient of approximately 0.2%. Ground surface elevations range from approximately 2,890 feet above mean sea level (msl) in the southeast to 2,580 feet above msl in the northwest. The Project site is bisected by a concealed, inactive fault. The fault shows evidence of displacement during the late Quaternary time, most likely during the Pleistocene. The inactive fault trends northwest and is located in the southern half of the site.

Topography at the RSPP site slopes gently away from the El Paso Mountains from the south to the north-northwest across the site. The topography shows an average slope of about one foot in 80 feet (1.2%) on the west side of the central drainage (El Paso Wash) crossing the Project site. There are steeper grades east of the El Paso Wash on the Project site. Grades of 1.5% to 2.3% to the north and northwest are measured from an unnamed topographic high on the eastern boundary of the Project site.

Climate and Precipitation

The climate in the Basin and Range province is characterized is dry and arid and characterized by low precipitation. The region experiences a wide variation in temperature, with very hot summer months with mean maximum temperatures exceeding 100 degrees Fahrenheit (°F) occurring in July and August and cold dry winters with mean maximum temperatures in the 60s °F and lows in the 30s °F occurring in December. The average annual precipitation in the Project area is less than five inches with over 77% of the precipitation occurring between November and March with January being the wettest month. May and June are usually the driest months.

Annual precipitation in Indian Wells Valley ranges from four to six inches. **Soil and Water Table 3** presents the average monthly and annual minimum and maximum temperatures and total precipitation from 1940 to 2008, collected from a gauging station in Inyokern (Station 044278), about seven miles northwest of the Project. Average annual precipitation is approximately 4.22 inches based on 68 years of record.

Soil and Water Table 3
Inyokern, California Climate and Precipitation Summary[1]
1940 through 2008

Climate	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual[2]
Ave. Max. Temp (°F)	59.6	64.9	70.4	77.8	87.0	96.8	102.7	101.3	94.2	83.3	69	59.7	80.6
Ave. Min. Temp (°F)	30.7	34.6	38.8	44.5	52.9	60.5	66.2	64.6	58.1	48.2	37.3	59.7	47.2
Ave. Total Precip (in)	0.74	0.97	0.57	0.17	0.07	0.02	0.17	0.23	0.21	0.	0.39	0.59	4.22

Notes: [1] Source - Western Regional Climate Center, http://www.wrcc.dri.edu/ (Climate Station 044278 – Inyokern, CA)
[2] Refers to the annualized average of monthly temperature and precipitation values.

Key:
Ave—Average Max—Maximum Temp—Temperature °F - degrees Fahrenheit Precip—Precipitation in Inches

Source: SM 2009a

Soils

The Project is located in an undeveloped area with few agricultural activities ongoing at the site. The Project site has no history of intensive agricultural use (though it has had grazing authorized by BLM permits), nor has it been mapped for agricultural purposes or had any special agricultural land use designations applied under the Farmland Mapping Act or the Williamson Act. Thus, the Farmland Mapping Act and Williamson Act do not apply to the Project, and are not discussed further.

The ground surface in the region of the Project generally slopes gently downward to the northwest at a gradient of approximately 0.2%. Ground surface elevations at the Project site range from approximately 2,820 feet above mean sea level (msl) in the southeast to 2,580 feet above msl in the northwest. A steeper grade of 8% is present along the eastern side of the Project at the rock outcrops in Section 25, T27S R39E. Because of the high temperatures, low precipitation, and permeable soils, local drainage is intermittent and occurs as dry washes. In areas where the topography is flat, soils range in texture from very sandy to sandy loams and loamy sands. There is an absence of adjacent uplands to introduce surface runoff; discrete channels have not formed. Coarse-textured soils exhibit high infiltration rates, indicating that most precipitation infiltrates immediately into the ground.

Soil survey maps are not available from the NRCS Soil Survey website so the Applicant commissioned a reconnaissance soil survey for the Project. Wasco sandy loam is considered to be representative of the soils at the Project site. It is a component of the Wasco-Rosamond-Cajon Association that was mapped in the majority (95%) of the site. Only 5% of the site is underlain by the Trigger-Sparkhule-Rock Outcrop Association **(Soil and Water Figure 3)**. The Wasco-Rosamond-Cajon Association is characterized by soils with high sand percentage (greater than 70%) and is highly susceptibility to wind erosion. Detailed soil descriptions were developed from the borings, test pits, and site reconnaissance conducted during the preliminary geotechnical investigation. Soil characteristics including depth, texture, drainage, permeability, and erosion hazard of individual soil mapping units are included in **Soil and Water Table 4**. Land capability

classification is an indicator of the soils primary limitations for revegetation. Soil types on the plant site include VIIs and VIIc Capability Subclasses, which means the soils have very severe limitations that make them unsuitable for cultivation.

Soil and Water Table 4
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
Wasco	Wasco Series - Sandy Loam - Formed in mixed alluvium derived mainly from igneous and/or sedimentary rock sources - Well drained - Slopes range from 0-5% - Negligible or very low runoff - Moderately rapid permeability - Slight hazard of wind erosion - Capability Subclass VIIs and/or VIIc - Taxonomic Class: Coarse-loamy, mixed, superactive, nonacid, thermic Typic Torriorthents
Rosamond	Rosamond Series – Fine Sandy Loam - Formed in material weathered mainly from granitic alluvium - Well drained - Slopes range from 0-2% - Medium runoff - Moderate to moderately slow permeability - Moderate hazard of wind and water erosion - Capability Subclass VIIe - Taxonomic Class: Fine-loamy, mixed, superactive, calcareous, thermic Typic Torrifluvents
Cajon	Cajon Series - Sand - Formed in sandy alluvium from dominantly granitic rocks - Somewhat excessively drained - Slopes range from 0-15% - Negligible to very low runoff - Rapid permeability; sandy loam surface textures have moderately rapid over rapid permeability - Slight hazard of wind erosion - High hazard of water erosion - Capability Subclass VIIIs and/or VIIe - Taxonomic Class: Mixed, thermic Typic Torripsamments
Trigger	Trigger Series - Gravelly Sandy Loam - Formed in material weathered from hard sedimentary rocks - Well drained - Slopes range from 5-50% - Medium to rapid runoff - Moderately rapid permeability - Taxonomic Class: Loamy, mixed, superactive, calcareous, thermic Lithic Torriorthents
Sparkhule	Sparkhule Series – Gravelly Sandy Loam - Formed in residuum from volcanic or granitic rocks - Well drained - Soils are on rock pediments and hill with slopes ranging from five to 50% - High to very high runoff - Moderately slow permeability - Taxonomic Class: Loamy, mixed, superactive, thermic Lithic Haplocalcids

Source: SM 2009a

Site soils were described during a reconnaissance-level geotechnical assessment conducted for the site. General observations indicated that soil textures at the site ranged from coarse sands to sandy clay loams, but were predominantly sandy loams.

This was confirmed by the laboratory textural analysis conducted for soil samples collected at the site. The soils were formed in alluvial deposits from the surrounding mountains. The vegetation at the site is dominated by predominantly creosote bush, with other low brush, cacti, annual forbs, and some introduced grasses in places. The ground surface at the site ranged from scattered small stones to significant coverage by fine gravels (SM, 2009a).

Geology

The Project site is located within Indian Wells Valley, which is in the southern end of the Basin and Range Province east of the Sierra Nevada, south of the Coso range, north of the El Paso Mountains, and west of the Argus Range. Indian Wells Valley is also situated between the Sierra Nevada Fault Zone to the west and the El Paso and Garlock faults to the south. The Valley is characterized by a broad alluvial basin of Cenozoic-age sedimentary and volcanic material overlying older plutonic and metamorphic rocks (**Soil and Water Figure 4** and **Soil and Water Figure 5**). Quaternary lacustrine deposits are also found in the region as a result of playas in the northeastern portion of the valley. Indian Wells Valley is underlain with alluvial deposits up to 2,000 feet thick. The Project site is underlain by three stratigraphic units: Jurassic age basement complex, Quaternary and Tertiary age Black Mountain Basalt and Quaternary alluvium of Holocene age. A basement complex of Jurassic, undifferentiated plutonic, hypabyssal, and metamorphic rocks outcrop in the eastern portion of the site. The basement complex forms a basin in which the Tertiary and Quaternary age deposits are found. The Black Mountain Basalt is thought to be of late Pliocene and Pleistocene age and consists of olivine basalt flows that are more than 100 feet thick in some places. An unconformity is formed at the boundary of the Black Mountain Basalt and the overhead Tertiary age continental deposits that comprise the Goler and Ricardo Formations. Surficial Quaternary alluvium sits atop the Tertiary continental deposits.

The majority of the Project site is underlain by Quaternary alluvium and alluvial fan deposits of Holocene age. These deposits consist of unconsolidated moderately to well-sorted gravel, sand silt, and clay. These deposits are derived as alluvial fans from the surrounding mountainous regions and may include fluvial deposits.

Regional Tectonic Setting

The Project site is located in seismically active Southern California, a region that has experienced numerous earthquakes in the past. A review of the AP Earthquake Fault Zone maps and the Kern County Online Mapping System Faults and Fault Zones layer indicate that there are no AP fault zones present within the Project boundaries; however there are three AP fault zones within a 10-mile radius of the center of the Project site. The closest of these AP fault zones is the Little Lake Fault Zone which is located approximately 6.6 miles northeast of the site. Two segments of the Airport and Little Lake Fault Zone are located to the north and northwest of the Project site, approximately 10 miles from the center of the site.

An unnamed buried fault trace has been mapped as trending northwest-southeast across the center of the site. Based on personal communication with Glenn Harris (BLM Ridgecrest office), site features, and observations made during a July 2009 field reconnaissance (SM 2009a), the more probable location of the unnamed fault is just north of, and parallel to Brown Road, and trends roughly east-west (**Soil and Water**

Figure 6). This fault has not been mapped by the United States Geological Survey (USGS) as a Quaternary (sufficiently active) fault, and is not listed by the EQFAULT program as a fault potentially affecting the site.

Hydrogeology

The Project site is within the South Lahontan Hydrologic Region, which covers about 33,100 square miles of eastern California. The South Lahontan Hydrologic Region is bound to the west by the crest of the Sierra Nevada; to the north by the watershed divide between Mono Lake and East Walker River drainages; to the east by the California-Nevada border; and to the south by the crest of the San Gabriel and San Bernardino mountains and the divide between watersheds draining south toward the Colorado River and those draining to the north. The South Lahontan Hydrologic Region includes the Owens, Mojave, and Amargosa River systems, the Mono Lake drainage system, and numerous other internally drained basins.

Groundwater Basins

The South Lahontan Hydrologic Region is subdivided into 76 groundwater basins that cover approximately 18,100 square miles. The IWVGB is located in the west-central portion of the South Lahontan Hydrologic Region and is bounded to the east by the Argus Range, to the south by the El Paso Mountains; to the west by the Sierra Nevada Range; and to the north by the Coso Range. Other groundwater basins that are adjacent to the IWVGB include the Coso Valley Groundwater Basin to the north, the Rose Valley Groundwater Basin to the northwest, the Searles Valley Groundwater Basin to the east, and the Fremont Valley Groundwater Basin to the southwest (**Soil and Water Figure 2**).

The lowest point of the IWVGB is China Lake at an elevation of 2,150 feet above mean sea level (msl). The topography of the Project site is characterized by low relief and elevations that gently slope toward China Lake at grades between 1% and 3%. China Lake is approximately 12 miles to the northeast of the Project site. Two smaller playas, Mirror and Satellite Lakes, are south of China Lake in the east-central portion of the valley and are the primary surface water and groundwater discharge points. Surface elevations in the valley floor range from approximately 2,153 above msl in the northeast to 2,400 feet above msl in the southwest.

Groundwater beneath the plant site and surrounding area is contained within the IWVGB. This basin encompasses an area of about 597 square miles or 382,000 acres. Water resources, their occurrence and use are complicated issues within the region. In this desert environment, groundwater provides an important resource for domestic, agricultural, commercial and industrial use. Groundwater is the sole source for municipal, agricultural, and domestic water supply in the Indian Wells Valley Groundwater Basin (IWVGB).

The IWVGB is not an adjudicated basin. In 1995, the major water service providers and stakeholders in the IWVGB formed the Indian Wells Valley Cooperative Groundwater Management Group and published the Cooperative Groundwater Management Plan. Participants in the plan include the IWVWD, the China Lake Naval Air Weapons Station (NAWS), the BLM, Searles Valley Minerals, the Kern County Water Agency, City of

Ridgecrest, Inyokern Community Services District, Eastern Kern County Resources Conservation District, Indian Wells Valley Airport, Quist Farms, and Kern County, and stakeholders. The plan outlines seven objectives with the intent to extend the useful life of the groundwater resources to meet current and foreseeable future needs. The seven management objectives are as follows:

1. Limit additional large scale pumping in areas that appear to be adversely impacted. Under this objective, no signatory producing water will increase its annual production of water from the groundwater depression in the area in T26S R40E Sections 29, 30, 32, and parts of sections 31, and 33; and T27S R40E Sections 4, 5, and northern part of Section 9; and T26S R39E part of Section 25. This applies to extractions greater than 5 afy.

2. Distribute new groundwater extraction within the Valley in a manner that will minimize adverse effects to existing groundwater conditions (levels and quality), and maximize the long-term supply within the IWV. Under this objective, the participants will consider developing wells in the outlying areas of the IWV.

3. Aggressively pursue the development and implementation of water conservation and education programs. Under this objective, the Signatories have collectively developed a written policy regarding water conservation (Water Conservation Public Advisory) and will continue to develop water conservation guidelines and education programs.

4. Encourage the use of treated water, reclaimed water, recycled, gray and lower quality water where appropriate and economically feasible. The Signatories will consider the use of non-potable water, such as treated sewage effluent or poor quality sources, for appropriate re-use applications.

5. Explore the potential for other types of water management programs that are beneficial to the IWV. Under this objective, the Signatories will consider projects such as water transfers, water banking, water importation, groundwater replenishment, and other programs that will enhance or prolong groundwater reserves in the IWV.

6. Continue cooperative efforts to develop information and data which contributes to further defining and better understanding the groundwater resources in the IWV. Under this objective, the Signatories will continue to efforts to gather data and analyze projects focusing on groundwater recharge, discharge, storage, quality, transmissivity, and storativity with respect to groundwater resources of the IWV.

7. Develop an interagency management framework to implement objectives of this Plan. This objective lists the Signatories to the Plan and provides for the further development of this cooperative agreement to define the roles, responsibilities, rights, and obligations of all participants. It also affords the opportunity to enlist new members and provides the administrative framework for implementing applicable elements of this Plan.

The Cooperative Groundwater Management Group is a public water data-sharing group consisting of most of the major water producers, other government agencies, and

concerned citizens in the Valley. In the past, efforts by the individuals or agencies involved were often, for lack of communication, duplicated by another. This group was formed to coordinate efforts, share data, and avoid the redundancy of effort. A technical sub group continually reviews and monitors the ongoing efforts to better understand the local water resources. This group is also responsible for an extensive well monitoring program and a water recharge study. Numerous studies have been conducted to better understand the groundwater resource in the Valley and provide information to be used to manage the groundwater resource. Rain and stream gages have been placed in strategic locations in the basin, and over 100 wells are monitored.

Groundwater Inflow/Outflow

The water budget inflows for the Valley consist of mountain front recharge, subsurface inflow from the Rose Valley Basin and Coso Valley Basin, and infiltration of surface flows through Little Lake Gap. The only outflows are through groundwater pumping and evapotranspiration from the playa areas. Generally, groundwater flow directions throughout Indian Wells Valley are directed towards the China Lake playa just north of Ridgecrest. Groundwater flow direction on the Project site trends northeast towards the playa. In the region, groundwater elevations range from approximately 2,150 feet above msl to 2,350 feet above msl. Beneath the Project plant site groundwater flows to the northeast towards Ridgecrest and ranges from approximately 2,250 feet above msl and 2,350 feet above msl.

The IWVGB is virtually closed, and there is limited groundwater underflow to or from adjacent valleys. As a closed basin, surface drainage does not “exit” the basin and flow from the surrounding mountains drain toward China Lake, or other small playas in the area. Evapotranspiration (ET) from the playa areas was the primary outflow from the IWVGB until the about 1950s or 1960s. At this time, groundwater pumping began to exceed ET rates. Prior to this time, ET from the China Lake area (playa) was the primary outflow of groundwater from the IWVGB. Current groundwater pumping rates have intercepted water flowing east towards the playa, reducing the amount of ET from the IWVGB.

The current conceptual model for the hydrogeologic system in the IWVGB is that the basin is closed and that the bulk of groundwater inflows are primarily from the mountain front recharge from the Sierra Nevada and subsurface inflow from the north and north-central portions of the IWVGB. Recharge to the IWVGB is derived from the infiltration of precipitation and runoff from the Sierra Nevada and anthropogenic recharge. Anthropogenic recharge is recharge that occurs from excess water applied for domestic or agricultural irrigation, or from wastewater treatment system percolation ponds. The estimates of total basin recharge have varied from 9,000 to 11,000 afy. Brown and Caldwell estimated total mountain front recharge into the basin to be 9,400 afy (SM 2009a).

Recharge to the IWVGB is also derived from underflow from the Rose Valley Basin and the Coso Valley Basin. Subsurface inflow from the Rose Valley Basin occurs through the Little Lake Gap and possibly from underneath or through the basalt flow located approximately five miles east of the Little Lake Gap. Based on available information,

recharge through subsurface inflow from the Rose Valley Basin is estimated to be between a few hundred to between 2,000 and 3,000 afy. Subsurface inflow from the Coso Valley Basin is believed to be very low.

In addition, during wet years, some surface flow enters the IWVGB through the Little Lake Gap; however, this flow is anomalous and intermittent and is not included in the long-term water balance calculation.

Groundwater in the IWVGB is used for municipal, domestic, industrial and agricultural purposes. The principle entities pumping groundwater are the IWVWD, China Lake NAWS, and the Searles Valley Minerals Company, which uses water to support mining operations in the adjacent Searles Valley. In 2007 – the latest year for which this data was available, groundwater pumping in the IWVGB was about 25,000 afy. Municipal and agricultural uses account for 32% each, industrial uses account for 12% and miscellaneous private well owners account for 24% of the total production. Less well documented groundwater pumping is conducted by smaller water providers and domestic wells used both for potable use and domestic irrigation. In 1993, the USBR estimated there were 3,000 private wells in the IWVGB with approximately 550 of those operational and producing approximately 2,099 afy of groundwater. In 1996, the residential groundwater pumping was estimated to be 1,728 afy. The Indian Wells Valley Groundwater Cooperative Management Group estimated in 1997, there were 670 individual domestic wells and 120 residential cooperative wells (SM 2009a).

A conceptual basin-scale groundwater budget was developed that included inflows from mountain front recharge, subsurface inflow, and infiltration from surface flows thru Little Lake Gap; and outflows from groundwater pumping and ET from the playa. Prior to the onset of extensive pumping in the 1950s, groundwater flow was generally radial directed toward the playa, where it flowed upwards vertically through semi-confining layers and evaporated. The conceptual basin water budget for assumed steady state conditions in 1920 was approximately 11,000 AFY of total inflow and outflow (including 1,000 AFY of groundwater pumping).

Brown and Caldwell has developed a three-dimensional, MODFLOW-2000-based, finite difference, numerical groundwater flow model for the IWV using common format project databases and a fully integrated combination of 3 software packages, including GIS, EVS, and a MODFLOW modeling interface. The IWVGB numerical groundwater flow model has four layers and a uniform cell spacing of one-quarter mile. The active groundwater flow domain covers approximately 450 square miles and extends to a maximum depth of 2,000 feet bgs. The model was used to simulate historical groundwater elevations, natural water budget components, and pumping from 1920 to 2006.

During the model calibration process, the aquifer material properties, recharge, subsurface inflow and ET were varied in an effort to best match available measured historical water level data. In general, the model results simulate the historical water levels very well for the early years (including 1920 and 1953), with greater deviations from observed conditions in later years (including 1985 and 2006). A review of the 2006 model residuals shows that simulated model water levels are locally overestimated in the vicinity of Ridgecrest (most likely due to intense local pumping depressions), and

underestimated immediately south of the playa (due to local shallow perched conditions). Based upon a thorough set of quantitative calibration criteria, the basin-wide distribution of model water levels was deemed appropriate to use the model for future predictive simulations and planning purposes.

One of the most significant results of the IWVGB Groundwater Flow Model and Hydrogeologic Study has been the estimation and refinement of the basin water balance (**Soil and Water Table 5**). Additionally, the amount of groundwater pumping in excess of natural basin inflows, or overdrafting of the regional groundwater system, was estimated. Total simulated outflows increase dramatically from both the 1920 (steady state) and 1953 time periods due to large increases in total estimated groundwater pumping. This has occurred in spite of the continued decline of simulated ET as groundwater pumping in the southern and western portions of the basin captured an increasing amount of groundwater flow before it reaches and evaporates at the playa. The simulated decline in ET flux over the modeled time frame does offset some of the increase in pumping, however, a comparison of storage versus basin groundwater pumping suggests that over 80% of present day pumping is derived from aquifer dewatering. The model calibration process also indicated that much less recharge was occurring from the El Paso Sub-Basin than previously postulated, which in part explains the steep drop in water levels between the El Paso Sub-Basin and the southwest area of the main IWVGB. Since approximately 1980, the annual change in groundwater storage (overdraft) has averaged approximately 20,000 AFY and is estimated to total approximately 900,000 acre-feet since 1920, the bulk of which has occurred since the 1950s.

Soil and Water Table 5
Estimated Balance for Indian Wells Valley Groundwater Basin

Inflow/Outflow	Estimated Quantity (afy)
INFLOWS	
Mountain Front Recharge	9,500
Groundwater Subsurface Inflow (Rose Valley & Coso Valley Basins)	1,500
Inflow Sub-Total	11,000
OUTFLOWS	
Evapotranspiration (ET)	-4,000 to -8,000
Groundwater Extraction	-24,336
Outflow Sub-Total	-28,336 to -32,336
BASIN BALANCE	**-17,336 to -21,336**

Source: Derived from SM 2009a, Appendix J, Brown and Caldwell

Water-Bearing Units

Recent studies have led to a better understanding of the hydrogeology of the IWVGB. A comprehensive groundwater monitoring program for Indian Wells Valley was

undertaken by the Indian Wells Valley Cooperative Groundwater Technical Advisory Committee and Geochemical Technologies Corporation (Groundwater Management Group) culminating in a final report that was published in March 2008. Through a local groundwater assistance program (AB 303 Grant), eight wells were installed and sampled to provide data in Indian Wells Valley where historical groundwater data was lacking. The Groundwater Management Group study also included the sampling of 46 wells for water quality parameters including: general chemistry, general physical parameters, stable and radio-isotopic parameters. Details of this study were used to develop the hydrogeology of the IWVGB described below.

In 2009, a report was published that focused on a groundwater flow model and hydrogeologic study of the IWVGB. The study was performed for the IWVWD by Brown and Caldwell. Using existing data and previous studies by the USGS, United States Bureau of Reclamation (USBR), and studies conducted for China Lake NAWS, four key hydrostratigraphic features were identified that were critical to understanding the basin-wide water budget and in developing the hydrogeologic conceptual model. These features include: the existence of a north-south fine-grained sediment plug in the west-central basin, an east-west high permeability gravel zone in the Ridgecrest-Inyokern area, high groundwater gradient between the neighboring El Paso Sub-basin and the southwest area of the IWVGB, and playa ET losses and changes over time. The groundwater flow model led to the estimation and refinement of the water budget for the IWVGB that concluded that groundwater storage in the aquifer has been in overdraft condition averaging approximately 20,000 afy and totaling about 900,000 af since 1920. Most of which has occurred since the 1950s.

The Indian Wells Valley is composed of two broad geologic units, igneous, metamorphic and continental rocks and unconsolidated deposits (**Soil and Water Figures 4** and **5**). The igneous and metamorphic rocks consist of Mesozoic age rocks, which form the basement complex (Sierra Nevada Batholith); Tertiary continental deposits; and Miocene volcanic rocks. The Mesozoic basement complex exists below 2,000 feet to as much as 6,000 feet of alluvial fill, underlie the groundwater basin, and crop out in the surrounding hills. The Tertiary continental deposits overlie the basement complex and fill the valley to approximately 1,000 feet below ground surface. Miocene volcanic rocks crop out along the perimeter of the basin, more specifically, near the El Paso and Coso Mountains. The consolidated rocks are nearly impermeable except for areas where fracturing or weathering has occurred. These rocks are believed to yield little water to the overlying alluvial aquifer system.

The unconsolidated deposits are composed of Quaternary-age fan, lacustrine, alluvium, playa, and sand-dune deposits. The unconsolidated deposits achieve a maximum thickness of approximately 2,000 feet near the west-central part of the valley. Wells exceeding 7,000 feet have been drilled in the valley; however, sediments below 2,000 feet were observed to be consolidated Pliocene and Miocene continental deposits and are not considered to be water producing. Unconsolidated deposits vary throughout the valley, but in general, deposits consist of gravel, sand, silt, and clay, with the percentage of silt and clay increasing toward the central and eastern parts of the valley. Holocene sedimentation has been dominated by sand and gravel deposited in steep alluvial fans to gentle alluvial plain settings, and by silt and clay deposited primarily in dry, ephemeral lakes.

Previous investigations have divided the unconsolidated Quaternary deposits into two main aquifers: the shallow aquifer and the deep aquifer. The shallow and deep aquifers are different in quality and aerial extent, and are separated by the lacustrine aquitards over the eastern part of the valley. The shallow aquifer extends from China Lake westward to the center of the valley and from the area south of Airport Lake southward to the community of China Lake. Sediments of the shallow aquifer are as much as 300 feet thick and generally do not yield water readily. Water quality of the shallow aquifer is characterized by high concentrations of total dissolved solids. The deep aquifer is confined or partly confined by the lacustrine sediments of the shallow aquifer. In the past, water from the shallow aquifer was used only for fire protection and maintenance of a few buildings on China Lake NAWS.

The deep aquifer occurs beneath the shallow aquifer on the east side of the valley; however, the thickness of the deep aquifer is uncertain due to a lack of data. Wells drilled in the Intermediate Wellfield area between Inyokern and Ridgecrest indicate that the base of the deep aquifer is at least 1,750 feet bgs. The deep aquifer is the sole drinking water supply in the valley and is used by the China Lake NAWS, public water districts, private well owners, industry, and agricultural users.

A recent study by Brown and Caldwell (SM 2010a) identified four hydrostratigraphic features in the IWVGB. The features are: 1) Fine-Grained Sediment Plug, 2) Gravel Zone, 3) High Gradient, and 4) Playa. **Soil and Water Figure 6** shows the location of these features.

- The Fine-Grained Sediment Plug is located approximately three to four miles east of the Sierra Nevada mountain front and trends north-south. The upper contact of this feature begins at depth of approximately 340 feet bgs and sediments may be as much as 1,340 feet thick. The areal extent of this deposit is not well defined due to limited borehole data.
- The Gravel Zone is a west-east trending area of coarse-grained high permeability sediments. This area is located from the mouth of Indian Wells Canyon to approximately the northwest portion of Ridgecrest, extends approximately two miles north-south, and fines to the east. This region is referred to as the Inyokern and Intermediate Areas and contains high volume production wells. Wells within the Ridgecrest city limits are believed to be associated with this Gravel Zone; however, wells in this area have a higher percentage of fines and, therefore, their groundwater production is lower than the wells to the west.
- The High Gradient area extends from the El Paso sub-Basin into the main IWVGB near the southwestern portion of the valley. Groundwater gradients in this area have been measured at approximately 100 feet per mile. Brown and Caldwell proposed that the high gradient may be caused by a combination of a narrowing of the area available for flow and the influx of recharge from Freeman Canyon. In addition, the high hydraulic gradient could be related to a change in aquifer transmissivity from the narrows to the high permeability zone to the north.
- The Playa feature identified by Brown and Caldwell is located in the area of China Lake. The thickness of these sediments is not known, but is likely several tens of

feet thick. Deposits are highly micaceous silt, sandy silt, and fine sand with occasional plastic clays. Shallow water beneath China Lake is highly saline and unfit for most uses.

The majority of the wells in the IWVGB are located northeast of the Project in the City of Ridgecrest and are located within the IWVWD (**Soil and Water Figures 1** and **7**). It is important to note that while there is one well (27S/39E-35B001M) on the plant site and a nearby well approximately one mile to the west of the site, no lithologic information could be obtained as the well logs were unavailable for review.

Groundwater Occurrence and Flow

Prior to pumping, groundwater within the IWVGB flowed toward the China Lake playa, the area of lowest altitude in the Indian Wells Valley (2,153 feet above msl). As discussed above, the IWVGB is considered to be a virtually closed basin; with the majority of the water flowing into the basin remaining within the basin. Groundwater subsurface inflow is believed to enter the IWVGB from the Rose Valley and the Coso Groundwater Basins. Conservative estimates of potential subsurface inflow from Rose Valley Groundwater Basin range from a few hundred to between 2,000 and 3,000 afy. Based on the dry nature of the region and the absence of alluvial fill in the Coso Groundwater Basin, estimates for the subsurface outflow coming from the IWVGB are thought to be “very low”. Subsurface outflow out of the IWVGB has been hypothesized; however, this has not been formally documented and is considered insignificant. The other natural mechanism for groundwater to exit is through evaporation. ET rates at China Lake prior to pumping (1920s) in the valley were estimated at approximately 8,000 to 11,000 afy. In the 1960s, groundwater flow and ET rates began to decrease due to excessive groundwater pumping that caused lowering of the groundwater table and regional cones of depression. ET is largely absent from the playa area due to interception of the groundwater by pumping wells. If groundwater levels continue to drop near the playa area, ET will eventually cease (SM 2009a).

Groundwater in the deep aquifer of the IWVGB is reportedly contained under generally unconfined conditions, except in the vicinity of China Lake, where silt and clay lenses, lake deposits, and playa deposits locally create confined conditions (see **Soil and Water Figure 8**). The shallow aquifer does not yield water freely to wells and consists of poor quality water. Wells in the deep aquifer yield more than 1,000 gallons per minute (gpm), with some wells up to 2,000 gpm. This aquifer is used as the primary aquifer due to the better water quality.

The depth to groundwater below the southern portion of the site, measured in 1959 from the one onsite well (Glenn Harris with the BLM reported that the old onsite well site was discovered during cultural resource surveys of the site), is estimated to be approximately 230 feet bgs. That same year groundwater was measured at 451 feet bgs in a well approximately one mile west of the northern portion of the Project (**Soil and Water Figure 7**). The difference in the depth to groundwater in these two wells is approximately 220 feet. One possible explanation for the difference in groundwater elevations is that there is a groundwater barrier across the Project site, more specifically, a fault. Kunkel and Chase (1969) reported a probable groundwater barrier approximately two miles south of Inyokern in the southwest portion of the Valley. This description appears to be in the general area of the Project site and corresponds to the

general area of an unnamed, inactive fault that crosses the center of the site (**Soil and Water Figure 7**). This fault location and trend runs between the two wells described above and appears to be acting as a groundwater barrier, thus explaining the difference in groundwater depths observed in the two wells.

Historic water level data for selected wells within the IWVGB are provided in the AFC (SM 2009a Appendix J.1.) and illustrated in **Soil and Water Figures 9** through **11**, the figures show groundwater level contours from selected wells within the IWVGB from 1920, 1985, and 2006, respectively. Between 1920 and 1985, groundwater levels dropped throughout the Valley and are reflective of pumping within the City of Ridgecrest and west in the direction of Inyokern. The lowering of groundwater levels is again evident in the 2006 groundwater elevation map where an increase in the effects of pumping continued to lower groundwater levels and caused a cone of depression beneath the City of Ridgecrest.

Current depth to groundwater west of the eastern Project boundary and north of Brown Road (based on 2006 data) is estimated at 480 feet below the ground surface. The contours show that groundwater flows in a radial pattern toward China Lake and toward the cone of depression beneath the City of Ridgecrest. Based on regional groundwater trends and topography, groundwater flow beneath the plant site is expected to flow to the northeast towards the cone of depression.

Prior to China Lake NAWS operations (late 1940s), the primary use for groundwater in the IWVGB was for mining operations in the adjacent Searles Valley and to a much lesser extent for irrigation of agriculture. Between 1920 and 1937, annual groundwater pumping increased from 1,000 af to slightly less than 2,000 af. By 1950 pumping had increased to 6,000 af and by the early 1960s, groundwater pumping had exceeded the natural recharge and subsurface inflow of the IWVGB. At that time, total inflow into the basin was estimated to be between 9,000 to 11,000 afy. Currently, groundwater pumping within the IWVGB is estimated to total approximately 25,000 afy. With groundwater pumping increasing over the years, lowering of water levels are apparent throughout the valley; however, the natural flow of the basin continues to be toward China Lake.

Aquifer Characteristics

Properties used to define the aquifer characteristics include hydraulic conductivity, transmissivity, and storativity. Hydraulic conductivity is the property of the aquifer material to transmit water, and is expressed in units of feet per day (ft/d). Transmissivity is the hydraulic conductivity multiplied by the thickness of the sediments capable of storing water, and is expressed in units of gallons per day per foot or feet squared per day (ft^2/d). Storativity refers to the volume of water an aquifer releases or takes into storage per unit surface area of the aquifer per unit change in head.

In the development of a groundwater flow model and hydrogeologic study for the IWVGB, Brown and Caldwell used hydraulic conductivity values ranging from 0.1 ft/d to 100 ft/d. These values were based on geologic logs, pre-existing groundwater modeling studies, and interpretations based on local geology, depositional environments, and groundwater flow regime. The model showed that the areas with the highest hydraulic

conductivities are generally located immediately east of the Sierra Nevada. Areas of the IWVGB with lower hydraulic conductivities are localized and distributed throughout the Basin.

Published aquifer testing data report transmissivity values from of less than 1,400 ft^2/d to 36,800 and 44,000 ft^2/d to 155,000 ft^2/d. Both sets of values were based on aquifer testing and geologic data. The Brown and Caldwell (2009) model used storativity ranges of 0.05 to 0.15. Reported well yields in the lower aquifer are more than 1,000 gpm and some wells consistently yield more than 2,000 gpm. The IWVGB has an estimated storage capacity of about 2,200,000 af and 5,120,000 af. The calculated storage of 2,200,000 af is based on 1921 water levels as a steady state limit and 200 feet below this level as the economically feasible limit to extract groundwater (SM 2009a).

Groundwater Quality

The groundwater quality in Indian Wells Valley varies throughout the Basin. According to the CDWR (2009), TDS ranges from less than 600 mg/L to more than 1,000 mg/L. Analyses of water from ten public supply wells in the IWVGB show that TDS content ranges from 220 to 720 mg/L. In general, the highest quality water is in the deep aquifer (Groundwater Management Group 2008). TDS concentrations for wells in the IWVGB were mapped by the Indian Wells Valley Cooperative Groundwater Management Group. Groundwater considered to have the best quality (TDS of 500 mg/L or lower) is found in the southwestern part of the Valley and the western part of the Valley along the area of recharge.

A review of the water quality data for the IWVGB shows that eight major types of groundwater quality occur in the Basin:

- Alpine waters, characteristically calcium-sodium-magnesium-bicarbonate. These are characteristic of the Sierra Nevada.
- Sodium-chloride waters, characteristic of China Lake, southeastern parts of the City of Ridgecrest, and the Coso Geothermal Area.
- Sodium-carbonate waters, principally occurring in the southwestern part of Indian Wells Valley.
- Sodium-bicarbonate waters, occurs in an extensive horseshoe-shaped area in the north and southwestern parts of the basin.
- Sodium-bicarbonate-chloride waters, east of the horseshoe area and may represent mixing of easterly moving groundwater with the groundwater of the China Lake Playa.
- Sulfate waters from geothermal areas, mineralized areas, and sewage pond seepage.
- Calcium-(sodium-magnesium)-bicarbonate-chloride-sulfate waters, these probably represent a mixture of Alpine and Coso geothermal waters.
- “Waters of the well fields. Usually sodium-calcium, but sometimes calcium-sodium-bicarbonate-chloride waters. These could represent Alpine waters concentrated by ET mixed with sodium chloride geothermal leakage”.

A review of the water quality data for the ten wells pumped for the IWVWD water supply shows the following:

- TDS concentrations (280 to 5,640 mg/L) generally exceeded the recommended standard of 500 mg/L, for a drinking water resource in California.
- Arsenic was reported in general water quality data for 2008 at concentrations between 0.0024 – 0.025 mg/L. Some concentrations exceeded the primary State and Federal Maximum Contaminant Level (MCL) for Arsenic (0.010 mg/L). The IWVWD began compliance testing for arsenic in December 2007. At that time, three wells were placed on quarterly monitoring. Two wells violated the MCL based on samples collected in March, July, and October 2008. Arsenic is a naturally occurring element commonly found in drinking water sources in California.
- Boron concentrations range from 0.18 mg/L to 1.2 mg/L. Boron was reported in two District wells at concentrations of 1.2 mg/L and 1.1 mg/L. The Action Level for boron is 1.0 mg/L. The Action Level is the concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

The IWVWD serves the City of Ridgecrest and the surrounding areas. Ten wells are pumped by the IWVWD for their water supply and these wells are tested regularly for the presence of radioactive, biological, inorganic, volatile organic, and synthetic organic compounds. The results of the 2008 Annual Water Quality Report are presented on **Soil and Water Table 6**. This table also presents the analytical results for three wells that are proposed to be pumped for the Project water supply and are located approximately four miles from the center of the Project site. Given the long screen interval for these wells, these data likely represent an average water quality of the more permeable sediments over the screen interval.

Soil and Water Table 6
Summary of Water Quality Data (all values reported in mg/L)

Analyte	IWVWD Wells[1]	Proposed Project Supply Wells[2]		
	General Water Quality	Well 18	Well 33	Well 34
Arsenic	0.0024 – 0.025	ND	ND	0.004
Bicarbonates (HCO3)	87 – 150	150	140	140
Boron	0.180 – 1.20	0.26	0.29	0.29
Calcium	7.5 – 68	36	36	38
Chloride	21 – 210	25	30	31
Fluoride	0.43 – 1.20	0.94	0.73	0.62
Magnesium	ND	4.8	5.1	6.3
Nitrate (N)	6.5	1.7	1.8	2
Sodium	35 - 180	41	41	49
Sulfate	ND	43	43	46
Total Hardness (CaCO3)	21 - 250	110	110	120
Total Dissolved Solids (TDS)	220 – 720	290	280	290
Uranium (in pCi/L)	2.1 – 6.1	NS	NS	NS
Gross Alpha Particle Activity (in pCi/L)	0.8 – 7.8	NS	NS	NS
Vanadium	ND - .04	0.014	0.012	0.016
pH	7.2 – 9.0	7.8	7.9	7.2

Key:
mg/L – milligrams per liter ND – not detected at the practical quantification limit shown NS – not sampled
1 - IWVWD, 2008.
2 - Data provided by the IWVWD.

Source: SM 2009a

Indian Wells Valley Water District (IWVWD)

The Project site is adjacent to the IWVWD (**Soil and Water Figure 2**), which serves customers in Ridgecrest and the surrounding areas. Water from the IWVWD comes from ten wells that draw from the Indian Wells Valley aquifer. Water is pumped from the wells to ten water reservoirs with a combined storage capacity of about 16.6 million gallons. In the summer months when water demand is highest, the average monthly water use in the district is about 360 million gallons (1,105 af). During the winter months when water demand is lowest, the average monthly water use is 125 million gallons (384 af).

The IWVWD and the Project owner signed a Water Supply Agreement on October 29, 2009 (**SOIL AND WATER APPENDIX A**). IWVWD also issued a Will Serve Letter (SM 2009d Attachment Water-D) for water service. Water will be supplied to the project site from the Ridgecrest Heights B Zone water storage tank. A 16 inch diameter (originally 12 inch diameter) pipeline from the water storage tank will be constructed in China Lake

Boulevard southerly to Brown Road then westerly to the Project site. The Project owner is responsible for the design, permitting and construction of all necessary facilities. IWVWD is in the process of annexing the Project site (SM 2009d). **Soil and Water Figure 12** illustrates the proposed annexation. .

Surface Water Hydrology

The project site lies on the southern edge of the Indian Wells Valley and north of the El Paso Mountains. The general stormwater flow pattern is from the higher elevations in the mountains located approximately 6 miles south to the lower elevations in Indian Wells Valley to the north. The stormwater from the project site flows northeast to China Lake which is a depression in the Indian Wells Valley with no identifiable outlet.

The extents of the overall watershed impacted by the project was delineated utilizing existing USGS quadrangle maps and are shown on figure **Soil and Water Figure 13.** The figure was taken directly from the Project Drainage Report (SM 2010a). Off-site flows impacting the Project site are from a large watershed area to the south which covers approximately 37 square miles. The majority of the watershed impacting the upstream project boundary has been divided into three major sub-basins. The largest sub-basin flows to El Paso Wash and drains approximately 22 square miles from the El Paso Mountains and exits the mountains to the south of the site. El Paso wash crosses Brown Road inside the property boundary at two low points in the road. The second largest of the main sub-basins drains to an unnamed wash and covers approximately 9.2 square miles south and east of the Project. The sub-basin includes drainage areas both east and west of the U.S. Highway 395 (Three Flags Highway). Drainage water crosses U.S. Highway 395 at several points in both east-west and west-east directions, hydraulically connecting all the catchments in this drainage area. The smallest of the three main sub-basins drains to an unnamed water course and drains approximately 4.2 square miles south and west of the project site. The main watercourse associated with this sub-basin crosses the southwest section of the Project site continuing in a northwest direction toward Brown Road.

Peak discharges for each sub-basin were calculated using the HEC-HMS software package and methodology which generally followed the guidelines presented in the Kern County Hydrology Manual.

Review of the Curve Number (CN) used for the pre-development analysis indicated some of the values may not reasonable for the Project area. The pre-development soils map provided in the Project Drainage Report (SM 2010a) shows a discreet area which has been assigned a CN value of 95. This area coincides exactly with the Project boundary. This CN value is significantly out of the range of values provided for in the Kern County Hydrology Manual which reports a maximum CN value of 94 for what is described as “rockland, eroded and grade land.” The undeveloped project site does not meet these criteria and should have been assigned a value of more consistent with the surrounding areas which have a CN ranging from 75 to 81. The result of using this approach is that the pre-development discharges may appear to be too high when compared to post-development conditions.

Discussions with the applicant indicate that the CN of 95 used in the existing conditions analysis was based on results of the preliminary geotechnical analysis. These results

indicate moderate to very dense soils at all test locations. Estimates of hydraulic conductivity were provided based on sieve analysis results. However, actual infiltrometer tests were not completed. Any significant deviation from the accepted regional values will require site specific infiltration testing and detailed explanation of the correlation between the test results and the proposed CN value. In the absence of this data, values consistent with the Kern County Hydrology Manual should be utilized.

Staff has modified the existing conditions HEC-HMS model as provided by the applicant to reflect a regionally accepted CN value of 81 for all onsite watersheds in the undeveloped condition. Initial abstraction values were also modified to be consistent with the revised CN values. The results of the peak discharge analysis for the three main sub-basins impacting the upstream property boundary are summarized in **Soil and Water Table 7***.*

Soil and Water Table 7
Summary of Offsite Peak Discharges

Sub-basin ID	Sub-basin Area (Sq. Mi.)	Q100 (cfs) (HEC-HMS)	Q100 (cfs) (Regression)*
E1a	4.2	1,978	2,288
E2c	20.8	6,682	6,901
E3a	9.2	3,961	3,930

*The regional regression equation used in the analysis above was taken from the U.S. Geological Survey Open File Report 93-419 (1994), as provided in the Caltrans Highway Design Manual. The equation provided was $Q_{100}=850AREA^{0.69}$ for Region 10.

For this analysis, a comparison was made between the discharge data provided as part of the Project Drainage Report and discharges obtained using the appropriate USGS Regional Regression Equation for the region. The purpose of the comparison was to provide some insight into the reasonableness of the calculated discharges when compared to some other regionally accepted methodology. Overall, the reported pre-development discharges from both sources are very well correlated as reported in the Project Drainage Report (SM 2010a).

Dry Washes

There are no perennial streams in the Project watershed and the vast majority of the time, the area is dry and devoid of any surface flow anywhere. Water runoff occurs only in response to infrequent intense rain storms. There are numerous small washes which traverse the site and outfall into progressively more defined channels. All of the onsite washes are eventually tributary to El Paso Wash.

Storm Water Flow

Storm water flow across and adjacent to the project occurs in a network of generally shallow alluvial channels which converge into more defined drainages such as El Paso Wash and North Ridgecrest Wash. The effective FIS mapping for these washes was overlain on the current project topography and found not to correlate well with current conditions. This situation is typical as effective FIS maps for approximate Zone A floodplains are often based on USGS quadrangle maps and not detailed topography.

The applicant has completed a revised existing conditions HEC-RAS model on El Paso Wash and North Ridgecrest Wash in order to have floodplain mapping which is based on the best available data.

The revised mapping for El Paso Wash was used to prepare a project site plan which avoids the 100-year flood limits. Revised mapping for North Ridgecrest Wash was used to show the area of the floodplain which will be filled within the project limits. Flows from this wash will be diverted around the site and released back to the natural floodplain just downstream of the property. The applicant has prepared a draft Conditional Letter of Map Revision (CLOMR) application for both El Paso Wash and North Ridgecrest Wash. The CLOMR will be submitted to FEMA for approval prior to construction. This document presents the updated existing conditions floodplain modeling as well as the proposed changes to the floodplains based on the proposed site improvements.

Surface and Groundwater Beneficial Uses

The Water Quality Control Plan (Plan) for the Lahontan Region Water Quality Control Board (LRWCQB) establishes water quality objectives, including narrative and numerical standards that protect the beneficial uses of surface and ground waters in the region. The Plan describes implementation plans and other control measures designed to ensure compliance with state-wide plans and policies, and provides comprehensive water quality planning. The following chapters of the Plan are applicable to determining appropriate control measures and cleanup levels to protect beneficial uses and to meet the water quality objectives: Chapter 2, Beneficial Uses; Chapter 3, Water Quality Objectives; and the sections of Chapter 4, Implementation, entitled “Point Source Controls” and “Non-Point Source Controls.”

- Beneficial Uses: Chapter 2 of the Water Quality Control Plan describes beneficial uses of surface and ground waters. The beneficial uses of surface waters of Indian Wells Valley (Hydrologic Unit No. 624.00) are municipal and domestic supply, agricultural supply, groundwater recharge, freshwater replenishment, water recreational purposes, wildlife habitat support, and warm freshwater habitat support. The beneficial uses of ground waters of the IWVGB are municipal and domestic supply, agricultural supply, industrial service supply, and freshwater replenishment.
- Water Quality Objectives: Region-wide numeric and narrative objectives for general surface waters are described in Chapter 3 of the Water Quality Control Plan under the “Water Quality Objectives for Surface Water” and region-wide objectives for groundwater under the “Water Objectives for Ground Water.”
- Waste Discharge Requirements: Chapter 4 of the Water Quality Control Plan describes the measures that are to be implemented to protect the beneficial uses and to achieve the water quality objectives of the Plan. The chapter discusses general control actions and describes the Region’s Nonpoint Source Program. Specific types of activities and their related control actions are discussed including Waste Discharge Prohibitions, Stormwater Runoff, Erosion, and Sedimentation, Land Development, Groundwater Protection & Management, and Mining, Industry, and Energy Production.

- Section 13243: Under this section, the Regional Water Boards are granted authority to specify conditions or areas where the discharge of waste will not be permitted. The discharge of designated waste can only be discharged to an appropriately designed waste management unit.

The Lahontan RWQCB is evaluating the proposed discharge of fill material, including structural material and/or earthen wastes into waters of the State and will provide the Energy Commission with Waste Discharge Requirements (WDRs) which will be incorporated into Staff's Conditions of Certification. The Lahontan RWQCB considers WDRs necessary to adequately address potential and planned impacts to waters of the State and to require mitigation for these impacts to comply with the water quality standards specified in the Water Quality Control Plan for the Lahontan Region – North and South Basins.

WDRs from the Lahontan RWQCB are required for the LTU that will be used to treat (through bioremediation and land farming techniques) HTF-impacted soil. The Applicant has prepared a draft ROWD application and the draft application was submitted to the Lahontan RWQCB. The Lahontan RWQCB is evaluating the ROWD application and will provide the Energy Commission with WDRs, which will be incorporated into Staff's Conditions of Certification.

C.9.4.3 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The direct potential effects of the Project on local water resources are those associated with using groundwater for construction (specifically for demands during site grading) and with the plant's operational process water demand. No surface water will be used, though Project construction and operation may have an effect on the ephemeral washes traversing the site.

Potential impacts on water resources during construction and operation include drawdown and related impacts, depletion of water resources, water quality impacts, erosion, and drainage impacts.

Soil Erosion

Erosion is the displacement of solids (soil, mud, rock, and other particles) by wind, water, or ice and by downward or down-slope movement in response to gravity. Due to generally flat terrain, the Project site is not prone to significant mass wasting (gravity-driven erosion and non-fluvial sediment transport) at present.

Environmental impacts associated with the construction and operations are discussed in the following sections. CEQA significance criteria were developed based on California CEQA Guidelines and evaluated using professional judgment. Impacts would be considered significant if:

- Substantially increased wind or water-induced soil erosion occurred as result of Project construction or operation,
- Substantially increased sedimentation occurred in areas adjacent to construction areas,

- Prime Farmlands, Farmlands of Statewide Importance, or Unique Farmlands were lost, or
- Construction activities were to occur in areas of high erosion susceptibility and the disturbed areas were left exposed and not properly stabilized.

Grading of the Project site will result in a less than 2% slope downward from the east to the west on the northern part of the project (east of El Paso Wash) and less than 1% slope downward from the east to the west on the southern part of the project (west of El Paso Wash). Earthwork associated with the Project will include excavation for foundations and underground systems, and the total earth movement that will occur is approximately 7,500,000 cubic yards. Cut and fill will be balanced on site and there will be no need to either import or export earthen material.

The vast majority of the Project grading and excavation will occur on the Project site with only minor excavation needed for installation of the water pipeline. Known soil types that will be affected are listed in **Soil and Water Table 4**. The runoff potential of these soils is negligible to very high, the water erosion hazard is slight to moderate, and the wind erosion hazard is moderate to high.

During construction, the Project site area and offsite linear facilities will be disturbed. At that time, the surface of the disturbed areas will be devoid of vegetation and there will be the highest potential for erosion, as well as associated effects including soil loss and increased sediment yields downstream from disturbed areas. With the implementation of BMPs contained in the SWPPP and DESCP, such as straw bales, silt fences, and limiting exposed areas, the impacts of soil erosion during construction should be less than significant. Site grading will be balanced on site; there will be no import or export of fill material.

Construction and Operation

Water Erosion

The runoff designations for the soils affected during site grading are negligible to moderate for the Wasco-Rosamond-Cajon Association which comprises over 95% of the project site, and moderate to very high for the Trigger-Sparkhule-Rock Outcrop Association. Permeability in the Wasco-Rosamond-Cajon Association is moderately slow to moderately rapid. Detailed infiltration test results are presented in the Preliminary Geotechnical Investigation Report in Appendix B of the AFC (SM 2009a). A more detailed discussion of surface water conditions at the Project site is included in Section 5.17, Water Resources of the AFC (SM 2009a).

The potential for soil loss by water erosion (sheet and rill erosion) was estimated Solar-Millennium (SM, 2010a) using the Universal Soil Loss Equation for pre-development, construction conditions and operational conditions. Soil data has been collected and surveys have been conducted to estimate the soil loss at the Project site. Soil loss estimates due to water erosion for the undisturbed site conditions are 0.48 tons per acre per year (t/ac/yr) and for disturbed site conditions are 0.8 t/ac/yr (SM 2009a). During operation soil loss due to water erosion is estimated to be 0.73 t/ac/yr (SM 2010a). Water erosion from sheet and rill erosion under the present undisturbed conditions can

be considered minimal. High infiltration rates, flat slopes, and low rainfall contribute to the low water erosions rates. It should be noted that when soils are disturbed (i.e., during construction) erosion rates may increase slightly which may pose a potential impact. During construction, the bulk density of soils will increase due to compaction from heavy equipment, reducing the erosion rates during the operational scenario. Compaction of the soil will decrease soil infiltration rates potentially causing greater runoff, especially during high intensity, short duration rainfall events. However, the soils can be adequately protected with the implementation of proper BMPs.

Wind Erosion

The potential for soil loss by wind erosion was estimated by Solar-Millennium (SM, 2009a) using the Wind Erosion Prediction System (WEPS) for pre-development (undisturbed) and during construction conditions. The soils on the Project plant site have a moderate to high hazard for wind erosion. The results of the geotechnical investigation and reconnaissance soil survey provided a detailed determination of wind erosion susceptibility (SM 2009a, Appendix B). Under current conditions, the soil loss from wind erosion is estimated to be about 135 t/ac/yr for undisturbed conditions. The WEPS model is designed for agricultural fields and the Applicant did not account for the shrub plant community on site or soil crusts that tend to reduce or eliminate wind erosion. The Wasco and the Cajon soil series (which make up more than 90% of the site) both indicate only a slight wind erosion hazard. Consequently, the pre-development (undisturbed) soil erosion estimate could be slightly high. Regardless, construction activities would increase the potential for soil loss, and the estimate of soil loss during this period is about 140 t/ac/yr for disturbed conditions which would be a CEQA significant impact without implementation of control measures and BMPs as described in the SWPPP and DESCP. Implementation of Conditions of Certification **SOIL&WATER-1** and **2**, and **SOIL&WATER-8** through **12** that includes a SWPPP, DESCP and use of BMPs to control wind erosion would reduce the impact to below the level of significance.

For operational conditions soil loss from wind erosion is estimated to be about 64 t/ac/yr. Soil loss during operational conditions was calculated with consideration of the increased bulk density of the soils achieved during construction and of the application of water for dust control and mirror array washing.

Modeling the potential for wind erosion and air borne dust utilizing the WEPS model (SM, 2009a) indicates that even under present undisturbed conditions soil losses exceed the soil loss tolerances on an annual basis and, more significantly, loft PM_{10} dust particulates. The computed values are in excess of 100 tons/ac/year, with PM_{10} values in excess of 8 t/ac on an annual basis. These losses may possibly increase if large areas are stripped of the native cover and left bare for long periods or pulverized during construction. Best Management Practices for the re-establishment of native vegetation and dust control are recommended (see Section C.2, Biological Resources).

As discussed in Section C.1, Air Quality, by its nature, a solar thermal project must keep dust to a minimum, as a film on the collectors of the solar array will reduce their efficiency for power production. Dust control will be achieved by a combination of soil

stabilizers, water from the collector washing and waste cooling water, and compaction of the driving surface over time. Therefore, operational controls designed to control dust are expected to reduce the overall soil erosion in the area.

Mitigation

Construction and operation of the Project could result in significant impacts related to water erosion of soils. Implementation of BMPs and condition of certification would reduce the impacts to insignificant. Implementation of Conditions of Certification **SOIL&WATER-1** and **SOIL&WATER-8 through 12** described in detail in Section C.9.13, *Proposed Conditions of Certification/Mitigation Measures,* below, would ensure there would be minimal potential for impacts to soils related to water and wind erosion.

Groundwater Balance

There is concern that the amount of groundwater used for both construction and operations would contribute to the groundwater basin overdraft conditions. Groundwater overdraft is "the condition of a groundwater basin in which the amount of water withdrawn by pumping exceeds the amount of water that recharges the basin over a period of years during which water supply conditions approximate average conditions." (CDWR, 1998).

Construction and Operation

As previously stated, the IWVGB is already significantly overdrafted and the Project's water use delivered to the Project site from the IWVWD (from groundwater wells located in the IWVGB) will exacerbate the overdraft condition. The Applicant has proposed a mitigation plan to offset the proposed construction and operation water demands with a plan for offsetting the Project's construction and operations water demands.

Mitigation

The mitigation plan identifies possible offset options within the Basin, and evaluates their feasibility of implementation, as well as provides the required offset in a reasonable time frame. The proposed plan is included in **SOIL AND WATER APPENDIX B**. From the feasibility study, a plan is presented wherein multiple options are proposed that will address the timely implementation of the full offset volume for construction and operational water supply.

From the feasibility study of potential options, the following were selected to be the initial focus of the water conservation offset plan:

- Water Supply through the LADWP;
- Xeriscaping ("cash for grass") of residential and commercial landscaped areas; and
- Fallowing of agricultural land within the Basin.

Options such as low-flow irrigation and tamarisk removal will be considered as necessary depending on the outcome of the implementation of the construction water supply through the LADWP aqueduct, xeriscaping program through the IWVWD, or agricultural fallowing. These options may be implemented to make up the difference should one or more of the primary options not be realized.

The above portfolio of mitigation measures either solely or in combination is expected to provide enough water to meet the required offset of 215 afy which equates to the average water annualized water demand for the project(1,500af over 28 months and 150afy during operation). **Soil and Water Table 8** summarizes the contribution expected from each measure.

Soil and Water Table 8
Summary of Water Savings Potential - Primary Water Offset Options

Offset Option	Potential Water Savings
Water Supply through the LADWP Aqueduct	1,500 af for construction water only.
Xeriscaping of Residential and Commercial Properties	215 afy, assuming 56 gallons per square foot savings by replacing turf with xeriscape. At this savings rate about 29 acres of turf would need to be converted; 29 acres represents about 6% of the estimated acreage (485 acres) in the City.
Fallowing of Agricultural Land	215 afy, assuming fallowing of alfalfa and a water use rate of 5.1 afy/acre. At this usage rate, about 42 acres are required on an annual basis; 42 acres is about 4% of the more than 970 acres of alfalfa grown within the Basin. Much of this acreage is farmed along Brown Road.

The Applicants are pursuing all the options indicated above equally as viable alternatives to further understand their implementability in meeting the Project construction start date and water offset requirement. Should one or more options prove to be feasible, a multi-option approach may be undertaken and the plan will be updated to reflect apportionment of the water supply between one or more options.

Supply from the LADWP Aqueduct

Access to the aqueduct would provide water from outside the Basin to offset water supply for construction of the Project. The application and approval process requires initial approval of the Project as a “public works” project through an initial contact with the Aqueduct Manager in Bishop, California. Following approval by the Aqueduct Manager, the application process is managed by the LADWP Bishop Real Estate Office and the Mojave Superintendant, who will establish the terms and requirements of the agreement, location of the connection, size of connection and required service.

Xeriscaping of Residential Landscapes

The IWVWD is currently in the process of developing a Cash for Grass Rebate Program for the City of Ridgecrest. The program consists of converting residential and commercial areas landscaped with grass/turf and replacing them with xeriscape. The Applicant through conversations with the IWVWD (**SOIL AND WATER APPENDIX B**) indicates the IWVWD plans to model their program after the cash for grass program by the Alliance for Water Awareness and Conservation (AWAC). The AWAC cash of grass program details are summarized in **SOIL AND WATER APPENDIX B**.

The Project would underwrite a portion of the xeriscaping program as planned by the IWVWD to the 625 homes needed to offset the water supply. In providing this support, the Project would offer financial incentives to the property owners within the City to convert their landscape. The administration and monitoring of the implementation would be performed by the IWVWD. Initial discussions between RSPP and the IWVWD are reported to have begun to determine how the Project can participate in the implementation of the cash for grass program.

Land Fallowing Program

The fallowing program would focus on alfalfa crops that are grown by Brown Road Farming on over 970 acres of farmland north of Inyokern, approximately 12 to 16 miles north of the Project site. The proposed plan would be similar to the agricultural land fallowing program that is currently in use by the Palo Verde Irrigation District (PVID) in the County of Riverside and the City of Blythe in the Palo Verde Mesa Groundwater Basin.

A land fallowing program would include some or all of the following elements:

- Meet with the Brown Road Farming landowner(s) and determine if they would be willing to participate in the fallowing program;
- Establish a “water factor per acre” to determine the acreage of land that will need to be fallowed to obtain the required volume of water. For the Basin, a determination should be made on using a single “water factor per acre” or using one that is crop specific for the Ridgecrest area. (For the South Lahontan Basin area, which includes the Indian Wells Valley Groundwater Basin, the average alfalfa crop water use is about 5.1 afy per acre [CDWR 1986]).
- Develop contracts/lease agreement with the property owner.

The proposed land fallowing program would include the IWVWD in the agreement in that water use would be monitored on a monthly and annual basis by the IWVWD to ensure that the annual water use by the grower does not exceed the negotiated water offset amount.

To ensure that land fallowed for water use offsets remains fallowed, a monitoring program will be implemented. The IWVWD does not provide water for irrigation to all growers; therefore, there are no meters or other means for monitoring water use other than visual inspection of the properties to ensure that they are not being irrigated. The monitoring program would consist of site visits on a regular or periodic basis to visually verify that properties participating in the fallowing program are complying with their contract requirements. Visual verification can be through site visits and/or review of aerial photography.

Groundwater Water Levels

The project has the potential to lower groundwater levels as a result of water production during both construction and operations. The lowering of groundwater levels could have a significant impact if the lowering of the groundwater levels impacts existing water wells in the basin.

Drawdown imposed by a well on another nearby pumping well can have adverse affects on the performance of that well and is referred to as interference drawdown or well interference. Specific potential adverse affects evaluated in this study include the following:

1. Interference drawdown can result in the water level of an aquifer being drawn down below the screen of the well (*i.e.*, the well goes dry);

2. Interference drawdown can result in the water level of an aquifer being drawn down to a point where the affected well's capacity to pump water is decreased and the well can no longer produce the amount of water that is needed for a particular use, or the well is at risk of becoming damaged and unusable over time due to exposure of the well's screen above the water table and resulting corrosion;

3. Interference drawdown can result in the water level in the affected well being drawn down to near the intake of the well's pump, requiring lowering of the pump intake in order for the well to remain operational; and/or

4. Interference drawdown can cause a decrease in groundwater level in the affected well such that the well and pump can continue to operate and produce adequate amounts of water, but pumping must occur at either greater frequency or duration, and/or water must be lifted to a greater height, resulting in greater operational and maintenance costs.

The extent and type of well interference experienced by an affected well is dependant on hydrogeologic conditions in the aquifer as well as the characteristics of the affected well. These include the following:

- The amount of interference drawdown that is applied (which varies with the distance of the impacted well from the Project well(s);
- The depth and screened interval of the affected well;
- The thickness of saturated sediments penetrated by the affected well;
- Local variations in the transmissivity of the saturated sediments in which the affected well is completed, if any;
- The condition and efficiency of the affected well;
- The affected well's pump specifications, including its rating curve, the depth at which the pump intake is set, and the resulting pumping water level in the well during operation; and
- The minimum required water production rate of the well.

Construction and Operation

Three wells, No. 18, 33 and 34 **(Soil and Water Figure 1)** that are operated by the IWVWD, all with the capacity to pump at about 1,200 gpm, are proposed to provide water for the Project. The wells may be used in rotating fashion though the period of rotation is not known. Therefore, to assess impacts one well was selected to provide the water for both construction and operation. Well No. 18 was selected to evaluate impacts from pumping to deliver water to the Project, since as at this time, the well is operated at

about 470 gpm and it has a reported capacity of 1,200 gpm. This well has more available capacity by comparison to wells No. 33 and No. 34, which according to the IWVWD are pumping at about 816 gpm and 1,200 gpm, respectively. It is also important to note that all IWVWD wells proposed for water supply are screened in Layer 2 of the model.

The calibrated model was used to provide an assessment of the changes in the cone of depression over a base line condition from pumping at IWVWD Well No. 18, and how the project pumping might impact adjacent water supply wells during the construction and operational periods.

Construction and operation activities are expected to take place over a period of approximately 28 months and 30 years, respectively. As noted above, among the available three IWVWD wells, Well No. 18 was used for the simulation, because of its high capacity and low pumping rate at the time of this report. The current pumping rate of Well No. 18 is 470 gpm. The pumping rate of the well will increase to 860 gpm (390 gpm addition for continuous construction water supply), or 561,600 gallons per day (gpd) (average) during 2.33 years (28 months) of construction period and 560 gpm (90 gpm addition for continuous operational water supply) or 129,600 gpd (average) during 30 years operational period.

Two simulations were conducted: one for a baseline scenario and another predictive scenario, one each for construction and operational supply. Before using the model for a baseline scenario, the model ran with default parameters to the time before construction (assumed to be December 31, 2010). The model continues through 28 months of construction followed by 30 years of operation with default pumping for all wells shown as operational in the model including Well No. 18 (i.e., 470 gpm). The predictive scenarios only changed the pumping rate in Well No. 18, and did not change the default rate for the wells within the IWVWD model.

The predictive scenarios ran with calibrated hydraulic parameters, but with a pumping rate of 860 gpm during the 28 month construction period and 560 gpm during the 30 year operation period. The predictive results of the drawdown (contour intervals of 10 feet and 5 feet) at the pumping well and of the drawdown distance are provided on the **Soil and Water Table 9**. The drawdown contours showing the cone of depression for baseline scenario and predictive scenario are shown on **Soil and Water Figures 14** through **18**. The following is a summary of the results from the predictive scenarios:

- The maximum drawdown at the well pumping and the distance to the 5-foot contour from pumping well (Well No. 18) at the end of the construction period at a pumping rate of 860 gpm with calibrated K and S is about 21 and 9,600 feet, respectively.
- The maximum drawdown at the well pumping and the distance to the 5-foot contour from pumping well (Well No. 18) at the end of the operational period at a pumping rate of 560 gpm with calibrated K and S is about 51 and 21,800 feet, respectively.

Compared to the baseline scenario, there is only an additional 2 feet drawdown at the well during the construction period and no discernable increase of drawdown during the operational period due to a very low pumping rate for the Project and a very small change in the baseline condition at Well No. 18. Similarly, there was not a significant

change in the diameter of the cone of depression over the baseline condition by comparison to operational supply. By comparison to the distance to the 5 foot contour, the proposed construction water supply expanded the cone of depression about 15% over the baseline condition during the proposed 28 month period of pumping.

A sensitivity analysis was also conducted to evaluate the response in the model prediction when varying key model variables. Two simulations were conducted for this purpose. Sensitivity Analysis 1 was based on the model calibrated K and low specific yield (25% calibrated value) and storativity (10% calibrated value) **(Soil and Water Table 9).** Sensitivity Analysis 2 was based on the low K (10% calibrated value) and low S (specific yield/storativity coefficient) **(Soil and Water Table 9)**. All IWVWD wells proposed for water supply are screened in Layer 2. For the sensitivity analysis, hydraulic parameters for all layers were adjusted except for Layer 4.

As shown in **Soil and Water Table 9**, Sensitivity Analysis 1 with a low specific yield and storage coefficient and calibrated hydraulic conductivity would result in minimal drawdown increases at the well with only an additional 3 feet drawdown at the end of the construction period and an additional 7 feet at the end of the operational period. Sensitivity Analysis 2 produces large drawdown increases at both the end of the construction period and the operational period. This is understandable because one order of magnitude lower K was used in this simulation.

As stated in the model report (SM 2009a, Appendix J, Brown and Caldwell, 2009), some uncertainties remain in the specific magnitude of each inflow and outflow component over various time periods. In addition, the spatial distribution of hydrogeologic properties also remains somewhat uncertain.

Soil and Water Table 7
Results of Numerical Groundwater Flow Modeling Proposed Construction and Operational Water Supply
Ridgecrest Solar Power Project Kern County, California

SCENARIO	Pumping Rate Construction/ Operation (1)	Period Construction/ Operation	Hydraulic Conductivity	Specific Yield and Storativity	END OF CONSTRUCTION			END OF OPERATION		
					MAXIMUM drawdown in the Pumping Well	DISTANCE to a Drawdown of 10 Feet	DISTANCE to a Drawdown of 5 foot	MAXIMUM drawdown in the Pumping Well	DISTANCE to a Drawdown of 10 Feet	DISTANCE to a Drawdown of 5 foot
	(gpm)	(year)	(ft/day)	--	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
BASELINE CONDITION (see Soil and Water Figure 14)	470	2.33/30	Layer 1: 5 Layer 2: 20 Layer 3: 0.5 Layer 4: 5	Layer 1: 0.15 - 1.0e-5 Layer 2: 0.12 -1.0e-5 Layer 3: 0.1 - 1.0e-4 Layer 4: 0.1 - 5.0e-5	19	1,520	8,320	51	21,800	23,400
CALIBRATED MODEL - No change in K and S (see Soil and Water Figure 15)	390/90 (860/560)	2.33/30	Layer 1: 5 Layer 2: 20 Layer 3: 0.5 Layer 4: 5	Layer 1: 0.15 - 1.0e-5 Layer 2: 0.12 -1.0e-5 Layer 3: 0.1 - 1.0e-4 Layer 4: 0.1 - 5.0e-5	21	3,160	9,600	51	21,800	23,400
SENSITIVITY ANALYSIS 1 Calibrated K and low S	390/90 (860/560)	2.33/30	Layer 1: 5 Layer 2: 20 Layer 3: 0.5 Layer 4: 5	Layer 1: 0.0375 - 1.0e-6 Layer 2: 0.03 - 1.0e-6 Layer 3: 0.025 - 1.0e-5 Layer 4: 0.1 - 5.0e-5	24	5,600	13,300	59	22,300	23,900
SENSITIVITY ANALYSIS 2 Low K and Calibrated S	390/90 (860/560)	2.33/30	Layer 1: 0.5 Layer 2: 2.0 Layer 3: 0.05 Layer 4: 5	Layer 1: 0.0375 - 1.0e-6 Layer 2: 0.03 - 1.0e-6 Layer 3: 0.025 - 1.0e-5 Layer 4: 0.1 - 5.0e-5	245	4,535	14,500	241	15,400	16,600

NOTES

1 Pumping rate reported for Indian Wells Valley Water District Well No. 18. Values in parentheses are the proposed rates including construction and operational water requirements 390/90 gpm respectively.
2 Calibrated groundwater model values for hydraulic conductivity, specific yield and storativity.
3 Sensitivity analysis - varied specific yield in layers 1, 2 and 3 by 25% (lower)
4 Sensitivity analysis - varied hydraulic conductivity in layers 1, 2 and 3 by 10% (lower)

SM 2009a, Appendix J

Mitigation

Groundwater levels near IWVWD water supply wells that supply water to the project will decline during the Project construction and operation. Local decline of groundwater levels within the cone of depression could affect nearby wells. However, groundwater is being supplied by IWVWD (water purveyor) under a basin management program. Consequently, any impacts related to groundwater level changes would be managed as part of the overall groundwater management of the IWVGB. Condition of Certification **SOIL&WATER-2** ,**-3** and **-4**, provided in Section C.9.13, *Proposed Conditions of Certification/Mitigation Measures,* below, are expected to minimize impacts to related to withdrawal of groundwater by the Project owner using water conservation offsets to below the level of significance.

Groundwater Quality

Construction

Operation of the Project has the potential to impact water quality through improper storage and use of materials and the existence of an unsecured well that may act as a conduit to groundwater at the site. Given the distance to the groundwater table (200-400 feet bgs) and the proposed implementation of a hazardous material management plan during construction (see Section C.4), the proposed measures are expected to minimize impacts to groundwater quality to below the level of significance. With respect to the existing well at the site, the Project owner shall secure the well to prevent unauthorized access and either complete a monitoring well or destroy the well in accordance with **SOIL&WATER-13**. If a monitoring well is completed, the well shall be incorporated as part of the groundwater monitoring, mitigation and reporting listed in **SOIL&WATER-6** provided in Section C.9.13, *Proposed Conditions of Certification/Mitigation Measures,* below.

Mitigation

Water quality will be protected during construction through implementation of the SWPPP and DESCP for construction and operations. Conditions of Certification **SOIL&WATER-1** and **SOIL&WATER-6**, provided in Section C.9.13, *Proposed Conditions of Certification/Mitigation Measures,* below, are expected to minimize impacts to groundwater quality below the level of significance.

Operation

RO Brine for Dust Control

The RSPP proposes to control dust generated by site activities by application of RO concentrate (brine) water to unpaved road surfaces in the Project. A total of about 61,300 linear feet of unpaved road are planned where brine water will be applied for dust control. These roads are planned to be about 24 feet wide and as such represent about 1,471,200 square feet or about 1.9% of the operational Project area. To estimate water quality impacts from the discharge of brine, it was assumed that dust control using brine water would not include unpaved surfaces between the solar panels, as

these areas will be routinely wetted through application of high quality water for mirror washing. A total of 10 acre-feet annually of brine water are expected to be needed for dust suppression (SM 2009a).

High rates of evaporation at the site coupled with an assumption of minimal soil erosion are expected to result in the deposition of brine salts on the unpaved road surfaces. The brine salts have a potential to impact either underlying groundwater quality or surface water quality through runoff from the site. Groundwater could be impacted if the brine salts infiltrate though the unsaturated zone to the groundwater. Surface water could be impacted if the brine salts accumulated at the surface then dissolved into stormwater that leaves the site.

Because the annual evaporation rate (~111 inches/year) in the area of the Project site greatly exceeds the planned volume of water applied to the unpaved roads plus the average annual precipitation, minimal to no infiltration is expected in these areas. As such, there is not a complete path for the brine salts to reach groundwater and groundwater quality is not expected to be impacted by the practice of applying RO brines for dust suppression. There is thus, no potential for impact to groundwater through direct infiltration below the site.

The accumulation of brine salts on unpaved road surfaces has been conservatively modeled based on assumptions of rapid dissolution and transport without infiltration during storm events. Assuming that the annual deposition of salts from the brine water is completely dissolved in a one year storm event, the resulting TDS concentration at the RSPP outfall from the solar fields mixing with the run on stormwater is estimated to be 279 mg/L. This TDS concentration is within the regional groundwater concentrations and significantly below the State of California Drinking Water Standard (500 mg/L), and is within the range of TDS concentrations reported for the Indian Wells Valley Groundwater Basin (220 mg/L – 720 mg/L) should water infiltrate downstream of the RSPP.

Land Treatment Unit

The material that will be placed in the Land Treatment Unit (LTU) consists of soil that is impacted with Therminol® VP1 HTF as a result of minor leaks or spills that occur during the course of daily operational or maintenance activities. At ambient temperatures, HTF is a highly viscous material that is virtually insoluble in water. Operation of an LTU is not expected to impact surface water or groundwater quality beneath the site. The LTU will be surrounded on all four sides by berms that will protect the LTU from surface water flow. Because of the viscous and insoluble nature of HTF, it is not likely to mobilize from the soil downwards to the water table.

The LTU will be constructed with a 2-foot-thick clay layer on the floor on top of 3-feet of compacted native soil (SM, 2010a) that will serve as a protective barrier to the downward movement of contaminants from the LTU. Moreover, should any contaminants escape the LTU, the water table is approximately 480 feet beneath the LTU. In summary, because of the viscosity of HTF at ambient temperatures, the insolubility of HTF, the depth of the water table, and the placement of protective berms around the LTU, it is expected that surface water and groundwater quality beneath the site will not be impacted by LTU operation.

The LTU will be operated under the requirements of CCR Title 23, Division 3, Chapter 15 and Title 27, Section 2000 et seq. and Title 23, Section 2510 et seq.

Sanitary Waste Septic System

Sanitary wastes will be collected for treatment in a septic tank and disposed via a leach field located within the boundaries of the main power block. If separate control rooms with restrooms are located at the remote power blocks, smaller septic systems will be provided to receive sanitary wastes at those locations. The configuration of the power blocks being remote from the office would indicate that at least five leach fields will be required. Based on the current estimate of 2,800 gallons of sanitary wastewater production per day a total leach field area of approximately 5,600 square feet will be required. It is recommended that an additional 5,600 square feet of land be kept undeveloped for purposes of constructing replacement leach fields should that be necessary.

The use and application of septic fields is an established practice as a method of wastewater treatment. The closest septic field to the privately owned parcel of land is in excess of ½ mile. The septic system will have no affect on the surface water in or around the Project site. The septic system will be installed approximately 5-6 feet deep.

The septic system and leach fields for the Project will be constructed in accordance with the requirements of Kern County:

1. Kern County Ordinance Code, Title 14, Chapter 14.12 – Sewer Systems; Section 14.12.360, Private system installation; Section 14.12.370, Private systems,

2. Kern County Title 17 Chapter 17.20 – Uniform Plumbing Code; Section 17.20.170, Appendix K, Section K1 amended –Private Sewage Disposal – General; Section 17.20.180 Appendix K, Section K6(i) amended – Disposal fields,

3. Title 15 Section 15.24.010 (the Uniform Plumbing Code) Appendix K for Private Sewage Disposal – General and Disposal Fields, and

4. Title 8 Section 8.124.030 (Approval and Construction Permit for Sewage Discharge) and Section 8.124.050 (Operation Permit for Sewage Disposal).

Mitigation

Groundwater quality in the vicinity of the project site could be impacted as a result of the operation of the LTU and septic fields. While preliminary studies and calculations have been made to assess the potential for impact, there is a potential to impact groundwater quality in the vicinity of the project site. In addition, regulatory requirements for operation of the LTU as well as stormwater and potentially septic system operations requirements stipulate specific monitoring requirements.

Implementation of Conditions of Certification **SOIL&WATER-6**, **SOIL&WATER-7, SOIL&WATER-12 and SOIL&WATER-13** are anticipated to minimize impacts below a level of significance. These measures are provided in detail in Section C.9.13, *Proposed Conditions of Certification/Mitigation Measures,* below.

Surface Water Hydrology

The impacts of the Project on the local surface water hydrology are directly related to proposed onsite grading and the construction and operation of a network of engineered collector/conveyance channels and berms designed for the purpose of protecting the Project from flooding. The Project will change both the extent and physical characteristics of the existing drainage patterns both within and downstream of the Project site. The layout as presented in the Concept Engineering Plans (SM 2010a) has been designed to avoid the 100-year floodplain of El Paso Wash which is the major drainage feature in the immediate vicinity of the project.

The Project Drainage Report (SM 2010a) provides a summary of discharges at the downstream Project boundary which compares existing outflows with post-development outflows. As previously discussed in Section C.9.4.2, the same CN value of 95 was used in the post-development calculations as in the pre-development calculations for the project area. This value may be appropriate for the post-developed condition, but may be significantly too high for the existing condition. The result of this approach is that the calculations show no net increase in the onsite peak discharges between the pre- and post a development condition. This scenario may not be an accurate assessment of the project hydrology as in most cases the process of grading, compacting, and removing all vegetation will increase the CN value over existing conditions. Developed areas downstream of the Project site have a demonstrated history of flooding associated with El Paso Wash. It is therefore critical that any hydrologic analysis in support of changes in the El Paso Wash watershed be well documented and consistent with accepted and mandated local methodologies.

Staff modified the pre-developed conditions HEC-HMS model for the project as provided by the applicant. The revised model utilizes onsite CN values that are consistent with adjacent offsite CN values, as well as with the Kern County Hydrology Manual. The post-developed model was then modified to change the onsite CN values to a value of 94 consistent with the Kern County Hydrology Manual. The values for initial abstraction were also modified to be consistent with the revised CN values. No other parameters in the model were modified. The results of the revised HEC-HMS analysis for the drainage outlet locations as depicted on Soil and Water Figure 13 are provided in Soil and Water Table 10 below. The results indicate the potential for significant increases in post-development discharges at all outlet locations as a result of site development.

The impact to existing drainage patterns will be significant per CEQA criteria as the alteration of the existing drainage patterns may substantially increase the rate or amount of surface runoff in a manner which could result in increased offsite flooding. The implementation of Condition of Certification **SOIL&WATER-8** will ensure that post-development discharges do not exceed existing discharges by more than 5% and will mitigate the potential impacts to below the level of significance.

Soil and Water Table 10
Summary of Existing and Proposed Peak Flow Rates
At Downstream Project Boundary

Channel ID	Existing Flowrate at Outlet of Site (cfs)			Proposed Flowrate at Outlet of Site (cfs)		
	Q_{10}	Q_{25}	Q_{100}	Q_{10}	Q_{25}	Q_{100}
East Outlet	1856	3109	5759	2320	3822	6963
West Outlet	604	950	1645	785	1235	2145
North East Outlet	161	249	430	550	786	1262
Ex. Outlet 1	614	965	1670	780	1227	2132
Ex. Outlet 2	2421	4000	7315	2858	4656	8374
Ex. Outlet 3	164	253	438	550	794	1262

Alteration of Drainage Patterns

Construction and Operation

Onsite Drainage

All existing drainages within the Project boundary will be completely eliminated by the grading of approximately 1,994 acres to provide the flat, uniform and vegetation-free topography required for the construction and operation of the solar mirror array. Due to the relatively steep terrain on the northern portion of the Project site (east of El Paso Wash), the onsite grading will include numerous terraces with an approximately 20-foot grade differential between terraces. This scenario tends to complicate the drainage design both within the solar fields as well as for the peripheral collector and conveyance channels. The existing natural drainage system will be replaced with a system of constructed swales and channels designed to collect and convey onsite flows to designated points of discharge from the project. Onsite stormwater from the project will be discharged directly offsite without the use of detention or retention basins with the exception of at the power block which will include a stormwater basin per the Preliminary Civil Construction Plans. There are numerous points of outfall from the Project site directly into El Paso Wash. The Project site has historically drained into El Paso Wash, although portions of it did so significantly downstream of the proposed points of outfall.

The impact to onsite drainage patterns will be significant per CEQA criteria as the development will substantially alter the existing drainage patterns of the site through the alteration of drainages in a manner which could result in substantial erosion. This erosion would occur primarily where onsite flows will be discharged directly offsite to existing drainages or undisturbed ground. Proper design of erosion protection at these locations per Condition of Certification **SOIL&WATER-11** will mitigate this impact to below the level of significance.

Offsite Drainage

The Project site will be protected from flooding through the construction of a series of engineered drainage channels and berms located where offsite flows potentially impact the facility. These features will intercept and divert offsite flows around the facility. Construction and operation of these features will significantly change the offsite drainage patterns within the vicinity of the solar fields and potentially downstream. Along the east side of the northern solar field, runoff will be concentrated into an engineered channel and released back into North Ridgecrest Wash. Flows approaching the southern solar field from the south will collect against engineered berms and be diverted west and north to a point of discharge at Brown Road west of the facility.

The two most significant concerns related to the alteration of existing offsite drainage patterns are the shifting of flows to an adjacent watershed, and the increased potential for erosion due to the concentration of flows. The shifting of flows to an adjacent watershed can increase flooding and overwhelm existing drainage infrastructure such as culverts and roadside channels. The release concentrated flows from an engineered channel onto the native ground can create severe scour at that location if proper energy dissipation and flow dispersion is not implemented. The concentration of flows against engineered berms can also result in erosion and the development of an incised channel at the toe of the berm if there is sufficient flow and slope. An additional concern with the alteration of offsite flow patterns is that a significant change may “dry-up” discreet areas downstream of the project footprint. In the post-development condition these areas may only receive direct rainfall as they have lost all direct connection to their upstream watershed. This issue is discussed further in Section C.2 – Biological Resources.

The impact to offsite drainage patterns will be significant per CEQA criteria as the development will substantially alter the existing drainage patterns due to the collection and diversion of flows in the eastern collector around the project. This diversion could result in substantial increase in flows over existing conditions at the point of discharge of the eastern collector channel and increased erosion at that location. Implementation of Condition of Certification **SOIL&WATER-10** will mitigate this impact to below the level of significance.

Mitigation

Implementation of Condition of Certification **SOIL&WATER-10** and **SOIL&WATER-11**, (described in detail in Section C.9.13, *Proposed Conditions of Certification/ Mitigation Measures,* below) is anticipated to minimize impacts related to surface drainage associated with construction and operation of the Project to below the level of significance. Condition of Certification **SOIL&WATER-8** will ensure that adequate studies and data are provided to assess that **SOIL&WATER-10** and **SOIL&WATER-11** have been implemented within the context of site specific conditions.

Flood Hazards

Construction

The Project will be protected from flooding from offsite sources through the construction of engineered channels and berms along the project boundaries. For the northern solar field, a collector channel will be constructed along the east side of the solar field and will

be designed to convey 100-year year discharge around the Project. The channel will terminate just north of the solar field and discharge back into North Ridgecrest Wash. A berm will be constructed from the south end of this collector channel to Brown Road to divert all flow in this area north into the collector channel. The north solar field will be protected from flooding in El Paso Wash by generally avoiding the 100-year flood limits as defined in the revised floodplain mapping completed by the applicant based on the new project topography.

The southern solar field will also be constructed outside of the El Paso Wash 100-year floodplain. Berms will be constructed along the south and west property boundaries to divert flow west and north into existing drainage to the west of the project. Conceptual Engineering Plans provided on **Soil and Water Figures 19** through **21** provide information on the location and geometry of the proposed channels and berms as well as show the extent of the El Paso Wash floodplain. Additional details on the project drainage design can be found in the full set of the Conceptual Engineering Plans (SM 2010a).

An issue of concern within the proposed design is how the engineered channel along the eastern boundary of the northern solar field (east of El Paso Wash) will tie into existing grade. The combination of relatively steep terrain, terraced grading on the Project site, and the use of numerous grade control structures in the channel to maintain allowable velocities results in cut slopes as high as 20 to 30 feet along significant channel segments. These slopes will be prone to erosion and headcutting if not properly protected. Stabilization of these slopes through revegetation will likely not be successful. Grading to daylight to existing ground at a maximum 3:1 slope could result in horizontal cut slope distances of 60 feet to over 100 feet based on the site specific topography along the east channel.

Sheet 30 of the Conceptual Engineering Plans (SM 2010a) indicates that lateral flows into the east collector channels will be controlled by the use of a berm on the outside of the channel. Flow would be diverted by the berm to discreet openings which would allow this flow to enter the channel over a soil cement spillway. The plans as presented did not adequately demonstrate how the proposed berm would function and how it would be protected from erosion along its face and at the proposed openings where concentrated flows will enter the channel. Proper design of the berm, openings, and soil cement spillways in the channel would require an estimation of flow quantities, depths and velocities along the structures. The analysis required to provide this data was not provided in the project Drainage Report (SM 2010a). As flow collects along the upstream face of the berm it will likely cause erosion and development of incised channels as the resultant slopes along the toe will be in the range of 4-6%. Additionally, it will be difficult to get flow through the openings without the use of additional diversion berms which extend perpendicular from the main berm. This design would significantly complicate the effort associated with the required channel maintenance program. Condition of Certification **SOIL&WATER-11** prohibits the use of diversion berms and spillways along the eastern collector channel in lieu of full bank protection.

As previously discussed, the eastern collector channel as depicted in the Concept Grading Plans (SM 2010a) contains numerous soil cement drop structures along its length in order to reduce the effective channel slope to acceptable values. The

remainder of the channel would remain unlined with the exception of the soil cement spillways at the outer berm openings and possibly other stress areas such as channel bends. The use of these structures to limit channel slope appears to be one of the major factors contributing to the depth of the channel and the large cut slopes along the eastern project boundary. The use of a fully lined channel would minimize concerns related to channel slope and velocity providing the possibility to eliminate most, if not all, of the proposed grade control structures. This approach would allow the channel to more closely follow existing grade and significantly reduce channel depth and the associated cut slopes on the east bank. A design of this type will require a supercritical flow analysis to identify where hydraulic jumps may occur and to ensure adequate channel depth is provided at those locations.

The concept of a fully lined channel was discussed during data request workshops for the project and obtained consensus with the CEC biologist, CEC hydraulic engineer, and the Fish and Game representative for the project. It was concluded that it is impractical to design the east channel to have any biological benefits, and that the best approach was to minimize the channel footprint and provide a break-away wildlife barrier along the top of the outer channel slope. The barrier would be monitored regularly and replaced or reattached as needed. Condition of Certification **SOIL&WATER-11** requires the eastern collector channel be fully lined to reduce depth and cut slopes, and minimize the extents of impacts related to the channel.

The proposed design contains numerous locations where either diverted offsite flows or post-development onsite flows will be discharged to the existing drainage system. Localized erosion is of particular concern as these locations due to the discharge of concentrated flows. The first primary area of concern is the outlet for the eastern collector channel, denoted as the North-East Outlet in the drainage report. Based on the Concept Grading Plans (SM 2010a) flow will be discharged directly to North Ridgecrest Wash without dispersion or energy dissipation, likely resulting in significant scour downstream of the channel termination. Additionally, the peak discharge data in the Project Drainage Report (SM 2010a) indicate that the 10-year flow at this location will increase from 378 cfs to 777 cfs. The increase in flow is apparently the result of runoff in the Route 385 right-of-way potentially entering the east channel and being conveyed to North Ridgecrest Wash. The formal design will require that the flow in the right-of-way continue per existing conditions and not enter North Ridgecrest Wash upstream of the culvert crossing at Route 385. Implementation of Condition of Certification **SOIL&WATER-10** will ensure that the impacts associated with erosion and potentially greater flows at the outlet of the eastern collector channel will be mitigated below the level of significance.

The second primary issue of concern are the several locations along the western side of the north solar field where onsite flows will be discharged directly into El Paso Wash. Sheet 22 of the Conceptual Engineering Plans (SM 2010a) provides a detail for these outlets which show the construction of soil cement spillways down the side east bank of El Paso Wash with an energy dissipation basin at the bottom of the spillway. No cross-sectional view or information was provided with the details. The proposed spillway slopes are significantly steeper than the existing slopes. It is not clear how the slopes adjacent to the spillway will tie into the structure and if this additional disturbance will be prone to erosion. Implementation of Condition of Certification **SOIL&WATER-10** and

SOIL&WATER-11 will ensure that spillways that discharge onsite flows into El Paso Wash will be designed in a manner to reduce localized erosion to below the level of significance.

The Conceptual Engineering Plans (SM 2010a) provide typical channel sections for the proposed collector and conveyance channels as well as the grade control structures, and generally call for 3:1 side slopes. In the event that soil cement is utilized for bank stabilization or for the construction of grade controls, it is recommended that slopes should be reduced to no steeper than 4:1. Experience has shown that anything steeper than approximately 4:1 is impractical for a “slope paving” type of construction which is the most cost and time efficient method of construction. At steeper slopes, the soil cement is difficult to place and compact within industry accepted specifications, especially in channels which are more than a few feet deep. The option to achieve steeper slopes is to construct the soil cement in lifts which significantly increases material quantities and most likely construction time.

Operation

During operation, the proposed collector and conveyance channel along the east project, as well as along some of the other portions of the Project boundary will be exposed to incoming side flows. These inflows could include concentrated runoff at more defined drainages, shallow sheet flow, and smaller more localized flows. All of these elements have the ability to cause significant erosion of unprotected channel banks as well as to create headcutting which will extend roughly perpendicular from the outer channel bank into the adjacent floodplain. These headcut features have the potential to achieve the same depth as the main collector channel and can extend upstream for several hundred feet over time due to numerous smaller flow events, or can occur very quickly from a single large event depending on the magnitude of flow at a given location. The potential issue is exacerbated by the large cut slopes along primarily the east channel which are as high as 30 feet in some locations. Significant impacts to areas beyond the project boundaries can occur due to these erosional features. Appropriate engineered bank stabilization measures must be implemented to ensure that headcutting is prevented at all locations where flow enters the engineered channels.

Operation of the proposed channels and erosion mitigation measures will require significant inspection and maintenance over the life of the facility to ensure that the channels are operating as intended and that potential and observed erosion issues are addressed promptly to minimize damage to the facility and areas beyond the Project boundary. Relatively small problems and erosional features which develop during smaller more frequent events can become the focal point for problems during larger events. The applicant has presented a Channel Maintenance section in the revised Project Drainage Report which addresses some of the potential issues associated with long term operation of the channels. However, the section does not adequately address the issue of the collection of offsite flows or the use of soil cement along areas subject to inflows from offsite watersheds. The monitoring and mitigation of erosion to offsite areas caused by the presence and operation of the proposed collector and conveyance channels must be explicitly addressed in a Channel Maintenance Program as required by Condition of Certification **SOIL&WATER-13**.

Channel Maintenance Program

The applicant will develop and implement a Channel Maintenance Program that provides a framework for routine channel maintenance projects and ensures compliance with Conditions of Certification in a feasible and environmentally-sensitive manner. The Channel Maintenance Program would be a process document prepared by the project owner, which would be reviewed and approved by the both BLM's Authorized Officer and the CPM. Staff is requiring as part of Condition of Certification **SOIL&WATER-12** that the Channel Maintenance Program provide long-term guidance to the applicant to implement routine channel maintenance projects and comply with RSPP's related biological (see Section C.2) and flood protection (**SOIL&WATER-1** and **SOIL&WATER-6**) Conditions of Certification. Condition of Certification **SOIL&WATER-12** requires that the applicant will implement the measures identified in the program. The main goals of the Channel Maintenance Program would be to maintain the diversion channels to meet its original design to provide flood protection, protect offsite areas form erosion, support RSPP mitigation, protect wildlife habitat and movement/migration, and maintain groundwater recharge. Compliance with Condition of Certification **SOIL&WATER-12** would reduce the impacts below the level of significance.

Mitigation

Implementation of Conditions of Certification **SOIL&WATER-9** through **SOIL&WATER-12**, described in detail in Section C.9.13, *Proposed Conditions of Certification/Mitigation Measures,* below is anticipated to minimize impacts related to flood hazards and erosion associated with construction and operation of the Project to below the level of significance. They will also provide the basic information to assist the CPM to adequately review and assess the appropriateness of the proposed design within the context of the site specific conditions.

Surface Water Quality

Project storm water may encounter soil or chemicals deleterious to aquatic and terrestrial plants and wildlife. The Project Applicant proposes to implement BMPs for managing potentially harmful storm water and protect water quality. Potentially significant water quality impacts could occur during operations if contaminated or hazardous materials used during operations were to contact storm water and drain offsite. The Project would alter natural storm water drainages and use BMPs to reduce potentially significant impacts related to concentrated drainage and ensuing soil erosion and sediment transport offsite. Recognizing these potential impacts, the applicant has prepared a draft industrial SWPPP required by the general waste discharge requirements for industrial activity.

Construction

Potential threats to surface water quality related to construction includes: potential increases in sediment loads to adjacent streams and washes; accidental spills of hydrocarbon fuels and greases associated with construction equipment. The implementation of BMPs as defined in Condition of Certification **SOIL&WATER-1** and

SOIL&WATER-2 (and found in Section C.9.13, *Proposed Conditions of Certification/Mitigation Measures,* below) would reduce potential water quality impacts to insignificant.

Operation

Potential threats to surface water quality related to operations includes: potential increases in sediment loads to adjacent washes; accidental spills of hydrocarbon fuels and greases (including HTF fluid) associated with operations equipment, and accidental releases from HTF treatment area. As previously discussed, the Project Applicant proposes to control dust generated by site activities by applying RO concentrate (brine) water to unpaved road surfaces in the Project area.

During a stormwater event, the residual brine salts in the road surface will dissolve into the stormwater that falls on the unpaved road and comes in contact with the salts. Stormwater containing brine salts will then mix with the other stormwater on the solar field (i.e., first mixing). Subsequently, the stormwater from the solar field will drain into the stormwater conveyance system, combining with runoff from upstream sources, and the combined stormwater will discharge from the Project at an outfall (i.e., second mixing). In the case of the RSPP, there are a total of three outfalls for the Project with the stormwater from the solar fields discharging only to one, the center channel, which will combine with stormwater from the El Paso Wash.

The predicted TDS concentration of the brine and the amount of water applied (3.6 inches) per year (based on AFC reported volumes evenly distributed by road area) were used to calculate the unit mass loading of brine salts applied to the unpaved roads (grams per square foot of road), see SM 2009d DA WATER-5 and SM 2010a DR-S&W-135 for the detail calculations. Through the year, about 57 grams per square foot of salts would be applied to the unpaved roads.

The total mass of brine salts applied annually to the unpaved roads for each solar field was calculated from the area of the unpaved roads in each solar field area times the calculated unit mass loading of brine salts. The dimensional data for the unpaved roads was determined from the 30% design conceptual drawings. The 24-hour duration, mean precipitation storm event with a one year frequency was then used to determine the concentration of salts in the stormwater leaving the unpaved roads. The baseline TDS concentration in the stormwater running off the remainder of the solar field excluding the roads was estimated to be 200 mg/L (USGS, Water Resources Investigation Report 2003-4326) (SM 2009d).The predicted concentration of TDS in the stormwater from the solar fields to be 757 mg/L as a result of the mixing of the stormwater from the unpaved road surfaces with the stormwater from the remainder of the solar field and both entering the stormwater conveyance system (i.e., first mixing concentration).

To determine the incremental brine salt concentration contribution to the stormwater at the outfall for the Project, the Drainage Report (SM 2009a, Appendix L) for the site was consulted to understand the conceptual drainage design for the site. The runoff from each solar field or unit drains into a specific channel that in turn drains off the site through a specific outfall at the Project boundary. These channels have been designed to convey both stormwater running on to the Project from up stream watershed areas (as needed) and to convey stormwater running off the solar fields. Therefore, the

stormwater from each solar field is mixed with stormwater from up stream watershed areas before discharging at an outfall (i.e., second mixing). For the RSPP, the contribution of the solar field stormwater run off is 14.2% of the total stormwater flow for the central channel outfall. Table B2 describes the conceptual drainage design for each solar field and associated conveyance channel/outfall and estimates stormwater contribution from each solar field to the total storm flow discharged for the associated channel/outfall discharged from the Project.

The TDS concentration in the outfall is calculated by determining a weighted average of the TDS the concentration in the solar field runoff mixing with that from the up stream source of stormwater. For the RSPP, the TDS concentration in the stormwater at the central channel outfall is estimated to be 279 mg/L (SM 2009a). This concentration is well within the regional groundwater concentrations and below State of California Secondary Drinking Water Standards (State of California, Title 22 CCR, Article 16, Section 64449 [Table 64449 A/B] - Secondary Maximum Contaminant Levels) of 500 mg/L.

The accumulation of brine salts on unpaved road surfaces has been conservatively modeled based on assumptions of rapid dissolution and transport without infiltration during storm events. Assuming that the annual deposition of salts from the brine water is completely dissolved in a one year storm event, the resulting TDS concentration at the RSPP outfall from the solar fields mixing with the run on stormwater is estimated to be 279 mg/L. This TDS concentration within the regional groundwater concentrations and is significantly below the State of California Drinking Water Standard, and is below the underlying groundwater concentrations reported for the Indian Wells Valley Groundwater Basin should water infiltrate downstream of the RSPP.

Mitigation

No significant impacts are anticipated related to surface water quality. Implementation of Condition of Certification **SOIL&WATER-1**, **SOIL&WATER-6**, and **SOIL&WATER-12** (described in detail in Section C.9.13, *Proposed Conditions of Certification/Mitigation Measures,* below), is anticipated to ensure there are no impacts related to surface water quality associated with construction and operation of the Project.

CEQA LEVEL OF SIGNIFICANCE

CEQA Guidelines define a significance threshold as being an “identifiable quantitative, qualitative, or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect will normally be determined to be less than significant.”

The CEC, in its role as CEQA lead agency for the Project evaluates projects on a case by case basis as each power plant impacts soil and water resources in different ways. Facts that would indicate significance include but are not limited to pumping of ground water so that neighboring wells are damaged or polluted, or that hydrologically connected surface water is drained eliminating habitat for species of special concern. Significant impacts may also include soil erosion that pollutes a nearby water way

resulting in mortality of fish. Appendix G as discussed in Section C.9.3 provides guidelines to consider when evaluating a project for environmental impacts.

C.9.5 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because (1) it eliminates about 42% of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources (desert tortoise and Mohave ground squirrel), cultural resources, and recreational uses, and (2) avoids constructing a solar facility in the Mohave Ground Squirrel Conservation Area (MGSCA).

C.9.5.1 SETTING AND EXISTING CONDITIONS

The Northern Unit Alternative would consist of 167 solar collector array loops with a net generating capacity of approximately 146 MW. The total disturbance area would be approximately 1134 acres of land. This alternative would retain 58% of the proposed solar array loops and would affect 58% of the land of the proposed 250 MW project. The boundaries of the Northern Unit Alternative are shown in **Alternatives Figure 1.**

Similar to the proposed project, the Northern Unit Alternative would transmit power to the grid through the planned SCE 230-kV substation to be located near the proposed project site. The power block covering approximately 18 acres, would remain north of Brown Road, as proposed by the project and would include all operational power facilities, structures, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system). The proposed transmission line alignment is 3,900 ft and would connect to the proposed switchyard (3.2 acres) adjacent to the existing SCE 230kV transmission line, west of the proposed project. In addition, the site would require access roads, a parking lot, bio-remediation unit and main office building (3 acres) all of which are proposed north of Brown Road within the proposed project footprint (SM, 2009a). The proposed 16.3 acre water line would remain at the location as proposed by the project. The Northern Unit Alternative would not require the relocation of the two existing SCE transmission lines.

As stated above, the Northern Unit Alternative is evaluated in this SA/DEIS because it would reduce some impacts of the project. Additionally, the Northern Unit Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals, while minimizing impacts to the desert environment. A limited acreage alternative was suggested in scoping comments.

C.9.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Soil Erosion

Soil erosion at the Northern Unit Alternative project site could be impacted as a result of the construction and operational of the Southern Unit Alternative project. Impacts

related to soil erosion from wind and surface water are anticipated to be less than those associated with the proposed Project due to the smaller foot print and less surface disturbance.

Basin Storage and Groundwater Levels

Groundwater basin balance and groundwater levels in the vicinity of the Northern Unit Alternative project site could be impacted as a result of the construction and operational water use. The potential impacts related to basin storage and groundwater levels are anticipated to be less than those associated with the proposed Project due to the smaller foot print, less surface disturbance and less water requirements. Water usage would be reduced by approximately 40% to approximately ~90 afy during operation. This may reduce the size of the supply pipeline as well as water level draw downs around the IWVWD well field.

Groundwater Quality

Groundwater quality in the vicinity of the Northern Unit Alternative project site could be impacted as a result of the operation of the LTU, and septic fields. These facilities are required regardless of the size of the project. The potential impact would be similar as for the proposed Project.

Surface Water Hydrology

The impacts and mitigation measures for the Northern Unit Alternative would be similar to the preferred alternative. All existing washes within the site would be eliminated by onsite grading and replaced with a system of engineered swales and channels. Mitigation of potential channel erosion and headcutting would still be required for all channels and slopes subject to flows.

The volume of offsite flow that would need to be rerouted would be less since flow upstream of Brown Road would not be impeded and diverted to the west and north by engineered berms. The overall changes to the floodplain downstream of the Northern Unit Alternative would be the same as the proposed Project as there would still be drainages that will be completely cutoff from their natural upstream watershed due to placement of the solar field.

Surface Water Quality

Surface water quality in the vicinity of the Northern Unit Alternative Project site could be impacted as a result of surface grading. In addition, potentially significant water quality impacts could occur during operations if contaminated or hazardous materials used during operations were to contact storm water and drain offsite. The potential impacts to surface water would be similar as for the proposed Project.

CEQA LEVEL OF SIGNIFICANCE

CEQA Guidelines define a significance threshold as being an “identifiable quantitative, qualitative, or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect will normally be determined to be less than significant.”

The CEC, in its role as CEQA lead agency for the Project, evaluates projects on a case by case basis as each power plant impacts soil and water resources in different ways. Facts that would indicate significance include but are not limited to pumping of ground water so that neighboring wells are damaged or polluted, or that hydrologically connected surface water is drained eliminating habitat for species of special concern. Significant impacts may also include soil erosion that pollutes a nearby water way resulting in mortality of fish. Appendix G as discussed in Section C.9.3 provides guidelines to consider when evaluating a project for environmental impacts.

C.9.6 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would be a 104 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because it eliminates about 58% of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources, and cultural resources.

C.9.6.1 SETTING AND EXISTING CONDITIONS

The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of approximately 104 MW. The total disturbance area would be approximately 908 acres of land. This alternative would retain 42% of the proposed solar array loops and would affect 42% of the land of the proposed 250 MW project.

The boundaries of the Southern Unit Alternative are shown in **Alternatives Figure 2**. This area was would avoid a large portion of the El Paso Wash and sensitive biological resources, including areas that were mapped as occupied tortoise and Mohave ground squirrel habitat (live tortoise and/or active burrows and sign).

Similar to the proposed project, the Southern Unit Alternative would transmit power to the grid through the planned SCE 230-kV substation to be located near the proposed project site. The power block, spanning approximately 18 acres, would remain north of Brown Road, as proposed by the project and would include all operational power facilities, structures, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system). The proposed transmission line alignment is 3,900 ft and would connect to the proposed switchyard (3.2 acres) adjacent to the existing SCE 230kV transmission line, west of the proposed project. In addition, the site would require access roads, a parking lot, bio-remediation unit and main office building (3 acres) all of which are proposed north of Brown Road (SM, 2009a). The proposed 16.3 acre water line would remain at the location as proposed by the project. Similar to the proposed project, the Southern Unit Alternative would require the relocation of the two existing SCE transmission lines; this realignment would require approximately 58.2 acres.

As stated above, the Southern Unit Alternative is evaluated in this SA/DEIS because it would reduce some impacts of the project. Additionally, the Southern Unit Alternative

would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals, while minimizing impacts to the desert environment. A limited acreage alternative was suggested in scoping comments.

C.9.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Soil Erosion

Soil erosion at the Southern Unit Alternative project site could be impacted as a result of the construction and operational of the Southern Unit Alternative project. Impacts related to soil erosion from wind and surface water are anticipated to be less then those associated with the proposed Project due to the smaller foot print and less surface disturbance.

Basin Balance and Groundwater Levels

Groundwater basin balance and groundwater levels in the vicinity of the Southern Unit Alternative project site could be impacted as a result of the construction and operational water use. The potential impacts related to basin storage and groundwater levels are anticipated to be less than those associated with the proposed Project due to the smaller foot print, less surface disturbance and less water requirements. Water usage would be reduced by approximately 55% to approximately ~68 afy during operation. This may reduce the size of the supply pipeline as well as water level draw downs around the IWVWD well field.

Groundwater Quality

Groundwater quality in the vicinity of the Southern Unit Alternative project site could be impacted as a result of the operation of the LTU, and septic fields. These facilities are required regardless of the size of the project. The potential impact would be similar as for the proposed Project.

Surface Water Hydrology

The impacts and mitigation measures for the Southern Unit Alternative would be similar to the preferred alternative. All existing washes within the site would be eliminated by onsite grading and replaced with a system of engineered swales and channels. Mitigation of potential channel erosion and headcutting would still be required for all channels and slopes subject to flows.

The volume of offsite flow which would require diversion would be lower since North Ridgecrest Wash would no longer have to be intercepted and diverted around the north solar field. The overall changes to the floodplain downstream of the Southern Unit Alternative would likely be less than the proposed Project since certain downstream areas would not be cutoff form their natural upstream watersheds due the presence of the north solar filed.

Surface Water Quality

Surface water quality in the vicinity of the Southern Unit Alternative Project site could be impacted as a result of surface grading. In addition, potentially significant water quality

impacts could occur during operations if contaminated or hazardous materials used during operations were to contact storm water and drain offsite. The potential impacts to surface water would be similar as for the proposed Project.

CEQA LEVEL OF SIGNIFICANCE

CEQA Guidelines define a significance threshold as being an “identifiable quantitative, qualitative, or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect will normally be determined to be less than significant.”

The CEC, in its role as CEQA lead agency for the Project, evaluates projects on a case by case basis as each power plant impacts soil and water resources in different ways. Facts that would indicate significance include but are not limited to pumping of ground water so that neighboring wells are damaged or polluted, or that hydrologically connected surface water is drained eliminating habitat for species of special concern. Significant impacts may also include soil erosion that pollutes a nearby water way resulting in mortality of fish. Appendix G as discussed in Section C.9.3 provides guidelines to consider when evaluating a project for environmental impacts.

C.9.7 ORIGINAL PROPOSED ALTERNATIVE

The Original Proposed Project Alternative would be a 250 MW solar facility as originally proposed by Solar Millennium. This alternative is analyzed because it would reduce the amount of land developed within the Mojave Ground Squirrel Conservation Area and it could transmit the full 250 MW of power that Solar Millennium has requested.

C.9.7.2 SETTING AND EXISTING CONDITIONS

The Original Proposed Project Alternative would consist of 278 solar array loops with a net generating capacity of approximately 250 MW. The total disturbance area would be approximately 1,794 acres of land A shorter transmission interconnection – 1,250 feet as compared to the proposed project interconnection of 3,900 feet – would be needed.

The boundaries of the Original Proposed Project Alternative are shown in **Alternatives Figure 3**. This project footprint contains two desert ephemeral washes that would require redirection and smaller dry desert washes also traverse the site. In addition this site is the location of prime desert tortoise and Mojave ground squirrel habitat.

Similar to the proposed project, the Original Proposed Project Alternative would transmit power to the grid through the planned SCE 230-kV substation located near the proposed project site and would require infrastructure including main office building (3 acres), power block, water line, transmission line, switch yard, access roads, parking area, bio-remediation unit and maintenance building (SM, 2009a). The approximately 4 mile off-site water line route (approximately 18-acre total disturbance) would follow the same route as the proposed project. The bioremediation unit would be located north of Brown Road, within the proposed project footprint; the power block and ancillary facilities would be located south of Brown Road on approximately 18 acres in addition to

the transmission line and switch-yard (5.5 acres). The Original Proposed Project Alternative would require the relocation of the two existing SCE transmission lines.

As stated above, the Original Proposed Alternative is evaluated in this SA/DEIS because it reduces land developed with the MGSCA. Additionally, the Original Proposed Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals.

C.9.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Soil Erosion

Soil erosion at the Original Proposed Project Alternative project site could be impacted as a result of the construction and operation of the Original Proposed Project Alternative project. Impacts related to soil erosion from wind and surface water are anticipated to be about higher than those associated with the proposed Project. Water erosion could be higher since the Original Proposed Project Alternative requires disturbing and re-channelizing El Paso Wash.

Basin Balance and Groundwater Levels

Groundwater basin balance and groundwater levels in the vicinity of the Original Proposed Project Alternative project site could be impacted as a result of the construction and operational water use. The Original Proposed Project Alternative will be using the same amount of water (~150afy during operation) and have the same water related facilities as the proposed Project, the potential impacts related to basin balance and groundwater levels are anticipated to be the same as with the proposed Project.

Groundwater Quality

Groundwater quality in the vicinity of the Original Proposed Project Alternative project site could be impacted as a result of the operation of the LTU, and septic fields. These facilities will be the same size and type required in the proposed Project. The potential impact would be same as for the proposed Project.

Surface Water Hydrology

The impacts and mitigation measures for the Original Proposed Project would be similar to the preferred alternative. All existing washes within the site would be eliminated by onsite grading and replaced with a system of engineered swales and channels. Mitigation of potential channel erosion and headcutting would still be required for all channels and slopes subject to flows.

The volume of offsite flow would likely be the same as for the proposed Project. El Paso Wash is realigned and would be subject to continual maintenance and repair. The overall changes to the floodplain downstream of the Original Proposed Project would likely be less than the proposed Project due the slightly less disturbed area resulting in lower discharges.

Surface Water Quality

Surface water quality in the vicinity of the Original Proposed Project Alternative Project site could be impacted as a result of surface grading. In addition, potentially significant water quality impacts could occur during operations if contaminated or hazardous materials used during operations were to contact storm water and drain offsite. Since the Original Proposed Project Alternative has the same facilities and would be the same size as the Proposed Project the potential impacts to surface water would be similar as for the proposed Project.

CEQA LEVEL OF SIGNIFICANCE

CEQA Guidelines define a significance threshold as being an "identifiable quantitative, qualitative, or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect will normally be determined to be less than significant."

The CEC, in its role as CEQA lead agency for the Project, evaluates projects on a case by case basis as each power plant impacts soil and water resources in different ways. Facts that would indicate significance include but are not limited to pumping of ground water so that neighboring wells are damaged or polluted, or that hydrologically connected surface water is drained eliminating habitat for species of special concern. Significant impacts may also include soil erosion that pollutes a nearby water way resulting in mortality of fish. Appendix G as discussed in Section C.9.3 provides guidelines to consider when evaluating a project for environmental impacts.

C.9.8 NO PROJECT/NO ACTION ALTERNATIVES

C.9.8.1 NO PROJECT/NO ACTION ALTERNATIVE #1

No Action on Ridgecrest Solar Power Project Application and On CDCA Land Use Plan Amendment

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the impacts to soils and water from the construction and operation of the proposed project would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.9.8.2 NO PROJECT/NO ACTION ALTERNATIVE #2

No Action on Ridgecrest Solar Power Project and Amend the CDCA Land Use Plan to Make the Area Available for Future Solar Development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to classify the site as suitable for solar development. Same as no action no project.

C.9.8.3 NO PROJECT/NO ACTION ALTERNATIVE #3

No Action on Ridgecrest Solar Power Project Application and Amend The CDCA Land Use Plan to Make the Area Unavailable for Future Solar Development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to designate the proposed site unsuitable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

C.9.9 COMPARISON OF ALTERNATIVES AND PROPOSED PROJECT

Soil and Water Table 11 provides a summary comparison of the impacts associated with the proposed Project and each of the proposed Alternatives under consideration.

Soil and Water Table 11
Comparison of Proposed Project and Alternatives

Impact	Proposed Project (250 MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250 MW)	No Project/No Action*
Acreage	2,002	1,134	908	1,794	0
Soil Erosion	Potential soil erosion from wind and water. Mitigated to level of insignificance.	Potential soil erosion from wind and water. Less when compared to Proposed Project. Mitigated to level of insignificance.	Potential soil erosion from wind and water. Less when compared to Proposed Project. Mitigated to level of insignificance.	Potential soil erosion from wind and water. Less when compared to Proposed Project. Mitigated to level of insignificance.	No Impacts

Impact	Proposed Project (250 MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250 MW)	No Project/No Action*
Groundwater Basin Balance and Water Levels	Potential impact to groundwater balance and groundwater levels. No change in water use during operation, ~150 afy. Mitigated to level of insignificance.	Potential impact to groundwater balance and groundwater levels. ~40% less water need, less impact to groundwater levels. Water use during operation, ~90 afy Mitigated to level of insignificance.	Potential impact to groundwater balance and groundwater levels. ~55% less water need, less impact to groundwater levels. Water use during operation, ~68 afy Mitigated to level of insignificance.	Potential impact to groundwater balance and groundwater levels. No change in water use from Proposed Project, ~150 afy during operation. Mitigated to level of insignificance.	No Impacts
Groundwater Quality	Potential impact to groundwater quality from LTU and septic system. Mitigated to level of insignificance.	Potential impact to groundwater quality from LTU and septic system. Mitigated to level of insignificance.	Potential impact to groundwater quality from LTU and septic system. Mitigated to level of insignificance.	Potential impact to groundwater quality from LTU and septic system. Mitigated to level of insignificance.	No Impacts
Surface Water Hydrology	Significant impact to existing onsite drainage. Little impact to offsite drainage. Offsite drainage mitigated to level of insignificance.	Significant impact to existing onsite drainage. Offsite drainage mitigated to level of insignificance.	Significant impact to existing onsite drainage. Little impact to offsite drainage. Offsite drainage mitigated to level of insignificance.	Significant impact to existing onsite drainage. Impact to offsite by channelizing and relocating El Paso Wash. Little impact to offsite drainage. Offsite drainage mitigated to level of insignificance.	No Impacts
Surface Water Quality	Potential impacts resulting from grading and operation from spill of hazardous material. Mitigated to level of insignificance.	Potential impacts resulting from grading and operation from spill of hazardous material. Mitigated to level of insignificance.	Potential impacts resulting from grading and operation from spill of hazardous material. Mitigated to level of insignificance.	Potential impacts resulting from grading and operation from spill of hazardous material. Mitigated to level of insignificance.	No Impacts

*All No Project/No Action alternatives assume that the RSPP project would not be built on the proposed site.

C.9.10 CUMULATIVE IMPACTS

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" for CEQA means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (California Code Regulation, Title 14, section 15130). NEPA states that cumulative effects can result from individually minor but collectively significant actions taking place over a period of time (40 CFR §1508.7).

There is the potential for future development in the Indian Wells Valley area and throughout the southern California desert region. Cumulative impacts can occur if implementation of the proposed project could combine with those of other local or regional projects. The locations of existing and reasonably foreseeable developments in the Indian Wells Valley area are presented in the following sections.

C.9.10.1 GEOGRAPHIC SCOPE OF ANALYSIS

The geographic extent used as part of the cumulative impact assessment includes the IWVGB Groundwater basin. The extent of the basin is described in Section C.9.4.2.

C.9.10.2 EXISTING CUMULATIVE CONDITIONS

Section C.9.4.2, Setting and Existing Conditions describes the current conditions of the IWVGB Groundwater Basin that would take into account existing cumulative conditions as they were known to occur.

C.9.10.3 FUTURE FORESEEABLE PROJECTS

Foreseeable Projects in the Project Area

The potential for cumulative water resources impacts exists where there are two or more individual projects proposed in an area that, when considered together with the proposed Project, could result in an impact to water resources. Projects with overlapping construction schedules and/or operations collectively could result in a demand for water that cannot be met by the Project area water supply resources or could result in water quality impacts to surface or groundwater resources. There are several projects that could contribute along with the RSPP to cumulative impacts to water resources within the IWVGB. A listing of the local cumulative projects and their analysis of water supply impacts is provided in **Soil and Water Table 12,** below:

Soil and Water Table 12
Potential Cumulative Projects in the Indian Wells Valley Groundwater Basin Area

Proposed Project	Water Supply and Analysis of Impacts
Numerous Hotels under Construction along China Lake Boulevard (Construction Complete Mid- to Late 2010)	Projects' water supply requirements will be realized before the RSPP begins construction. Projects do not contribute to cumulative impacts.
China Lake NAWS BRAC Realignment (EIS); Expected Realignment by 2011.	EIS indicates no significant impacts from expected population growth the NAWS. The expected increase in operations is anticipated to create 4,085 new jobs. Assuming 1.5 people of a family of four would find work in these new jobs, a total of about new 2700 households would be added to the Basin. Assuming that a single-family home requires about one acre-foot of water per year, this equates to about 2,700 afy.
City of Ridgecrest Planning Commission Approval of 1970 tract/housing lots in anticipation of BRAC	Assuming that a single-family home requires about one acre-foot of water per year, if all housing were built as proposed, increased water supply requirement would be about 2,000 afy.
City of Ridgecrest - Super Wal-Mart (draft EIR)	According to the draft EIR (2009), "the Project would involve relocation of uses (from the existing Wal-Mart) to the new site, and there could be a slight increase in water demand due to changes in irrigation and fire protection requirements." But, it is not expected to exceed the current supply.

Source: SM 2009a

From these generalized assumptions, the BRAC re-alignment may increase the demand on the IWVGB by between 2,000 and 2,700 afy. The amount of increase in water demand will depend on the actual population growth in response to the number of additional jobs that are realized at the base. By comparison, the RSPP annual use is 150 afy, which represents between about 5-8% of the potential additional water requirements associated with the additional housing construction. This is not a significant increase by comparison to the potential requirements in support of BRAC realignment and thus, the Project's impacts would not be cumulatively considerable.

Mitigation Measures

The RSPP would not have significant cumulative adverse impacts on water resources. To ensure that no significant adverse effects to water quality or supply are caused by the proposed Project pumping for operational supply, the following mitigation measures are proposed for construction and operation.

Water quality will be protected through implementation of the SWPPP and DESCP for construction and operations. If is important to note that in order to keep water use as

low as practicable, the Project will attempt to recycle the process makeup water for a savings of about 25% of the annual total consumptive use.

C.9.10.4 CONTRIBUTION OF THE PROJECT TO CUMULATIVE IMPACTS

Construction and Operation

The construction of the proposed Project is expected to result in short term adverse impacts related to construction activities. It is expected that some of the cumulative projects described above which are not yet built may be under construction the same time as the proposed Project. In addition, it is expected that some of the future and foreseeable projects described above may be operational at the same time as the proposed Project. As a result, there may be substantial long term cumulative impacts during operation of these projects related to soils and water resources.

As a result, there may be substantial short term and long-term impacts during construction and operations of those cumulative projects related to: soil erosion, geomorphology, basin balance, groundwater levels, groundwater quality, surface water hydrology and surface water quality and they are discussed below.

Soil Erosion

Construction of the proposed Project would result in both temporary changes at the Project site which could incrementally increase local soil erosion and storm water runoff during construction. The proposed Project would be expected to contribute only a small amount to the possible short term cumulative impacts related to soil erosion because the Project Applicant will be required to implement the mitigation measures defined in this analysis, which are expected to bring short term impacts below the level of significance.

Operation of the proposed Project would result in permanent changes at the Project site. These changes could incrementally increase local soil erosion and storm water runoff. The proposed Project would be expected to contribute only a small amount to these possible long term operational cumulative impacts because potential Project-related soil erosion and increased sedimentation resulting from storm water runoff are expected to be reduced to a level of insignificance through implementation of the mitigation measures specified in Section C.9.13, below.

Groundwater Basin Balance and Groundwater Levels

From these generalized assumptions, the BRAC re-alignment may increase the demand on the IWVGB. The amount of increase in water demand will depend on the actual population growth in response to the number of additional jobs that are realized at the base. By comparison, the RSPP annual use is 150 afy, which represents between about 5-8% of the potential additional water requirements associated with the additional housing construction. This is not a significant increase by comparison to the potential requirements in support of BRAC realignment and thus, the Project's impacts would not be cumulatively considerably. The Project water demands will be completely offset through an offset program discussed in section C.9.4.3. Thus the Project will have no cumulative impacts related to water demands.

Groundwater Quality

There is a potential that significant cumulative groundwater quality impacts could occur during construction and operation if contaminated or hazardous materials used during construction and operations were to be released and migrate to the groundwater table.

The proposed Project would be expected to contribute only a small amount to the possible short-term cumulative impacts related to groundwater quality, given the distance to the groundwater table (200-400 feet bgs) over the IWVGB and the proposed implementation of a hazardous material management plan as well as monitoring plans associated with operation of LTUs, surface impoundments, septic systems and other various operations. With implementation of the mitigation measures specified in Section C.9.13, below, cumulative impacts to groundwater quality are anticipated to be below the level of significance.

Surface Water Hydrology

The cumulative impacts of the proposed Projects on the local surface water hydrology are directly related to proposed onsite grading and the construction and operation of a network of engineered collector/conveyance channels designed for the purpose of protecting the various projects from flooding. The proposed projects will change both the extent and physical characteristics of the existing floodplain within the project site as well as downstream of each project site, as well as change the sediment transport and depositional characteristics of each of the project sites.

The RSPP (proposed Project) would be expected to contribute only a small amount to the possible short-term cumulative impacts related to surface water hydrology because the implementation of the mitigation measures specified in Section C.9.13, below, would reduce the cumulative impacts below the level of significance.

Surface Water Quality

It is expected that stormwater generated on the various project sites may encounter soil or chemicals deleterious to aquatic and terrestrial plant and wildlife. It is expected that all of the projects would be required to implement BMPs for managing potentially harmful storm water and protect water quality. Potentially significant water quality impacts could occur during operations if contaminated or hazardous materials used during operations were to contact storm water and drain offsite. It is expected that all of the projects would have Hazardous Material Management Plans to reduce this potential impact to insignificant.

All of the proposed projects would alter natural storm water drainages and the expected use of BMPs would reduce potentially significant impacts related to concentrated drainage and ensuing soil erosion and sediment transport offsite. The proposed Project would be expected to contribute only a small amount to the possible short-term cumulative impacts related to surface water quality with implementation of the Conditions of Certification described in Section C.9.13, below.

Operation

In the preceding sections, the following areas were evaluated for potential cumulative impacts: soil erosion, basin balance and groundwater levels, groundwater quality,

surface water hydrology and surface water quality. Implementation of the mitigation measures specified in Section C.9.13, below, would reduce the cumulative impacts below the level of significance.

Decommissioning

The decommissioning of the proposed Project is expected to result in adverse impacts related to soils and water resources similar to construction impacts. It is unlikely that the construction or decommissioning of any of the cumulative projects would occur concurrently with the decommissioning of this Project, because the decommissioning is not expected to occur for approximately 40 years. As a result, the impacts of the decommissioning of the proposed Project would not be expected to contribute to cumulative impacts related to soils and water resources. To ensure there would be no impacts to soil and water resources during and after project decommissioning the applicant should be required to comply with Condition of Certification **SOIL&WATER–5.**

COMPLIANCE WITH LORS

Applicable Federal, State, and local LORS are summarized in **Soil and Water Table 13**. Non-applicable Federal and State LORS are also summarized along with an explanation why they are not applicable.

Soil and Water Table 13
Laws, Ordinances, Regulations, and Standards (LORS)

LORS		Compliance
Federal		
Clean Water Act (33 U.S.C. Section 1251 et seq.)	The Clean Water Act (33 USC § 1257 et seq.) requires states to set standards to protect water quality, which includes regulation of storm water and wastewater discharges during construction and operation of a facility. California established its regulations to comply with the Clean Water Act under the Porter-Cologne Water Quality Control Act of 1967. The Clean Water Act also establishes protection of navigable waters through Section 401. Section 401 certification through the Army Corps of Engineers and Regional Water Quality Control Board (RWQCB) is required if there are potential impacts to surface waters of the State and/or Waters of the United States, such as perennial and ephemeral drainages, streams, washes, ponds, pools, and wetlands. Section 401 requires impacts to these waters to be quantified and mitigated.	The USACE has determined that there are no jurisdictional waters of the U.S. at the project site.
Resource Conservation and Recovery Act	The Resource Conservation Recovery Act (RCRA) of 1976 (40 CFR Part 260 et seq.) seeks to prevent surface and groundwater contamination, sets guidelines for determining hazardous wastes, and identifies proper methods for handling and disposing of those wastes.	The LTU will be required to comply with this LORS, see **SOIL&WATER-6.**
BLM Land Management Regulation, Title 43 CFR Part 2800, et seq.	Part 2800 of Title 43 CFR sets forth application requirements through the BLM for granting a ROW for the project.	Pending Project approval, a site-wide inspection will be performed by a certified professional soil scientist and specific requirements pertaining to Project grading and soil erosion will be developed as part of the joint BLM/CEC review process for the Project. To prevent the discharge of pollutants (i.e., sediment) into waterways. Applicable BMPs will be incorporated into the preliminary construction SWPPP/DESCP, see **SOIL&WATER-1** and **6.**

LORS		Compliance
Title 44 of the Code of Federal Regulations (44 CFR) Part 65	44 CFR contains the basic policies and procedures of the Federal Emergency Management Agency (FEMA) for adoption of rules. Part 65 - Identification and mapping of special hazard areas requires development in areas identified as a FEMA Special Flood Hazard Area to meet the requirements of Title 44 of the Federal Code of Regulations (44CFR)	El Paso Wash passes through the project site and is a FEMA mapped flood way. El Paso Wash, however, will not be realigned or it's flood flows changed. However it will be remapped and a CLOMR will be submitted to FEMA per **SOIL&WATER-9.**
State		
Porter-Cologne Water Quality Control Act of 1967, Water Code Sec 13000 et seq.	Requires the State Water Resources Control Board (SWRCB) and the nine RWQCBs to adopt water quality criteria to protect state waters. Those regulations require that the RWQCBs issue Waste Discharge Requirements specifying conditions for protection of water quality as applicable.	In-lieu permit WDRs from the Lahontan RWQCB are required for the LTU that will be used to treat (through bioremediation) HTF-impacted soil, see **SOIL&WATER-6**
California Water Code (CWC) Section 13550 (Section 2 of Article X, California Constitution)	This section requires the use of recycled water for industrial purposes subject to recycled water being available and upon a number of criteria including: provisions that the quality and quantity of the recycled water are suitable for the use, the cost is reasonable, the use is not detrimental to public health, and the use will not impact downstream users or biological resources.	Recycled water is not available at or near the project site.
California Water Code Section 13551	Requires the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such water is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare.	Recycled water is not available at or near the project site. Water will be supplied by the IWVWD. The project owners will be offsetting their water use by implementing a program of water conservation measure within the Indian Valley Wells Valley to completely offset their water needs, see **SOIL&WATER-3.**
Recycling Act of 1991 (Water Code 13575 et. seq)	States that retail water suppliers, recycled water producers, and wholesalers should promote the substitution of recycled water for potable and imported water in order to maximize the appropriate cost-effective use of recycled water.	Recycled water is not available at or near the project site.

LORS		Compliance
SWRCB Water Quality Order 99- 08	The SWRCB regulates storm water discharges associated with construction projects affecting areas greater than or equal to 1 acre to protect state waters. The General Construction Permit requires the development and implementation of a SWPPP that specifies BMPs that will reduce or prevent construction pollutants from leaving the site in stormwater runoff and will also minimize erosion associated with the construction phase.	The applicant will develop, comply and monitor compliance of a construction SWPPP, see **SOIL&WATER-6.**
SWRCB Water Quality Order 97-03	The General Industrial Permit requires the implementation of management measures that will protect water quality. In addition, the discharger must develop and implement a SWPPP and a monitoring plan. Through the SWPPP, sources of pollutants are to be identified and the means to manage the sources to reduce stormwater pollution described. The monitoring plan requires sampling of stormwater discharges during the wet season and visual inspections during the dry season.	The applicant will develop, comply and monitor compliance of an operation SWPPP, see **SOIL&WATER-6.**
Public Resources Code Section 25300 et seq.	Consistent with SWRCB Policy 75-58 and the Warren-Alquist Act, the CEC adopted a policy stating it will approve the use of "fresh inland" water for cooling purposes by power plants only where alternative water supply sources and alternative cooling technologies are shown to be "environmentally undesirable" or "economically unsound."	The Project will use dry-cooling methods and does not propose to use site groundwater for power plant cooling. Water needs for the Project, including mirror washing, potable needs, etc., will be met by supplied water from the IWVWD.
California Code of Regulations, Title 23 Division 3, Chapter 15	This Chapter requires the Regional Board to issue Waste Discharge Requirements specifying conditions for protection of water quality and is applicable to the LTU.	In-lieu permit WDRs through the CEC for the Lahontan RWQCB are required for the LTU that will be used to treat (through bioremediation) HTF-impacted soil, see **SOIL&WATER-6.**
California Water Code Section 13260	Requires filing with the appropriate Regional Board a report of waste discharge that could affect the water quality of the state, unless the requirement is waived pursuant to Water Code section 13269.	As stated above, in-lieu permit WDRs from the Lahontan RWQCB are required for the LTU that will be used to treat (through bioremediation) HTF-impacted soil, see **SOIL&WATER-6.**

LORS		Compliance
California Safe Drinking **Water and Toxic Enforcement Act**	The California Health & Safety Code Section 25249.5 et seq. prohibits actions contaminating drinking water with chemicals known to cause cancer or possessing reproductive toxicity. The RWQCB administers the requirements of the Act.	Groundwater is over 400 feet below the site and is unlikely to have a potential for contamination from activates at the site. In-lieu permit WDRs from the Lahontan RWQCB are required for the LTU, see **SOIL&WATER-6.**
Local		
Kern County Ordinance **Code, Title 4, Chapter 14.08 – Water Supply Systems**	Regulates permitting, sitting, construction and destruction of groundwater wells.	An old well was located on the project site. The project owner will be required to either convert the well to a monitoring well or to abandon the well in accordance with this LORS and **SOIL&WATER-13**.
Kern County Environmental Health Services Department, Chapter II, Section 602, Sewage Disposal by Individual Soil Absorption Systems	Regulates construction of on-site sewage disposal systems.	The project owner will have a septic sewer system on site and is required to conform to this LORS, see **SOIL&WATER-7.**
Kern County Uniform **Plumbing Code, Chapter 17**	Regulates installation and requires inspection for locating disposal/leach fields and seepage pits.	Same as above.
Kern County Division Four, Standards for Drainage	Provides standards for drainage of waters generated by storms, springs, or other sources that should be mitigated so as to provide reasonable levels of protection for life and property, and the maintenance of necessary access to property or passage of the traveling public on the public highways,.	The project owner is required to comply with this LORS, see **SOIL&WATER- 8, 10, 11 and 12.**
Kern County Code of Building Regulations **Chapter 17.48 Floodplain Management**	Regulates development of projects in special flood hazard areas. These regulations are designed to comply with the National Flood Insurance Program regulations.	The project owner is required to comply with this LORS, see **SOIL&WATER-9.**

PROJECT COMPLIANCE WITH STATE WATER POLICY

The Energy Commission has five authoritative sources for statements of policy relating to water use in California applicable to power plants. They are the California Constitution, the Warren-Alquist Act, the Commission's restatement of the state's water policy in the 2003 Integrated Energy Policy Report ("IEPR"), the State Water Resources Control Board ("SWRCB" or "Board") resolutions (in particular Resolutions 75-58 and 88-63), and the Genesis Solar Project (09-AFC-08) Committee's water-issues order as guidance for interpreting all of the above.

California Constitution

California's interest in conserving water is so important to our thirsty state that in 1928, the common law doctrine of reasonable use became part of the state Constitution. Article X, section 2 calls for water to be put to beneficial use, and that "waste or unreasonable use or unreasonable *method of use* be prevented." (Cal. Const., art. X, § 2; emphasis added.) The article also limits water rights to reasonable use, including reasonable methods of use. (*Ibid*.) Even earlier in the 20th Century, a state Supreme Court case firmly established that groundwater is subject to reasonable use. (*Katz v. Walkinshaw* (1903) 141 Cal. 116.) Thus, as modern technology has made dry-cooling of power plants feasible, the Commission may regard wet-cooling as an unreasonable method of use of surface or groundwater, and even as a wasteful use of the state's most precious resource.

Warren-Alquist Act

Section 25008 of the Commission's enabling statutes echoes the Constitutional concern, by promoting "all feasible means" of water conservation and "all feasible uses" of alternative water supply sources. (Pub. Resources Code § 25008.)

Integrated Energy Policy Report

In the 2003 Integrated Energy Policy Report ("IEPR" or "Report"), the Commission reiterated certain principles from SWRCB's Resolution 75-58, discussed below, and clarified how they would be used to discourage use of fresh water for cooling power plants under the Commission's jurisdiction. The Report states that the Commission will approve the use of fresh water for cooling purposes only where alternative water supply sources or alternative cooling technologies are shown to be "'environmentally undesirable'" or "'economically unsound.'" (IEPR (2003), p. 41.) In the Report, the Commission interpreted "environmentally undesirable" as equivalent to a "significant adverse environmental impact" under CEQA, and "economically unsound" as meaning "economically or otherwise infeasible," also under CEQA. (IEPR, p. 41.) CEQA and the Commission's siting regulations define feasible as "capable of being accomplished in a successful manner within a reasonable amount of time," taking into account economic and other factors. (Cal. Code Regs., tit. 14, § 15364; tit. 20, § 1702, subd. (f).) At the time of publication in 2003, dry cooling was already feasible for three projects—two in operation and one just permitted. (IEPR, p. 39.)

The Report also notes California's exploding population, estimated to reach more than 47 million by 2020, a population that will continue to use "increasing quantities of fresh water at rates that cannot be sustained." (IEPR, p. 39.)

State Water Resources Control Board Resolutions

The SWRCB not only considers quantity of water in its resolutions, but also the quality of water. In 1975, the Board determined that water with total dissolved solids ("TDS") of 1,000 mg/l or less should be considered fresh water (Resolution 75-58.). One express purpose of that Resolution was to "keep the consumptive use of fresh water for powerplant cooling to that *minimally essential*" for the welfare of the state (*Ibid*; emphasis added.). In 1988, the Board determined that water with TDS of 3,000 mg/l or less should be protected for and considered as water for municipal or domestic use. (Resolution 88-63.)

Order from the Genesis Solar Power Project Committee

The Genesis Solar Power Project Committee grappled with all these sources of policy to arrive at a simple yet flexible determination for water use by power plants under Commission jurisdiction. The Order states:

> The Committee reads [the policies] as requiring projects seeking to use groundwater for power plant cooling to use the least amount of the worst available water, considering all applicable technical, legal, economic, and environmental factors. (Genesis Solar Energy Power Project Committee, Decision and Scoping Order, Feb. 2, 2010.)

As mentioned above, staff carefully considers all relevant factors when conducting analysis and arriving at recommendations for the Commission. Thus, staff must determine what is the least but nevertheless feasible amount of water available for use, and also the worst, feasible available water that applicant could use for particular purposes on a project. Specifically, in order to conform to decision 88-63, projects should avoid using groundwater when at all feasible.

In several cases the Commission has accepted offset programs that conserve water in the region as means of accepting compliance with the water policies. Staff takes this to mean that such offset programs are an acceptable method to ensure compliance for current projects.

Discussion

The applicant for the Ridgecrest Solar Power Project ("Ridgecrest") proposes a dry-cooled facility that would use 150 acre feet a year (afy) of groundwater delivered by the Indian Wells Valley Water District. Groundwater is the only available source of water. The water would be used for various purposes, including domestic use by workers, dust suppression, and mirror washing. Water is the only feasible means of cleaning the mirrors, which must be clean to maintain efficiency of output by parabolic trough solar plants. Process makeup water would be recycled, for an estimated savings of about 38 afy. Overall use of the water is efficient for this technology, requiring 60 afy per 100 MW of capacity, or 0.30 acre feet per gigawatt-hour generated.

Staff concludes that the Ridgecrest Solar Power Project complies with the state's water policies to feasibly use the least amount of the lowest-quality water available. For staff's complete analysis of related water issues for the Ridgecrest project, please see section C.9.4 of this Staff Assessment.

The administering agencies for the State LORS are the Energy Commission, the SWRCB, and the Lahontan RWQCB. The Project would comply with the applicable State LORS related to water use and quality during construction and operation.

C.9.12 NOTEWORTHY PUBLIC BENEFITS

No noteworthy public benefits of the proposed project were identified associated with soil and water resources.

C.9.13 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

This section presents the mitigation monitoring, compliance and reporting measures for Soil and Water Resources recommended by Energy Commission staff. For a summary of all proposed Project impacts and their respective mitigation measures, please see the Impact Summary Tables provided at the end of the Executive Summary.

DRAINAGE EROSION AND SEDIMENTATION CONTROL PLAN

SOIL&WATER-1 Prior to site mobilization, the Project owner shall obtain both the BLM's Authorized Officer (AO) and CPM approval of the Drainage Erosion and Sedimentation Control Plan (DESCP) for managing stormwater during Project construction and operations as normally administered by the County of Kern. The DESCP must ensure proper protection of water quality and soil resources, demonstrate no increase in off-site flooding potential, include provisions for sediment and stormwater retention from both the power block, solar fields and transmission right-of-way to meet Kern County requirements, address exposed soil treatments in the solar fields for both road and non-road surfaces, and identify all monitoring and maintenance activities. The plan must also cover all linear project features such as offsite transmission mains. The DESCP shall contain, at minimum, the elements presented below that outline site management activities and erosion and sediment-control BMPs to be implemented during site mobilization, excavation, construction, and post construction (operating) activities.

A. Vicinity Map – A map(s), at a minimum scale 1 inch=100 feet, shall be provided indicating the location of all Project elements (construction sites, laydown area, pipelines) with depictions of all significant geographic features including swales, storm drains, and sensitive areas.

B. Site Delineation – All areas subject to soil disturbance for the proposed Project (Project phases, laydown area, all linear facilities, landscaping areas, and any other Project elements) shall be delineated showing boundary lines of all construction areas and the location of all existing and proposed structures, pipelines, roads, and drainage facilities.

C. Watercourses and Critical Areas – The DESCP shall show the location of all nearby watercourses including swales, storm drains, and drainage ditches. It shall indicate the proximity of those features to the proposed

Project construction, laydown, and landscape areas and all transmission and pipeline construction corridors.

D. Drainage Map – The DESCP shall provide a topographic site map(s), at a minimum scale of 1 inch=100 feet, showing existing, interim, and proposed drainage swales and drainage systems and drainage-area boundaries. On the map, spot elevations are required where relatively flat conditions exist. The spot elevations and contours shall be extended off site for a minimum distance of 100 feet.

E. Drainage of Project Site Narrative – The DESCP shall include a narrative of the drainage measures necessary to protect the site and potentially affected soil and water resources within the drainage downstream of the site. The narrative shall include the summary pages from the hydraulic analysis prepared by a professional engineer and erosion control specialist. The narrative shall state the watershed size(s) in acres that was used in the calculation of drainage features.

F. Clearing and Grading Plans – The DESCP shall provide a delineation of all areas to be cleared of vegetation and areas to be preserved. The plan shall provide elevations, slopes, locations, and extent of all proposed grading as shown by contours, cross sections, or other means. The locations of any disposal areas, fills, or other special features shall also be shown. Existing and proposed topography shall be illustrated by tying in proposed contours with existing topography.

G. Clearing and Grading Narrative – The DESCP shall include a table with the quantities of material excavated or filled for the site and all Project elements (Project site, laydown area, transmission and pipeline corridors, roadways, and bridges) whether such excavation or fill is temporary or permanent, and the amount of such material to be imported or exported.

H. Soil Wind and Water Erosion Control - The plan shall address exposed soil treatments to be used during construction and operation of the proposed Project for both road and non-road surfaces including specifically identifying all chemical based dust palliatives, soil bonding, and weighting agents appropriate for use at the proposed Project site that would not cause adverse effects to vegetation. BMPs shall include measures designed to prevent wind and water erosion including application of chemical dust palliatives after rough grading to limit water use. All dust palliatives, soil binders, and weighting agents shall be approved by both the AO and CPM prior to use.

I. Best Management Practices Plan – The DESCP shall identify on the topographic site map(s) the location of the site specific BMPs to be employed during each phase of construction (initial grading, Project element excavation and construction, and final grading/stabilization).

J. **Best Management Practices Narrative –** The DESCP shall show the location (as identified in (i) above), timing, and maintenance schedule of all erosion- and sediment-control BMPs to be used prior to initial grading, during all Project element (site, pipelines) excavations and construction, final grading/stabilization, and operation. Separate BMP implementation schedules shall be provided for each Project element for each phase of construction. The maintenance schedule shall include post-construction maintenance of structural-control BMPs, or a statement provided about when such information would be available.

K. **Project Schedule –** The DESCP shall identify on the topographic site map the location of the site-specific BMPs to be employed during each phase of construction (initial grading, Project element construction, and final grading/stabilization). Separate BMP implementation schedules shall be provided for each Project element for each phase of construction.

L. **Erosion Control Drawings –** The erosion-control drawings and narrative shall be designed, stamped and sealed by a professional engineer or erosion control specialist.

M. **Agency Comments –** The DESCP shall include copies of recommendations, conditions, and provisions from the County of Kern, California Department of Fish and Game (CDFG), and Lahontan RWQCB.

N. **Monitoring Plan:** Monitoring activities shall include routine measurement of the volume of accumulated sediment in the onsite drainage ditches, and storm water diversions. The monitoring plan shall be part of the Channel Monitoring and Maintenance Plan, **SOIL&WATER-12.**

Verification: No later than 90 days prior to start of site mobilization, the Project owner shall submit a copy of the final DESCP to the County of Kern, the Lahontan RWQCB, and both the AO and CPM for review and comment. No later than 60 days prior to start of site mobilization, the Project owner shall submit the DESCP with the County's and Lahontan RWQCB's comments to the both the AO and CPM for review and approval. Both the AO and CPM shall consider comments by the county and Lahontan RWQCB before approval of the DESCP.

The DESCP shall be consistent with the grading and drainage plan as required by Condition of Certification **CIVIL-1**, and relevant portions of the DESCP shall clearly show approval by the chief building official. The DESCP shall be a separate plan from the SWPPP developed in conjunction with any NPDES permit for Construction Activity. The Project owner shall provide in the monthly compliance report with a narrative on the effectiveness of the drainage, erosion, and sediment-control measures and the results of monitoring and maintenance activities. Once operational, the Project owner shall

update and maintain the DESCP for the life of the Project and shall provide in the annual compliance report information on the results of monitoring and maintenance activities.

WATER SUPPLY - CONSTRUCTION AND OPERATION

SOIL&WATER-2 The Project's owner proposes to obtain a water supply from the IWVWD for both construction and operation activities. They also will be providing a water conservation offset program for all their water usage (**SOIL&WATER-3**). As part of that program, they may opt to obtaining construction water from the LADWP Los Angeles Aqueduct. The Project owner shall provide both the AO and CPM two copies of an executed Water Purchase Agreement(s) (Agreement) between the project Owner and water supplier(s). The applicant shall do one of the following:

1. Obtain a long term Agreement with IWVWD through the life of the project covering both the construction and operations water supply; or

2. Obtain a short term Agreement with LADWP for construction water for the construction period of 28 months and a long term Agreement with IWVWD for operations water supply for 30 years.

The agreement shall specify all terms, conditions and costs for the delivery and use of the water supply at the project site.

Verification: No later than thirty (30) days prior to start of construction, the Project's owner shall submit two (2) copies of the executed agreement(s) for the water supply(s) for construction and operation.

PREPARE AND IMPLEMENT A WATER CONSERVATION OFFSET PROGRAM

SOIL&WATER-3 Sixty (60) days prior to start of construction, the project Owner shall provide a Water Conservation Offset Plan (WCOP) for review and comment by the both the AO and CPM. The Final WCOP shall be approved by the both the AO and CPM prior to the start of any site mobilization activities, and remain in effect for the life of the project. The Final WCOP shall include the following:

A. The plan shall follow the recommendations in the Proposed Plan for Offsetting Construction and Operational Water Supply in **SOIL AND WATER APPENDIX B**.

B. The plan shall contain a monitoring program. The monitoring plan shall monitor the effectiveness of the program on a monthly basis, summarized annually and included with the annual compliance report.

C. A tabulation of conservation measures including the amount of water to be conserved through each measure along with how they will be implemented and methodology and schedule for implementation.

D. The WCOP shall contain a contingency to assure a 100% offset of the Project's construction and operation water use during the life of the project.

E. A written and approved agreement between the Project owners and the WCOP primary participants agreeing to the plan including its implementation schedule and the plan monitoring.

F. Demonstration in the water conservation accounting that RSPP shall not be credited with other independent water conservation activities occurring within IWVWD's service area and IWVGB for which the WCOP has no effect.

G. Methodology for annual monitoring, reporting, and independent confirmation of the results of the WCOP demonstrating actual water conservation equivalent to RSPP's proposed annual water use of up to 1,470 af for the 28-month construction period and 150 afy during RSPP operation. The water conservation offset shall be demonstrated as an annual average over a running 3 years for the life of the project.

H. Demonstration that the WCOP meets the requirements of the both the AO and CPM

Verification: No later than 60 days prior to the start of construction, the Project owner shall submit the WCOP to both the AO and CPM for review, comment, and approval.

A. No later than 30 days prior to the start of construction the Project owner shall have an executed WCOP agreement with the IWVWD and any private participants outside of IWVWD. The WCOP agreement(s) are to be provided to the AO and CPM for review.

B. The WOCP shall be in full implementation before the use by the project of any water for construction or operation. The Project owner shall provide evidence of project implementation to the AO and CPM before the start of construction.

C. The Project owner shall submit its annual accounting/monitoring of the WCOP identifying the conservation measures implemented, demonstrating the actual conservation of groundwater from the IWVGB equivalent to RSPP's annual water use and include the report in the annual compliance report.

CONSTRUCTION AND OPERATION WATER USE

SOIL&WATER-4 The Project owner proposes to use groundwater (supplied by IWVWD) for water supply during construction and during operation. The proposed Project's use of groundwater in the IWVGB during construction shall not exceed 1,470 af during the 28 months of construction and 150 afy during operation.

Prior to the use of water for construction, the Project owner shall install and maintain metering devices as part of the water supply and distribution system

to document Project water use and to monitor and record in gallons per day the total volume(s) of water supplied to the Project from this water source. The metering devices shall be operational for the life of the Project.

Verification: At least thirty (30) days prior to the start of construction of the proposed Project, the Project owner shall submit to both the AO and CPM a copy of evidence that metering devices have been installed and are operational.

Beginning six (6) months after the start of construction, the Project owner shall prepare a semi-annual summary of amount of water used for construction purposes. The summary shall include the monthly range and monthly average of daily water usage in gallons per day.

The Project owner shall prepare an annual summary, which will include daily usage, monthly range and monthly average of daily water usage in gallons per day, and total water used on a monthly and annual basis in acre-feet. For years subsequent to the initial year of operation, the annual summary will also include the yearly range and yearly average water use by source. For calculating the total water use, the term "year" will correspond to the date established for the annual compliance report submittal.

DECOMMISSIONING PLAN

SOIL&WATER–5 The project owner shall identify likely decommissioning scenarios and develop specific decommissioning plans for each scenario that will identify actions to be taken to avoid or mitigate long-term impacts related to water and wind erosion after decommissioning. Actions may include such measures as a decommissioning SWPPP, revegetation and restoration of disturbed areas, post-decommissioning maintenance, collection and disposal of project materials and chemicals, and access restrictions.

Verification: The project owner shall submit decommissioning plans to the AO and CPM for review and approval 60 days after project certification. The project owner shall amend these documents as necessary, with approval from the AO and CPM, should the decommissioning scenario change in the future.

WASTE DISCHARGE REQUIREMENTS

SOIL&WATER-6 Conditions to require implementation of waste discharge requirements for the General Construction SWPPP, General Industrial Stormwater Permit during operation, and LTU is currently in development and will be included in the SAE/FEIS.

Verification: The Project owner shall do all of the following: Requirements are in development and will be included in the SAE/FEIS.

SEPTIC SYSTEM AND LEACH FIELD REQUIREMENTS

SOIL&WATER-7 The project owner shall comply with the requirements of the Kern County Ordinance Code, Title 14, Chapter 14.12 and the Kern County Title 17 Chapter 17.20 – Uniform Plumbing Code regarding sanitary waste disposal facilities such as septic systems and leach fields. The septic system and leach fields shall be designed, operated, and maintained in a manner that ensures no deleterious impact to groundwater or surface water. Compliance

shall include an engineering report on the septic system and leach field design, operation, maintenance, and loading impact to groundwater.

Verification: The project owner shall submit all necessary information and the appropriate fee to the County of Kern and the Lahontan RWQCB to ensure that the project has complied with county and state sanitary waste disposal facilities requirements. Written assessments prepared by the Kern County and the Lahontan RWQCB regarding the project's compliance with these requirements must be submitted to the AO and CPM for review and approval 30-days prior to the start of power plant operation.

REVISED PROJECT DRAINAGE REPORT AND PLANS

SOIL&WATER-8 The Project owner shall provide a revised Drainage Report which includes the following additional information:

A. Revised CN values for existing and proposed conditions that are consistent with available soil mapping and the Kern County Hydrology Manual.

B. A hydrologic analysis that supports a drainage design resulting in no more than a 5% increase in the post-development discharges at any of the designated outlet locations defined in the current Drainage Report (SM 2010a). Peak discharges must be based on curve number values consistent with those presented in the Kern County Hydrology Manual for the observed site conditions.

C. Detailed scour calculations to justify toe-down depths for all spillways, berms, drop structures, slope protection, and any other features where scour is an issue.

D. Revised hydraulic analysis for the fully lined east channel option accounting for supercritical flow and hydraulic jump conditions.

E. Revised onsite hydrology map showing peak discharge values at all locations where the onsite drainage system discharges directly offsite such as the outlets into El Paso Wash.

F. Report figure showing the revised El Paso Wash floodplain superimposed on the proposed site grading plan.

G. Specific analysis and discussion addressing the discharge of flows at the terminal end of the eastern collector channel and the methods for erosion control.

H. Specific analysis and discussion of the methods to be employed to prevent existing flows along the southwest right-of-way of Route 385 from entering the eastern collector channel and entering North Ridgecrest Wash upstream of the culvert crossing at Route 385.

I. Analysis and discussion of flows along the proposed diversion berms on the southern solar field demonstrating that flows are non-erosive or providing for the appropriate erosion protection. This task may require mapping of the floodplain along portions of the berm.

J. Digital copies of all hydrologic and hydraulic analysis.

The Project owner shall also provide the 30% Grading and Drainage Plans which include the design based on information provided in the revised Drainage Report outlined above.

Verification: The Project owner shall submit a Revised Project Drainage Report with the 30% Grading and Drainage Plans to both the AO and CPM for their review and comments 30 days after project certification. The Project owner shall address comments provided by both the AO and CPM until approval of the report is issued. All comments and concepts presented in the approved Revised Project Drainage Report with the 30% Grading and Drainage Plans will be included in the final Grading and Drainage Plans. The Revised Project Drainage Report and 30% Grading and Drainage Plans shall be approved by both the AO and CPM.

CONDITIONAL LETTER OF MAP REVISION

SOIL&WATER–9 In accordance with Kern County's Floodplain Management Ordinance and 44 CFR 65.12, the project owner shall prepare all necessary engineering plans and documents to support a Conditional Letter of Map Revision (CLOMR) application submittal to FEMA. The CLOMR shall cover both El Paso Wash and North Ridgecrest Wash within the limits of the project and far enough beyond to tie into the effective FIS per FEMA requirements. The project shall not commence construction in the SFHA until Kern County receives from FEMA an approved CLOMR. Following construction, the Project Owner shall prepare all necessary documents required for a final Letter of Map Revision (LOMR). The project owner shall use FEMA's Guidelines and Specifications for Mapping Partners for guidance. The project owner shall:

1. Prepare hydrologic analyses to estimate the 10-, 2-, 1-, and 0.2-% annual chance flood events for the El Paso watershed. The analyses shall be conducted using numerical models approved by FEMA;

2. Prepare preliminary (30%) design drawings for the channel, include typical channel cross section dimensions, typical details for all structural elements needed to protect the channel from erosion, and a grading plan for proposed conditions that ties into existing topography;

3. Conduct hydraulic analyses for existing and proposed conditions. Plot the water surface and energy grade line profile for the constructed channel. Tie the proposed conditions water surface elevation profile into the water surface profile from the existing hydraulic model upstream and downstream of the site;

4. Prepare flood hazard mapping for the existing and proposed conditions. Floodplain mapping shall tie-into the upstream and downstream special flood hazard mapping shown on the effective DFIRM;

5. Provide notification to all adjacent property owners, impacted by the proposed change to the SFHA;

6. Complete the necessary FEMA MT-2 application forms package and pay all applicable CLOMR review fees. The submittal shall be certified by a California-licensed professional engineer; and

7. Address all FEMA review comments as needed to receive an approved CLOMR.

Prior to mobilization, the Project Owner shall receive confirmation from Kern County that FEMA has issued a CLOMR for the RSPP. The Project Owner shall address all "conditions" in the CLOMR during project construction. No later than six months after the end of construction, the project owner, through a request from Kern County, must notify FEMA of the changes in accordance with 44 CFR 65.3.

The Project Owner shall submit the following technical or scientific data as part of a Letter of Map Revision (LOMR) request:

1. Conduct an As-Built survey of the completed construction;

2. Update the Proposed Conditions Model to reflect the As-Built Revised Conditions and delineate the resulting flood hazards;

3. Complete the necessary FEMA MT-2 application forms package and pay all applicable LOMR review fees. The submittal shall be certified by a California-licensed professional engineer;

4. Address all FEMA review comments as needed to receive approval of the LOMR; and

5. Notify the both the AO and CPM of the approved LOMR.

Verification: The project owner shall do all of the following:

1. Submit a copy of the draft application for a CLOMR, to include all backup calculations and the preliminary design drawings, to the both the AO and CPM 60 days prior to sending the request to FEMA.

2. No later than thirty (30) days after receiving notification from FEMA that all required CLOMR or LOMR documents have been received by FEMA, the Project Owner shall notify the both the AO and CPM that the project is currently being reviewed by FEMA. During the review process, the project owner shall submit all correspondence between FEMA and project owner's engineer representative responsible for addressing FEMA's comments.

3. Prior to construction activity within the effective SFHA the Project Owner shall provide a copy of the CLOMR to the both the AO and CPM for verification.

4. Following construction of the channel improvements, the Project Owner shall complete an As-built survey of the improvements, update the hydraulic model, and prepare a final submittal, to include forms and fees, for a FEMA LOMR request. The Project Owner shall submit a copy of the completed LOMR submittal to the both the AO and CPM and Kern County for review.

5. No later than thirty (30) days after receiving notification from FEMA that the LOMR has been issued to Kern County the project owner shall submit a copy of the LOMR to the both the AO and CPM for verification.

DRAINAGE CHANNEL AND BERM DESIGN

SOIL&WATER-10 All collector and conveyance channels shall be constructed consistent with Kern County Flood Control guidelines where applicable. Deviation from those guidelines should be documented in the Project drainage report along with justification. Grade control structures shall be utilized where needed in unlined channels to meet channel velocity and Froude number requirements. Channels shall be sized along discreet sections based on the results of the detailed hydrologic analysis as presented in the revised Project Drainage Report.

The eastern collector channel must be designed in a manner which minimizes channel depth and the length of the cut slopes on the eastern bank. This can be accomplished by fully lining the channel with concrete or gunnite. The channel lining on the eastern bank shall extend up the bank to the tie-in point with existing grade, and shall be constructed with a minimum 18” toe-down along the top edge. Break-away wildlife barrier fence is to be placed on the outside of the channel. The presence of this barrier will allow channel side slopes as steep as 1:1 given access ramps are provided for maintenance.

The site drainage design must ensure that the pre- and post-development discharges at the terminal end of the eastern collector channel are within 5% where flow is discharged back into North Ridgecrest Wash. Flows which previously were conveyed along the Route 395 right-of-way shall be conveyed directly to the downstream culvert crossing and not allowed to enter North Ridgecrest Wash. Flow dispersion and scour protection shall be provided at the downstream terminal end of the eastern collector channel to ensure a transition back to existing depth and velocity at that location.

All berms must be designed to prevent erosion along the toe and the incisement of a channel due to the concentration of flow along those structures. The design of the berms must be consistent with the hydraulic analysis presented in the Revised Drainage Report. As described in **SOIL&WATER-8.**

The proposed collector channel design must be fully documented in the revised Engineering Plans and must include the following information:

A. Accurate cut/fill lines demonstrating in plan view how the channel would tie into existing grade and the solar facility.

B. Channel cross-sections at 100ft intervals showing the engineered channel geometry, existing grade, proposed grade at the facility and how the channel would tie in on both banks.

C. Detailed channel profiles showing existing and finished grades at channel flow line and left and right banks. The 100-year water surface elevation shall be provided on all profiles.

D. Typical sections and design details for all discreet channel sections, berms, drop structures, channel confluences, flow inlets and outlets, flow dispersion structures and other relevant drainage features.

E. Grading detail for the proposed spillway structures which will convey flow into El Paso Wash.

F. Consistent nomenclature and stationing on all plans, sections, profiles and details.

Verification: The Project owner shall prepare preliminary, 30% channel design drawings and submit two (2) copies for both the AO and CPM review and comment. The preliminary design drawings shall be submitted at the same time as the **Revised Project Drainage Report** in **SOIL&WATER-8**. The Project owner shall update and modify the design as necessary to obtain both the AO and CPM approval.

CHANNEL EROSION PROTECTION

SOIL&WATER–11 Prior to construction, the Project owner must provide revised Engineering Plans which incorporate the items and information as listed below for the onsite collector and conveyance channels and berms.

A. Soil cement or concrete bank protection must be provided such that collector and conveyance channels are protected from bank erosion and lateral headcutting. The extents of the bank protection must be shown on the revised Engineering Plans. Typical sections for these channels must show the layout of the bank protection including thickness, width and toe-down location and depth consistent with the scour calculation provided in the revised Drainage Report.

B. Soil cement bank protection shall be provided on both channel banks wherever 10-year channel flow velocity exceeds 5 ft/s. It shall be provided on the outer channel bank wherever offsite topography indicates surface flow would enter the collector channels.

C. Other methods of channel stabilization, such as dumped riprap or gabions, will not be permitted. Bio-stabilization measures are not permitted.

D. Earthen berms used on the outside of collector channels to guide flow to discreet points of discharge into a channel shall not be utilized in lieu of soil cement or concrete bank protection on the outside bank of collector channels. Offsite flows shall discharge directly into collector channels.

E. If applicable, the plans shall include reference to regionally accepted specifications for soil cement production and construction. A copy of the specification must be submitted with the revised plans.

F. If applicable, a soils report indicating the suitability of the Project soils for use in the production of soil cement to the Project specifications shall be submitted with the revised Engineering Plans.

G. With the exception of the east channel on the north solar field which is to be fully lined, the bottom of engineered collector channels may be left earthen or fully lined at the discretion of the engineer. Fully lined channels will have higher allowable velocities and Froude numbers assuming hydraulic jumps are modeled and considered in the channel design.

H. Permanent erosion protection shall be provided at all locations where onsite flows discharge offsite either into existing channels or ground. This protection shall be designed to meet the specific conditions and 100-year peak discharge at each point of discharge.

Verification: The required information and criteria shall be incorporated into the Grading and Drainage Plans and with all subsequent submittals as required in **SOIL&WATER-8**. The Project owner shall update and modify the design as necessary to obtain both the AO and CPM approval.

CHANNEL MAINTENANCE PROGRAM

SOIL&WATER-12 The Project owner shall develop and implement a Channel Maintenance Program that provides long-term guidance to implement routine channel maintenance projects and comply with Conditions of Certification in a feasible and environmentally-sensitive manner. The Channel Maintenance Program will be a process and policy document prepared by the Project owner, reviewed by both the AO and CPM and the public entity. The Channel Maintenance Program shall be developed in consultation with the Maintenance District and the public entity and shall include the following:

A. Purpose and Objectives – establishes the main goals of the Program, of indefinite length, to maintain the diversion channel to meet its original design to provide flood protection, support RSPP mitigation, protect wildlife habitat and movement/ migration, and maintain groundwater recharge.

B. Application and Use - The channel maintenance work area is defined as the RSPP engineered channel, typically extending to the top of bank, include access roads, and any adjacent property that RSPP owns or holds

an easement for access and maintenance. The Program would include all channel maintenance as needed to protect the RSPP facilities and downstream property owners.

C. Channel Maintenance Activities

1. **Sediment Removal** - sediment is removed when it: (1) reduces the diversion channel effective flood capacity, to less than the design discharge, (2) prevents appurtenant hydraulic structures from functioning as intended, and (3) becomes a permanent, non-erodible barrier to instream flows.

2. **Vegetation Management** - manage vegetation in and adjacent to the diversion channel to maintain the biological functions and values proposed in the mitigation. Vegetation management shall include control of invasive or nonnative vegetation as prescribed in Condition of Certification **BIO-14**.

3. **Bank Protection and Grade Control Repairs** – Bank protection and grade control structure repairs involve any action by the Project owner to repair eroding banks, incising toes, scoured channel beds, as well as preventative erosion protection. The Project owner would implement instream repairs when the problem: (1) causes or could cause significant damage to RSPP; adjacent property, or the structural elements of the diversion channel; (2) is a public safety concern; (3) negatively affects groundwater recharge; or (4) negatively affects the mitigation vegetation, habitat, or species of concern.

4. **Routine Channel Maintenance** - trash removal and associated debris to maintain channel design capacity; repair and installation of fences, gates and signs; grading and other repairs to restore the original contour of access roads and levees (if applicable); and removal of flow obstructions at RSPP storm drain outfalls.

5. **Channel Maintenance Program –** Exclusions including: emergency repair and CIP.

D. Related Programmatic Documentation – both the AO and CPM will review and approve the Channel Maintenance Program programmatic documentation. Maintenance activities shall comply with the stream alteration agreement provisions and requirements for channel maintenance activities consistent with California's endangered species protection regulations and other applicable regulations.

E. Channel Maintenance Process Overview

1. **Program Development and Documentation** – This documentation provides the permitting requirements for channel maintenance work in accordance with the Conditions of Certification for individual routine maintenance of the engineered channel without having to perform separate CEQA/NEPA review or obtain permits.

2. **Maintenance Guidelines** - based on two concepts: (1) the maintenance standard and (2) the acceptable maintenance condition, and applies to sediment removal, vegetation management, trash and debris collection, blockage removal, fence repairs, and access road maintenance.

3. **Implementation** – Sets Maintenance Guidelines for vegetation and sediment management. RSPP's vegetation management activities are established in Condition of Certification **BIO-14**. Maintenance Guidelines for sediment removal provide information on the allowable depth of sediment for the engineered channel that would continue to provide design discharge protection.

4. **Reporting** – both the AO and CPM requires the following reports to be submitted each year as part of the Annual Compliance Report:

   a. Channel Maintenance Work Plan - Describes the planned "major" maintenance activities and extent of work to be accomplished; and

   b. Channel Maintenance Program Annual Report – Specifies which maintenance activities were completed during the year including type of work, location, and measure of the activity (e.g. cubic yards of sediment removed).

   c. A report describing "Lessons Learned" to evaluate the effectiveness of both resource protection and maintenance methods used throughout the year.

F. Resource Protection Policies - establishes policies to ensure that resources would be protected to the fullest extent feasible during routine channel maintenance activities. Policies would be developed to guide decision-making for channel maintenance activities. BMPs shall be developed to implement these policies.

Verification: The Project owner shall submit a Channel Maintenance Program to the AO and CPM for review and approval 30 days after project certification. The Project Owner shall provide written notification that they plan to adopt and implement the measures identified in the approved Channel Maintenance Program. The Project owner shall:

- Supervise the implementation of a Channel Maintenance Program in accordance with Conditions of Certification;
- Ensure the RSPP Construction and Operation Managers receive training on the Channel Maintenance Program;
- As part of the RSPP Annual Compliance Report to the both the AO and CPM , submit a Channel Maintenance Program Annual Report specifying which maintenance activities were completed during the year including type of work, location, and measure of the activity (e.g. cubic yards of sediment removed).

EXISTING WELL MAINTENANCE PROGRAM

SOIL&WATER-13 The Project owner shall construct a monitoring well in the existing well onsite or destroy the well. The Project owner shall ensure that the well is completed or destroyed in accordance with all applicable state and local water well construction permits and requirements, including the County of Kern County well construction/destruction requirements. Prior to initiation of well construction/destruction activities, the Project owner shall submit a well construction/destruction packet to the County of Kern, in accordance with the County of Kern Environmental Health requirements for construction/destruction of the existing well, containing all documentation, plans, and fees normally required for the county's well permit, with copies to both BLM's Authorized Officer and the CPM. The project shall not construct/destroy the well until the County of Kern provides a written concurrence that the proposed well construction/destruction would comply with all applicable county requirements and both BLM's Authorized Officer and the CPM provides approval to construct/destroy the well.

Post-Well Installation. The Project owner shall provide documentation to both BLM's Authorized Officer and the CPM that the well has been properly completed or destroyed. In accordance with California's Water Code section 13754, the driller of the well shall submit to the DWR a Well Completion/Destruction Report for the well. The Project owner shall ensure the Well Completion/Destruction reports are submitted. The Project owner shall ensure compliance with all county water well standards and requirements for the life of the wells and shall provide BLM's Authorized Officer and the CPM with two (2) copies each of all monitoring or other reports required for compliance with the County of Kern water well standards and operation requirements, as well as any changes made to the operation of the well.

Verification: The project owner shall do all of the following:

1. No later than sixty (60) days prior to the start of Project construction activities, the project owner shall submit to both BLM's Authorized Officer and the CPM a copy of the water well construction/destruction packet submitted to the County of Kern.

2. No later than thirty (30) days prior to the start of Project construction activities, the project owner shall submit a copy of written concurrence received from the County of Kern that the proposed well construction/destruction activities comply with all county well requirements and meet the requirements established by the county's water well permit program.

3. No later than sixty (60) days after installation/destruction of the existing well at the project site, the Project owner shall ensure that the well driller submits a Well Completion/Destruction Report to the DWR with a copy provided to both BLM's Authorized Officer and the CPM. The project owner shall submit to the CPM together with the Well Completion/Destruction Report a copy of well drilling logs, water quality analyses, and any inspection reports.

4. During well construction/destruction and for the operational life of the well, the project owner shall submit two (2) copies each to BLM's Authorized Officer and the CPM of any proposed well construction or operation permit changes within ten (10) days of submittal to or receipt from the County of Kern.

5. No later than fifteen (15) days after completion of the onsite monitoring well, the project owner shall submit documentation to BLM's Authorized Officer, the CPM, and the Lahontan RWQCB that well drilling activities were conducted in compliance with Title 23, California Code of Regulations, Chapter 15, Discharges of Hazardous Wastes to Land, (23 CCR, sections 2510 et seq.) requirements and that any onsite drilling sumps used for project drilling activities were removed in compliance with 23 CCR section 2511(c).

C.9.14 CONCLUSIONS

With the information provided to date, California Energy Commission staff referred to as staff) have determined that construction, operation, and decommissioning of the proposed Ridgecrest Solar Power Project (RSPP) could potentially impact soil and water resources. Where these potential impacts have been identified, Commission staff, under CEQA and Commission regulations, has proposed mitigation measures to reduce identified impacts to levels that are less than significant. The project's contribution to overdraft is cumulatively considerable but the proposed mitigation will reduce these impacts to less than significant. The mitigation measures, as well as specifications for laws, ordinances, regulations and standards (LORS) conformance, are included herein as Conditions of Certification. The Project would conform to all applicable LORS. Commission staff's conclusions based on analysis of the information submitted to-date are as follows:

1. The proposed Project would be located on an alluvial fan where flash flooding and mass erosion could impact the Project. Project-related changes to the alluvial fan hydrology could result in impacts to adjacent land users. A Draft Drainage, Erosion, and Sedimentation Control Plan (DESCP) has been developed to mitigate the potential storm water and sediment project-related impacts. However, the calculations and assumptions used to evaluate potential storm water and sedimentation impacts are imprecise and have limitations and uncertainties associated with them. Given the uncertainty associated with the calculations, the magnitude of potential impacts that could occur cannot be determined precisely. Based on these factors, the proposed Project could result in impacts that would be significant with respect to CEQA significance criteria specified herein and NEPA significance criteria specified in 40 CFR 1508.27. Therefore, Conditions of Certification have been developed that define the requirements for reports, plans, monitoring, and inspection, as well as standards and procedures for implementing Best Management Practices during construction and operations.

2. The proposed Project would be located in an area with no designated entity responsible for maintaining integrity of the rerouted channels. Commission staff believes the Applicant should be required to establish a Channel Maintenance Program as indicated in Condition of Certification **SOIL&WATER-12**.

3. The project applicant proposes to use groundwater supplied by the Indian Wells Valley Water District (IWVWD). Water from IWVWD wells will be piped to an existing tank and transmitted via pipeline that will be built by the RSPP to the Project site. The IWVWD and the Project owner signed a Water Supply Agreement on October 29, 2009. IWVWD also issued a Will Serve Letter for water service. Water will be supplied to the project site from the Ridgecrest Heights B Zone water storage tank. A 16 inch diameter pipeline from the water storage tank shall be constructed in China Lake Boulevard southerly to Brown Road then westerly to the Project site. The Project owner is responsible for the design, permitting and construction of all necessary facilities. IWVWD is in the process of annexing the Project site.

This analysis indicates that the IWVGB is already significantly overdrafted and the Projects pumping will exacerbate the overdraft condition. The Applicant has proposed a mitigation to offset the proposed construction and operation water demands. Condition of Certification **SOIL&WATER-2** and **3**, is expected to reduce the impact of the Project's water demand on the IWVGB to below the level of significance.

C.9.15 REFERENCES

California Department of Water Resources (CDWR), 1986, Bulletin 113-4: Crop Water Use in California, April.

California Department of Water Resources (CDWR), 1998. California Water Plan Update Bulletin 160-98, November 1998.

California Department of Water Resources (CDWR), 2004, Indian Wells Valley Groundwater Basin, California's Groundwater Bulletin 118, 1975 (updated in February 2004).

California Department of Water Resources (CDWR), 2009. Groundwater Level Data and Water Quality Data. Accessed at http://well.water.ca.gov.

Federal Emergency Management Agency (FEMA), 2008, Flood Insurance Rate Map, Kern County, California.

Groundwater Management Group, 2008, AB303 Final Report – Installation and Implementation of a Comprehensive Groundwater Monitoring Program for the Indian Wells Valley, California, March. Accessed at http://www.iwvgroundwater.org/.

Indian Wells Valley Water District (IWVWD), 2008, Annual Water Quality Report - Water Testing Performed in 2008, PWS ID# 1510017.

Kunkel, Fred, and Chase, G.H., 1969, Geology and Ground Water in Indian Wells Valley, California, U.S. Geological Survey, Open-File Report 69-329, January 23, 1969.

RWQCB, 2005. Water Quality Control Plan for the Lahontan Region, North and South Basin: California Regional Quality Control Board, Lahontan Region, Victorville, California.

SM 2009a - Solar Millennium LLC/J. Eichhammer (tn 53100). AFC for Ridgecrest Solar Power Project, dated 8/31/2009. Submitted to CEC/Docket Unit on 9/1/2009.

SM 2009b - Solar Millennium LLC/N. Tenenbaum (tn 53135). Cover Letter for Submitting Air Quality Modeling Files, dated 9/1/2009. Submitted to CEC/Docket Unit on 9/3/2009.

SM 2009c - Solar Millennium/N. Tenenbaum (tn 53251). Letter Regarding Confidential Cluster Phase I Interconnection Study Title, dated 9/16/2009. Submitted to CEC/Docket Unit on 9/16/2009.

SM 2009d - Solar Millennium (tn 54005). Application for Certification Volume 3 Supplement, dated 10/26/2009. Submitted to CEC/Docket Unit on 10/30/2009.

SM 2010a - Solar Millennium/A. Harron (tn 55004). Applicant's Responses to Energy Commission Data Request Set 1 & 2, dated 1/25/2010. Submitted to CEC/Docket Unit on 1/25/2010.

ACRONYMS

af	acre-feet
AF	Acre-feet
AFC	Application for Certification
afy	acre-feet per year
AFY	Acre-Feet per Year
amsl	Above mean sea level
bgs	Below ground surface
BLM	United States Bureau of Land Management
BMPs	Best management practices
BP	Before Present
CEC	California Energy Commission
CEQA	California Environmental Quality Act
cfs	cubic feet per second
CIMIS	California Irrigation Management Information System
CWA	Clean Water Act
CVGWB	Chuckwalla Valley Groundwater Basin
DESCP	Drainage Erosion and Sediment Control Plan
DR	Data Request
CDWR	California Department of Water Resources
EPA	United States Environmental Protection Agency
FEMA	Federal Emergency Management Agency
ft	Feet
ft/s	feet per second
ft^2	square feet
ft^2/d	square feet per day
gpd	gallon per day

gpm	Gallons per minute
HTF	Heat Transfer Fluid
in	Inches
IWVGB	Indian Wells Valley Groundwater Basin
IWVWD	Indian Wells Valley Water District
LORS	Laws Ordinances, Regulations and Standards
Lahontan RWQCB	Lahontan Regional Water Control Board
LTU	Liquid Treatment Unit
mg/L	milligrams per liter
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resource Conservation Service
NWIS	National Water Information System
OW	Observation Well
RSPP	Ridgecrest Solar Power Project
RO	Reverse Osmosis
ROW	Right of Way
RPS	Renewable Portfolio Standard
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	California State Water Resources Control Board
t/ac/yr	tons per acre per year
TDS	Total Dissolved Solids
TW	Test Well
USBR	United States Bureau of Reclamation
USGS	United States Geological Survey

SOIL AND WATER
APPENDIX A

IWVWD WILL SERVE LETTER AND AGREEMENT

INDIAN WELLS VALLEY WATER DISTRICT

BOARD OF DIRECTORS

Leroy Corlett, President
Peter Brown, Vice President
Peggy Breeden
Donald J. Cortichiato
Harold W. Manning

Thomas F. Mulvihill
General Manager
Krieger & Stewart, Incorporated
Engineers
McMurtrey, Hartsock & Worth
Attorneys-at-Law

RECEIVED
10/5/09
RS

October 2, 2009

Solar Millennium, LLC
1625 Shattuck Avenue, Suite 270
Berkeley, CA 94709

ATTN: Josef Eichhammer, CEO

RE: Will Serve Letter for the Ridgecrest Solar Power Project

To Whom It May Concern:

The Indian Wells Valley Water District ("District") can provide potable water service, to the Ridgecrest Solar Power Project as described in and subject to that certain "Water Supply Agreement Between Indian Wells Valley Water District and Solar Millennium, LLC, dated October 2, 2009 ("Agreement"), subject to all District Ordinances, Rules and Policies, upon commencement of construction by Solar Millennium of the Project described in the Agreement and the deposit of applicable charges and fees for obtaining water service.

Pursuant to Section 2(h) of the Agreement, this offer of service shall be valid for a period of twelve (12) months following Solar Millennium's receipt of all necessary permits, consents, and approvals for the Project, including but not limited to, a right of way or lease with BLM, permit from CalTrans for the pipeline to cross Highway 395, and Certification and Verification of the Project by the California Energy Commission.

Sincerely,

Tom Mulvihill

Tom Mulvihill
General Manager

500 West Ridgecrest Boulevard - Mailing Address: P.O. Box 1329, Ridgecrest, California 93556-1329
(760) 375-5086 FAX (760) 375-3969
www.iwvwd.com E-mail: iwvwd@iwvwd.com

WATER SUPPLY AGREEMENT BETWEEN INDIAN WELLS VALLEY WATER DISTRICT AND SOLAR MILLENNIUM, LLC

THIS AGREEMENT is entered into as of the 2 day of October, 2009, by and between INDIAN WELLS VALLEY WATER DISTRICT, a California water district organized and existing under the provisions of Division 13 of the Water Code of the State of California ("District") and SOLAR MILLENNIUM, LLC, a California limited liability company ("Solar Millennium").

AGREEMENT:

1. General Provisions.

a. The District is authorized to operate, maintain, and repair the necessary works for the production, storage, transmission, and distribution of water ("District System").

b. Solar Millennium intends to develop a solar thermal power plant utilizing dry cooling technology with a capacity of 242 megawatts ("Project") on approximately 3,920 acres as shown on Exhibit "A" hereto ("Site"), subject to a right-of-way or lease with the United States Bureau of Land Management ("BLM");

c. The Project requires approximately 1,500-acre feet of water during construction of the Project, which is estimated to last approximately twenty-eight (28) months from the start of construction, which is estimated to begin in the fourth quarter of 2010 ("Project Construction Water"). The Project requires water, in an amount not to exceed 165 acre-feet per annum, for operations over a period of thirty (30) years as shown on Exhibit "B" ("Project Operations Water"). The maximum instantaneous water flow required for operations is estimated to be 310 GPM;

d. Solar Millennium desires to receive water from the District for the construction and operation phases of the Project, and District is willing to provide water subject to the terms and conditions set forth in this Agreement. Upon execution of this Agreement, the District will execute the Will Serve Letter attached as Exhibit "C" hereto. The District will cooperate with Solar Millennium in its efforts to obtain permits and approvals for the Project. Solar Millennium will cooperate with District in its annexation efforts related to the Project;

e. In order for District to serve the Project, Solar Millennium must construct a water main and other District-required facilities from the District's Ridgecrest Heights B Zone water storage tank to the Project Site ("Facilities"). All Facilities constructed by Solar Millennium from the Ridgecrest Heights B Zone water storage tank to and including the water meter ("Off-Site Facilities") shall be dedicated to and become the property of the District upon District's written acceptance of the Off-Site Facilities. All facilities within the boundaries of the Project shall be the property of Solar Millennium ("On-Site Facilities"); and

f. Solar Millennium shall be responsible for obtaining all necessary permits, consents, and approvals for the Project and adoption and approval of any and all required environmental documents for the Project.

2. Construction of Facilities.

In the event that Solar Millennium, in its sole and absolute discretion, proceeds to construct the Facilities, Solar Millennium shall comply with the following requirements:

a. Solar Millennium shall prepare, at its expense, detailed plans and specifications for the Facilities to be installed and shall submit the same to District for review and written approval.

b. Solar Millennium agrees to install approved Facilities in compliance with said plans and specifications prepared by Solar Millennium and approved in writing by District. In no event shall Solar Millennium install additional or different Facilities without first obtaining the written approval of District.

c. Solar Millennium agrees to construct and install all Off-Site Facilities to be dedicated to District to the alignment and grade set forth on the approved plans and specifications and in the manner designated and approved in writing by District's engineer. Said construction and installation work shall be done at a time and in a manner that will not interfere with the District's delivery of water to its customers.

d. Solar Millennium shall pay the entire cost of laying, constructing and installing the Facilities, including the costs of all labor and materials incurred or used in connection with the trenching, installing, backfilling, testing and disinfecting of the Facilities.

e. Solar Millennium shall pay District for all costs associated with engineering review and approval of the construction plans and specifications ("Plan Checking") and all costs associated with all inspections of Off-Site Facilities constructed by Solar Millennium ("Inspection"). Said Plan Checking and Inspection fees shall be paid at the times and in the amounts specified in the District's Water Sales and Service Policy Manual.

f. Solar Millennium shall pay all applicable District charges and fees specified in the District's Water Sales and Service Policy Manual, including but not limited to Construction Meter Charges, Rates and Provisions; Capital Facility Fee; and Service Installation Charges.

g. In the event Solar Millennium either elects to terminate this Agreement pursuant to Section 23(a) infra or does not pay the entire costs or fails to complete the construction of said Off-Site Facilities as provided in this Agreement, District may in its sole and absolute discretion, and upon thirty (30) days written notice to Solar Millennium, agree to accept ownership of the Off-Site Facilities "as is" and any Off-Site Easements[1] in existence at that time, in which case Solar Millennium shall transfer, assign, and dedicate, subject to District's written acceptance, any and all Off-Site Facilities and Off-Site Easements free and clear of all liens, claims and encumbrances. In the event District decides in its sole and absolute discretion to accept

[1] Off-Site Easement is defined in Section 3(b) infra.

ownership of the Off-Site Facilities and Off-Site Easements pursuant to this Section 2(g), this Agreement shall automatically terminate upon Solar Millennium's transfer, assignment, and dedication, and District's written acceptance of any and all Off-Site Facilities and Off-Site Easements to the District, and Solar Millennium shall have no further responsibility to complete construction of the Off-Site Facilities and the Warranty of Off-Site Facilities in Section 4 of this Agreement shall not apply.

h. Construction of the Facilities shall begin within twelve (12) months of Solar Millennium's receipt of all necessary permits, consents, and approvals for the Project, including but not limited to, a right of way or lease with BLM, permit from CalTrans for the pipeline to cross Highway 395, and Certification and Verification of the Project by the California Energy Commission.

i. The District shall at all times have access to inspect the construction of the Off-Site Facilities.

3. Dedication.

a. Solar Millennium agrees that, upon completion of construction and installation of said Off-Site Facilities and District's written acceptance thereof, which acceptance shall not be unreasonably withheld or delayed, Solar Millennium shall dedicate the Off-Site Facilities at no cost to the District free and clear of all liens, claims and encumbrances. District shall at all times be in sole and absolute control of the manner, method, and time of conveying and delivering water through District's Off-Site Facilities.

b. Prior to District's acceptance and Solar Millennium's dedication of the Off-Site Facilities, Solar Millennium agrees that it must acquire and dedicate, on behalf of the District, any and all easements required for the construction, operation, maintenance and repair of the Off-Site Facilities ("Off-Site Easements"). The configuration and dimensions of the Off-Site Easements and the form and substance of the Off-Site Easements will be determined solely by District and subject to District's written approval of the plans and specifications for the Facilities.

c. Solar Millennium shall cause to be issued, a standard CLTA policy of title insurance insuring District as owner of the Off-Site Easements, subject to those items shown as exceptions to a preliminary title report issued and delivered to District, unless District, within thirty (30) days after receipt of said preliminary title reports, indicates those items which it is not willing to accept, in which case Solar Millennium shall cause such items to be removed prior to the dedication of the Off-Site Easements to District.

4. **Warranty of Off-Site Facilities.**

a. Solar Millennium agrees to warrant to District said Off-Site Facilities that are constructed by Solar Millennium in good condition and repair continuously for a period of two (2) years from and after the completion of construction by Solar Millennium and District's written acceptance of said Off-Site Facilities and to pay all costs of such repairs and of any replacement of any part thereof required to keep said Off-Site Facilities in good operating condition during said two (2) year period.

b. Solar Millennium agrees that, in the event it fails, neglects or refuses to repair or replace promptly, upon demand by District, any part of said Off-Site Facilities during Solar Millennium's two (2) year warranty period pursuant to Section 4(a), District shall have the right, but shall not be required, to make any such repairs or replacements and Solar Millennium does hereby agree to repay District the cost of any such repairs or replacements made by District, with interest at 10% per annum from the date such cost is incurred to the date of repayment.

5. **Reimbursement.**

a. Solar Millennium shall submit to District separate detailed bid results/sheets ("Bid Sheets") for construction of the Off-Site Facilities; one Bid Sheet based on the District-specified minimum diameter water main and up to two (2) additional Bid Sheets based on larger diameter water mains as selected by the District. District shall advise Solar Millennium within forty-five (45) days of receipt of said Bid Sheets of District's decision to have the Off-Site Facilities constructed using a larger diameter water main. At District's request, Solar Millennium shall construct the Off-Site Facilities using the larger diameter water main selected by District. District agrees to reimburse Solar Millennium for the difference in total construction costs between construction of the Off-Site Facilities using the District-specified minimum diameter water main and construction of the Off-Site Facilities using the larger diameter water main selected by District, as determined by the Bid Sheets submitted by Solar Millennium to District pursuant to this Section 5(a).

b. District agrees to reimburse Solar Millennium for the difference in total construction costs between construction of the Off-Site Facilities using the District-specified minimum diameter water main and construction of the Off-Site Facilities using the larger diameter water selected by District. The difference in total construction costs shall be determined based on the Bid Sheets submitted by Solar Millennium to District, pursuant to Section 5(a), and paid to Solar Millennium within forty-five (45) days of District's written acceptance of the Off-Site Facilities.

c. District and Solar Millennium shall each appoint a Representative to work together in good faith to facilitate the terms of this Section 5.

6. **Insurance.**

a. Solar Millennium's and/or its contractor(s) shall maintain during the design and construction of the Facilities, without cost or expense to the District, the following insurance with the District, its directors, officers, employees, consultants and agents all named as additional insureds:

i. Commercial general liability insurance covering third-party liability risks including, without limitation, bodily injury, personal injury, property damages, contractual liability covering the indemnity provisions contained in this Agreement, premises/operations, products/completed operations, and underground hazard liability including explosion and collapse hazard, underground excavation and removal of lateral support. Coverage shall have limits of liability not less than one million dollars ($1,000,000) per occurrence, two million dollars ($2,000,000) annual aggregate.

ii. Comprehensive automotive liability insurance, with bodily injury and property damage limits of not less than one million dollars ($1,000,000) per claim.

iii. Professional liability insurance covering claims arising out of the design or construction of the Facilities under this Agreement and caused by the wrongful acts, errors, and omissions, or negligent acts for which Solar Millennium or contractor is liable, in an amount not less than two million dollars ($2,000,000) per claim and annual aggregate.

iv. Worker's compensation and employer's liability insurance as required by law for not less than the statutory limits.

7. Delivery of Water.

a. Project Operations Water. Upon Solar Millennium's request and District's written acceptance of the completed Off-Site Facilities, the District shall deliver Project Operations Water to the Project Site, in an amount not to exceed 165 acre feet per annum and in an amount not to exceed an instantaneous water flow requirement of 500 gallons per minute, for use in the operation of the Project, in accordance with the District's rules and regulations.

b. Project Construction Water. Upon Solar Millennium's request, the District shall make Project Construction Water available to Solar Millennium at a mutually agreeable location in the vicinity of the Ridgecrest Heights B Zone until the Off-Site Facilities have been completed and upon District's written acceptance, at which time Project Construction Water shall be provided via the Off-Site Facilities, in an amount not to exceed a total of 1500 acre feet and in an amount not to exceed an instantaneous water flow requirement of 500 gallons per minute, for use in construction of the Project, in accordance with the District's rules and regulations.

c. Fire protection. Solar Millennium understands and acknowledges that District is not responsible for providing the Project's fire protection requirements, however, District understands and agrees that Solar Millennium may use water supplied by the District for fire protection purposes.

d. Payment for water services. Solar Millennium shall pay the District for water delivered pursuant to this Agreement in accordance with the District rates effective at the time of delivery. District agrees that it will not implement a rate system that charges Solar Millennium a higher rate than is charged to other water users with a same size meter for commercial and/or industrial use, or like category.

e. Water Service. In the event of a water emergency declared by the Board of Directors of the District, restrictions implemented on Solar Millennium will be the same as those restrictions implemented on other commercial and/or industrial users, or like category.

8. Term.

a. The term of this Agreement shall commence upon execution by the parties and shall terminate thirty (30) years after the date of the first delivery of Project Operations Water to the Project Site, unless otherwise earlier terminated.

9. Representations and Warranties.

a. Representations and Warranties of Solar Millennium. Solar Millennium hereby makes the following representations and warranties, which representations and warranties are true in all respects as of the date hereof:

i. Solar Millennium has the requisite right, power, legal capacity and authority to enter into and fully perform each and all of its obligations under this Agreement.

ii. The individuals executing this Agreement on behalf of Solar Millennium have the requisite right, power, legal capacity and authority to execute and enter into this Agreement on behalf of Solar Millennium, to legally bind Solar Millennium to the terms and provisions of this Agreement and to execute all other documents and take all other actions as may reasonably be necessary to perform each and all of Solar Millennium's obligations under this Agreement.

b. Representations and Warranties of the District. The District hereby makes the following representations and warranties, which representations and warranties are true in all material respects as of the date hereof:

i. The District has the requisite right, power, legal capacity and authority to enter into and fully perform each and all of its obligations under this Agreement.

ii. The individuals executing this Agreement on behalf of the District have the requisite right, power, legal capacity and authority to execute and enter into this Agreement on behalf of the District, to legally bind the District to the terms and provisions of this Agreement, and to execute all other documents and take all other actions as may reasonably be necessary to perform each and all of the District's obligations under this Agreement.

10. Indemnity.

a. Solar Millennium agrees to fully defend, protect, indemnify, and hold harmless District, its directors, officers, employees, consultants, and agents, from and against each and every claim, demand, or cause of action, and any liability, costs, expenses (including, but not

limited to reasonable attorney's fees and expenses incurred in defense of District), damage or loss in connection therewith, which may be made or asserted by Solar Millennium, Solar Millennium's employees, agents, subcontractors, or any third parties on account of personal injury or death or property damage to the extent caused by, arising out of, or in connection with Solar Millennium's negligent performance of this Agreement, except such as may result solely from the negligence of District.

b. District agrees to fully defend, protect, indemnify, and hold harmless Solar Millennium, its directors, officers, employees, consultants, and agents, from and against each and every claim, demand, or cause of action, and any liability, costs, expenses (including, but not limited to reasonable attorney's fees and expenses incurred in defense of Solar Millennium), damage or loss in connection therewith, which may be made or asserted by District, District's employees, agents, subcontractors, or any third parties on account of personal injury or death or property damage to the extent caused by, arising out of, or in connection with District's negligent performance of this Agreement, except such as may result solely from the negligence of Solar Millennium.

11. Compliance with District Rules and Regulations.

a. Solar Millennium shall comply with all of the District's policies, rules, regulations and ordinances, and as they may be amended from time to time.

12. Readiness.

a. Both parties shall maintain adequate facilities, personnel and resources to meet their respective obligations under this Agreement.

13. Remedies in Event of Either Party's Failure to Perform.

a. In the event of either party's failure to perform any of its obligations under this Agreement, the other party's right to seek all remedies at law or in equity are reserved.

14. Dispute Resolution.

a. In the event of any dispute arising out of or relating to this Agreement, the parties agree to participate in good faith in the mediation and negotiations related thereto for a period of thirty (30) days. Said thirty (30) day period to commence upon written notice by either party that it wishes to participate in mediation and negotiations pursuant to this Section 14.

15. NOTICES.

a. Any notices necessary under the terms of this Agreement shall be delivered by first class mail, return receipt requested, effective upon receipt as follows:

To District: Indian Wells Valley Water District
500 W. Ridgecrest Boulevard
Post Office Box 1329
Ridgecrest, CA 93556
Attn: Thomas F. Mulvihill, General Manager

To Solar Millennium: Solar Millennium LLC
1625 Shattuck Ave., Suite 270
Berkeley, CA 94709
Attn: Legal Counsel

Either party may change the address by giving written notice in accordance with this paragraph.

16. Attorneys' Fees.

a. If any action at law or in equity is necessary to enforce or interpret the terms of this Agreement, the prevailing party shall be entitled to reasonable attorneys' fees, costs and necessary disbursements in addition to any other relief to which such party may be entitled. The phrase "prevailing party" shall include a party who receives substantially the relief desired, whether by settlement, dismissal, summary judgment, judgment, or otherwise.

17. Successors and Assigns.

a. This Agreement shall bind and inure to the benefit of the successors and assigns of the Parties.

18. Sale or Transfer of Ownership of the Project.

a. Solar Millennium shall be entitled to (i) assign this Agreement, in whole or in part, to an affiliate and/or in connection with the sale or transfer of ownership of the Project.

19. Entire Agreement.

a. This Agreement sets forth the entire agreement between the parties with respect to the matters herein.

20. Choice of law.

a. This Agreement shall be governed by and construed in accordance with the laws of the State of California and any lawsuit related to this Agreement shall be initiated and maintained in Kern County, California.

21. Interpretation.

a. If any clause, sentence or other portion of this Agreement shall become illegal, null or void for any reason, or shall be held by any court of competent jurisdiction to be so, the remaining portions shall remain in full force and effect.

22. No Agency Relationship.

a. The parties shall not become or be deemed a partner or joint venturer with one another by reason of this Agreement.

23. Termination.

a. Solar Millennium may terminate this Agreement in its sole and absolute discretion upon thirty (30) days written notice to the District.

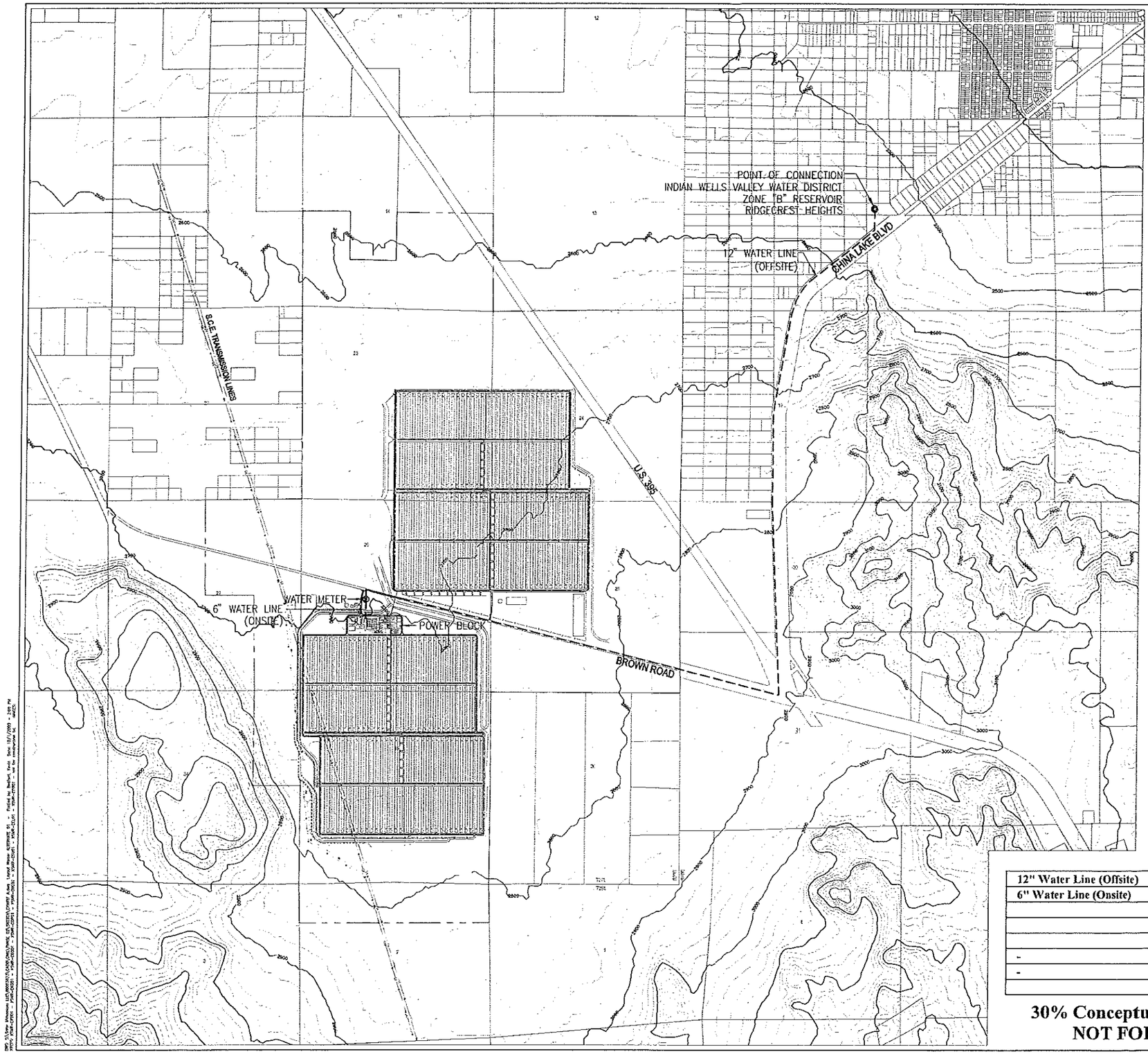
IN WITNESS WHEREOF, the parties have executed this Agreement as of the day and year first above written.

INDIAN WELLS VALLEY WATER DISTRICT

By: Thomas F Mulhill
Its: General Manager

SOLAR MILLENNIUM, LLC

By: V. Fichtner
Its: CEO



12" Water Line (Offsite)	26,385 LF
6" Water Line (Onsite)	812 LF
-	-
-	-

30% Conceptual Engineering Plans
NOT FOR CONSTRUCTION

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Designed	W. BLACK
Checked	W. BLACK
Drawn	K. S. BEDFORD
Record Drawing Initials:	

Revisions: #	DATE	DESCRIPTION

Prepared for:

Solar Millennium LLC

1000 500 0 1000 2000
SCALE IN FEET

Ridgecrest Solar Power Project

Kern County, California

WATER MAIN PLAN

EXHIBIT "A"

Date: 10/01/09
Sheet: 1 OF 1

EXHIBIT B

Ridgecrest Solar Power Plant: Estimated Monthly Water Consumption

TOTAL MONTHLY WATER CONSUMPTION & COSTS (Boiler Water + Mirror Wash Water + Aux Cooling Water + Sanitary and Service Water)

Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total (yearly)
gal/month	1,000,000	2,800,000	3,600,000	5,100,000	5,700,000	5,700,000	5,600,000	5,300,000	4,800,000	3,400,000	2,700,000	2,300,000	49,000,000
af/month	6	9	11	16	17	17	17	16	15	10	8	7	150
gallons per day	64,516	100,000	116,129	170,000	183,871	190,000	180,645	170,968	160,000	109,677	90,000	74,194	
gallons per hour	2,688	4,167	4,839	7,083	7,661	7,917	7,527	7,124	6,667	4,570	3,750	3,091	

INDIAN WELLS VALLEY WATER DISTRICT

BOARD OF DIRECTORS

Leroy Corlett, President
Peter Brown, Vice President
Peggy Breeden
Donald J. Cortichiato
Harold W. Manning

Thomas F. Mulvihill
General Manager
Krieger & Stewart, Incorporated
Engineers
McMurtrey, Hartsock & Worth
Attorneys-at-Law

[DATE]

Solar Millennium, LLC
1625 Shattuck Avenue, Suite 270
Berkeley, CA 94709

ATTN: Josef Eichhammer, CEO

RE: Will Serve Letter for the Ridgecrest Solar Power Project

To Whom It May Concern:

The Indian Wells Valley Water District ("District") can provide potable water service, to the Ridgecrest Solar Power Project as described in and subject to that certain "Water Supply Agreement Between Indian Wells Valley Water District and Solar Millennium, LLC, dated _____, 2009 ("Agreement"), subject to all District Ordinances, Rules and Policies, upon commencement of construction by Solar Millennium of the Project described in the Agreement and the deposit of applicable charges and fees for obtaining water service.

Pursuant to Section 2(h) of the Agreement, this offer of service shall be valid for a period of twelve (12) months following Solar Millennium's receipt of all necessary permits, consents, and approvals for the Project, including but not limited to, a right of way or lease with BLM, permit from CalTrans for the pipeline to cross Highway 395, and Certification and Verification of the Project by the California Energy Commission.

Sincerely,

Tom Mulvihill
General Manager

500 West Ridgecrest Boulevard - Mailing Address: P.O. Box 1329, Ridgecrest, California 93556-1329
(760) 375-5086 FAX (760) 375-3969
www.iwvwd.com E-mail: iwvwd@iwvwd.com

SOIL AND WATER
APPENDIX B

PLAN FOR OFFSETTING PROPOSED CONSTUCTION AND OPERATIONAL WATER SUPPLY

AECOM
Environment

Prepared for:
Ridgecrest Solar I, LLC

Data Request 170-172

Plan for Offsetting Proposed Construction and Operational Water Supply

Ridgecrest Solar Power Project
Kern County, California

February 2010

60139696-WMP

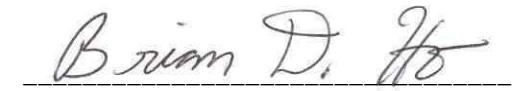
AECOM
Environment

Prepared for:
Ridgecrest Solar I, LLC

Data Request 170-172

Plan of Offsetting Proposed Construction and Operational Water Supply

Ridgecrest Solar Power Project
Kern County, California



Prepared By Brian Ho

Reviewed By Michael Flack, PG, CEG

February 2010

60139696-WMP

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List of Abbreviations

°F	degrees Fahrenheit
af	acre-feet
afy	acre-feet per year
AVEK	Antelope Valley East Kern Water Agency
AWAC	Alliance for Water Awareness and Conservation
Basin	Indian Wells Valley Groundwater Basin
BMPs	Best Management Practices
CEC	California Energy Commission
CIMIS	California Irrigation Management Information Systems
DOE	Department of Energy
DWR	Department of Water Resources
ET	evapotranspiration
$gpft^2$/year	gallons per square foot per year
gpm	gallons per minute
Group	Indian Wells Valley Cooperative Groundwater Management Group
IWV Water District	Indian Wells Valley Water District
KCDA	Kern County Department of Agriculture
Kgal	Kilogallon
LADWP	Los Angeles Department of Water and Power
MDW	Metropolitan Water District
NAWS	Naval Air Weapons Station
Project	Ridgecrest Solar Power Project
PVID	Palo Verde Irrigation District
RSPP	Ridgecrest Solar Power Project
SNWA	Southern Nevada Water Authority
sq. ft.	square feet
STC	Synthetic Turf Council
USGS	US Geological Survey
WRCC	Western Region Climate Center

1.0 Introduction

This report was prepared as a supplemental response to Data Request 170-172 that was provided to the California Energy Commission (CEC) on January 25, 2010 to address water offset/mitigation plans.

Ridgecrest Solar I, LLC is proposing the Ridgecrest Solar Power Project (RSPP or Project), a solar thermal power project (in the Indian Wells Valley Groundwater Basin (Basin). The Project proposes to use dry (or air) cooling in the steam-cycle, which significantly minimizes water use by comparison to a wet-cooled facility of a similar design. The Project has been designed to minimize its water use in consideration of the Basin, which has been in overdraft for many years.

Though water use is minimized, some water for construction and other operational processes including mirror washing is required. Any additional water use, such as that required by the Project, is considered to be a significant impact on the water resources by the CEC. As such, the Project has always proposed to mitigate or offset the water supply that will be provided from existing groundwater supply wells through the Indian Wells Valley Water District (IWV Water District). This plan is the next step in identifying measures to offset water use.

The plan identifies possible offset options (Section 2) within the Basin, and evaluates their feasibility of implementation, as well as provides the required offset in a reasonable time frame (Section 3). From the feasibility study, a plan is presented wherein multiple options are proposed that will address the timely implementation of the full offset volume for construction and operational water supply (Section 4). The source of water for the Indian Wells Valley is exclusively groundwater, which is currently being used at a rate above what is being recharged to the Basin. With the exception of one possible option for construction water supply that may represent a new source of water to the Basin, all the options considered result in a net reduction of current groundwater use by residential, public or agricultural users.

1.1 Project Description

Ridgecrest Solar I, LLC is proposing to construct, own and operate a concentrating solar electric generating facility proposed on an approximately 3,995-acre site in Kern County, California (**Figure 1**). The Project will have a nominal electrical output of 250 megawatts and commercial operation is planned to commence by the third quarter of 2013, subject to timing of regulatory approvals, equipment procurement and construction schedule. The Project will use well-established parabolic trough solar thermal technology which uses solar energy in a heat transfer process to generate steam and drive a steam turbine generator that produces electricity. The estimated life for the Project is 30 years.

1.2 Water Use Requirements

The Project proposes to use dry cooling in the steam cycle. Water for process water makeup and other industrial uses such as mirror washing will be supplied by the IWV Water District through their water supply wells no. 18, 33 and 34 that are located north of the Project site. Groundwater will be pumped from these wells and conveyed through existing pipelines to the Ridgecrest Heights Booster Station. From there, a new five-mile long, 12- to 16-inch diameter pipeline will be constructed along China Lake Boulevard, south to the Project site. Construction of the pipeline is expected to take approximately five months to complete. During the period it takes to construct the water pipeline, water will be delivered daily to the Project site by tanker trucks supplied from a turnout at the Ridgecrest Heights Booster Station.

The Project will use about 450 acre-feet (af) of groundwater per year (afy) during the 2.33-year long (28 month) construction period. This equates to a total volume of 1,500 af over the construction period.[1]

The Project will use about 150 afy of groundwater for operations, which equates to an average pumping rate of about 90 gallons per minute (gpm). Over the Project's 30-year life, water use will total about 4,500 af.

A Memorandum of Understanding has been approved (dated October 2, 2010) by the IWV Water District Board for water supply to the Project in the volume of 1,500 af for construction and up to 165 afy[2] for operational supply for 30 years. Amortizing the construction water volume over the life of the Project (30 years) yields a yearly water supply for offset of 215 afy.

1.3 Groundwater Use within the Indian Wells Valley Groundwater Basin

The current conceptual model for the hydrogeologic system in the Basin is that it is closed with no groundwater outflow and the bulk of inflow comes primarily from the mountain front recharge. Recharge to the Basin is derived from the infiltration of precipitation and runoff from the Sierra Nevada, sub-flow from the Rose Valley Basin through the Little Lake Gap and return form excess water applied for domestic or agricultural irrigation, or from wastewater treatment system percolation ponds. The estimates of total basin recharge have varied from 9,000 to 11,000 afy (AECOM 2009).

Water usage information for the Basin was provided for review in development of this plan by the IWV Water District (AECOM 2010a). While this information should be considered an order-of-magnitude estimate, as not all the usage could be verified, groundwater production from 1975 to 2008 show that the total average groundwater use for the period was 26,134 afy. The major water users within the Basin and their average water use over the period are as follows:

- Brown Road Farming (alfalfa) – 7,257 afy;
- IWV Water District – 6,806 afy;
- Naval Air Weapons Station (NAWS) – 3,720 afy;
- Private Wells – 3,434 afy; and
- Searles Valley Minerals – 2,645 afy.

Of the major water users, Brown Road Farming represents about 30 percent of the total average water use since 1975. Recent trends over the past 10 years show a decline in the annual water use for private water users and NAWS, and a relative stability of consumption for Searles Valley Minerals. In general, there has been an increase in water use for Brown Road Farming, as the annual usage has been over 9,000 afy in the last 10 years. The Groundwater Water Management Plan (Tetra Tech 2003) projects relative stability in water use for the other users within the Basin and a two percent increase in water use through the IWV Water District through 2020.

Groundwater is the exclusive source for water for the Valley. At this time, there are no other outside sources of water that are brought into the Valley. The City of Los Angeles Department of Water and Power (LADWP) Aqueduct is located on the west side of the Basin in the foothills of the Sierra Nevada. The Antelope Valley East Kern Water Agency that brings water from the California Delta to the south terminates in California City, about 40 to 45 miles south of the City of Ridgecrest. Water supply from the California

---

[1] A yearly volume of 450 af equates to an average pumping rate of about 390 gallons per minute (gpm) of water for construction activities (assuming a continuous uninterrupted supply and continuous usage).

[2] IWV Water District wanted to include a margin even though the project will only use 150 afy.

Delta is uncertain and has been curtailed to users in the Antelope Valley and California City in response to reductions in supply from the Delta.

1.4 Current Water Conservation Programs in Indian Wells Valley

The following is a summary of current programs that have been implemented by a variety of water users within the Basin in response to overdraft conditions. They are discussed briefly to provide context for the current status of water savings programs in the Valley and as a basis for identification of possible supplemental programs or alternatives that could be used by the Project to offset its water supply.

1.4.1 Indian Wells Cooperative Groundwater Management Group Objectives

The Indian Wells Valley Cooperative Groundwater Management Group (Group) is a public data-sharing group consisting of most of the major water producers, other government agencies and concerned citizens in the Indian Wells Valley (http://iwvgroundwater.org/). The Group was formed in 1995 to encourage water conservation and preservation of the water resources within the Indian Wells Valley. To meet this goal, the members work to coordinate efforts, share data and avoid the redundancy of effort that has occurred in the past. The current signatories of the Group are:

- U.S. Bureau of Land Management
- City of Ridgecrest
- County of Kern-Board of Supervisors 1st District
- Eastern Kern County Resources Conservation District
- Searles Valley Minerals
- Indian Wells Valley Airport District
- IWV Water District
- Inyokern Community Services District
- Kern County Water Agency
- NAWS China Lake
- Quist Farms

With the exception of Brown Road Farming, the major water users within the Basin are included in the Group.

Currently, the Group has developed and published a Water Conservation Public Advisory (revised June 19, 2008) which provides a variety of recommendations for water conservation, including the use of gray water for all domestic, commercial, industrial and agricultural water users in the Valley. According to this advisory, the average water consumption per connection per year in Ridgecrest has decreased since the 1980s from 0.84 afy to 0.77 afy (the Group 2008):

In November 2009, the Group published its 2010 and 2011 planning objectives. The objectives and methods for meeting them are as follows:

- Objective No. 1: Limit additional large-scale pumping in areas that appear to be adversely impacted.
- Objective No. 2: Distribute new groundwater extraction within the Valley in a manner that will minimize adverse effects to existing groundwater conditions and maximize the long-term supply within the Valley.
- Objective No. 3: Aggressively pursue the development and implementation of water conservation policy and education programs.
- Objective No. 4: Encourage the use of treated water, reclaimed water, recycled, gray and lower quality water where appropriate and economically feasible.

- Objective No. 5: Explore the potential for other types of water management programs that are beneficial to the Valley.
- Objective No. 6: Continue cooperative efforts to develop information and data, which contributes to further defining and better understanding the groundwater resource in the Indian Wells Valley.
- Objective No. 7: Develop an inter-agency management framework to implement and enforce the objectives of this plan.

Of the 2010/2011 objectives, Objective No. 3 (water conservation and education) is directly applicable to the Project as it promotes water savings and a reduction in water usage within the Basin.

1.4.2 Indian Wells Valley Water District

Water conservation measures for new housing developments have been enacted through local Ordinance Numbers 90 and 91. The Ordinances require water efficient landscaping as a condition of receiving water service from the IWV Water District. Ordinance No. 90 pertains to new single-family housing developments while Ordinance No. 91 applies to new multi-family housing as well as landscape irrigation at new commercial business developments. Both Ordinances contain the following provisions:

1. No turf is allowed in the front yard;
2. Only plants from an approved plant list are allowed in the front yard;
3. Only low-volume irrigation systems are allowed; and
4. The landscaped area shall be designed to eliminate any runoff.

The IWV Water District has voluntary summer outdoor watering guidelines whereby from May 1 through October 31, residents are urged to limit outdoor watering to three days per week, with watering performed between the hours of 8:00 P.M. and 8:00 A.M.

The IWV Water District has not yet enacted a “cash for grass” program in which residents who remove lawns and replace them with low-water use plants and low-flow irrigation systems are reimbursed by the District on a unit cost per square foot basis, although elements of such a program are under review and the District has indicated they are interested in implementing such a program (IWVWD 2010b). The “cash for grass” are directly applicable to the Project offset requirements as they provide a mechanism for water savings and net reduction in water use within the Basin.

The IWV Water District has a free program called XERIC© (Xeriscape Education, Resources and Idea Corps) that helps homeowners transition to more water efficient landscape. The IWV Water District sends volunteer expert gardeners to a home for a free one-hour consultation. The homeowner/renter gets a sketch, plant recommendations, a plant guide, a watering guide, irrigation tips, hand-outs of do-it-yourself projects and other helpful information. They also receive a list of local plant and hardware providers known to be familiar with Xeriscape principles and a list of online nurseries. The IWV Water District also sponsors a public education program in the form of dry climate seminars and workshops that are given throughout the year.

1.4.3 Naval Air Weapons Station - China Lake

To comply with Executive Order 13323, Strengthening Federal Environmental, Energy and Transportation Management, signed January 24, 2007, the U.S. Navy developed a Water Management Plan (Plan) for NAWS China Lake. NAWS China Lake is located approximately 12 miles north of the Project. The Plan (U.S. Navy 2008) provides a guide for water use from the time it is pumped at a well through its ultimate disposal. Based on the use of the water, the Plan presents best management practices (BMPs) for water conservation and management.

The Plan specifically references ten BMPs, recommended by the Department of Energy (DOE), for water conservation. Currently, the DOE recommends facilities implement at least four of the following BMPs:

- Public Information and Education Programs;
- Distribution System Audits, Leak Detection and Repair;
- Water Efficient Landscaping;
- Toilets and Urinal;
- Faucets and Showerheads;
- Boiler/Steam Systems;
- Single-Pass Cooling Systems;
- Cooling Tower Systems;
- High Water-Use Processes; or
- Water Reuse and Recycling.

NAWS China Lake has completed phase one of a two-phase irrigation project that focused on irrigation system replacement at six buildings and installation of computerized irrigation controllers. The Navy estimates the water savings from these two upgrades is 118,500 kilogallons (Kgal) annually (364 afy).

Another BMP being implemented by NAWS China Lake is replacement of old style high-flow shower heads (approximately 2.5 gpm) with new low-flow (1.5 gpm) models. Additionally, they have replaced old style toilets in three buildings with new dual flush toilet flushometers. These two ongoing projects are estimated to save approximately 2,527 Kgal of water annually (7.7 afy).

The Plan also calls for NAWS China Lake to replace current urinals with new waterless models (or install models rated at less than one gallon per flush); to install water meters for all significant water uses on base (currently approximately 20 percent of the significant buildings are metered) to help in identifying system leaks; to implement a water conservation awareness program; and to implement other relevant BMPs. The estimated water savings from implementation of these activities/programs could be 33,000 Kgal annually (101 afy).

At present, most of the water savings programs proposed under the plan are being or have been implemented by NAWS. As such, other alternatives to meet the offset requirement are being considered.

2.0 Potential Water Offsets

To provide an offset of 215 afy, several potential programs were considered in light of the current water conservation measures being implemented or contemplated for the Basin by members of the Group. As the initial step of the plan, a group of possible offset measures were identified that could be implemented to meet the water savings requirement, either solely or in combination with other options. No option was considered that would not lead to a reduction in groundwater use within the Basin. For example, a change in water use from potable to recycled water or gray water use was not considered an alternative as there would be no net reduction in water use within the Basin. Additionally, use of wastewater in place of groundwater that is currently being discharged to land and serves as recharge to the Basin was also not considered since this would be a simple exchange of water and not result in a net reduction of water use in the Basin. The feasibility of their implementation and capability to meet the water offset requirement in a timely fashion is described in Section 3.0.

The options that are under consideration to address the offset of the proposed construction and operational water supply include the following:

1. Low-Flow Irrigation – Conversion to low-flow irrigation in the landscaped areas at the City of Ridgecrest recreational and government facilities and at County of Kern facilities within the Basin.
2. Artificial Turf Replacement – Replacement of natural turf with artificial turf at City parks and recreational fields (youth football, baseball, and soccer fields).
3. Tamarisk Removal – Implementation of a Tamarisk Removal Program for areas of infestation within the Basin.
4. Fallowing – Fallowing (or removal) of agricultural land within the Basin.
5. Xeriscaping (“cash for grass”) – Replacement of turf lawns for xeriscaping at homes within the Basin.
6. Water from LADWP Aqueduct – Secure a connection to the aqueduct to offset the construction water use.

2.1 Low-Flow Irrigation

Low-flow irrigation systems use small-diameter tubes placed on top of or below the soil’s surface. Frequent, slow applications of water are applied to the soil through small holes or emitters. The emitters are supplied by a network of main, submain, and lateral lines. Water is dispensed directly to the root zone, avoiding runoff or deep percolation and minimizing evaporation. Different types of low-flow irrigation systems include the following (eSSORTMENT 2010):

- Drip and Micro-Sprinklers – these are a cross between spray nozzles and drip irrigation. This type of sprinkler system has a low flow rate, a low application rate, a small radius that ranges from 4 to 12 feet and operates with low pressures. These types of sprinklers are well suited for ornamental plantings as well as a single tree or shrubs.
- Drip Irrigation (micro irrigation) – applies water to the soil at point locations using low controlled flow rates and drip emitters that discharge at a rate of 0.5 to 2 gallon per hour. Drip irrigation can be used on individual plants or groupings of plants. There are two types of drip irrigation: drip tubing and bubble irrigation.

Properly installed drip-irrigation systems use approximately 20 percent less water than conventional sprinkler systems.

For the Project, potential offsets could come from the landscaped areas managed by the City of Ridgecrest government buildings and parks and recreation department and those managed by the Kern County.

2.2 Artificial Turf Replacement

Artificial turf or synthetic turf has been in use for decades as the playing surface for professional sports teams and is increasingly popular as the playing surface of choice by athletic departments at colleges and universities. Manufacturers of artificial turf tout the benefits of the synthetic surface as a means to reduce the expense of irrigation and maintenance costs that are associated with natural turf fields.

Artificial turf installation typically includes ground preparation measures that entail removing a portion of the existing landscape. A blend of crushed rock is then spread and compacted to create a stable base. The turf is then laid and secured. All seams are then glued and stapled to avoid splitting. Lastly, the turf is in-filled with a rubber and sand composite. Section 3.0 describes some of the issues associated with artificial turf maintenance including the application of water for cooling the surface of the turf to maintain a safe temperature in hot climates.

For the Project, proposed water offsets would come in the form of replacing existing natural turf with artificial turf at City of Ridgecrest parks and recreational fields and/or installing artificial turf (instead of natural turf) at new parks/recreational fields that are planned to be constructed by the City over the next three to five years. Installation of artificial turf would reduce the demand for irrigation water thus generating savings in water use year after year.

2.3 Tamarisk Removal

Tamarisk (salt cedar) is native to southwestern Asia and was introduced to the United States in the early 1800s for wind breaks. In the western United States, tamarisk is a highly invasive weed that has taken hold in semi-arid and arid watersheds in recent decades (de Gouvenain 1996).

Tamarisk can consume up to 250 gallons of ground water per day per mature tree (State of Washington 2009). In addition, it competes for resources utilized by native species and, in many cases, disrupts ecological cycles. Previous studies suggest that tamarisk spread has significant effects on river channel morphology including the ability to decrease channel width, increase overbank flooding, stabilize sand bars at river bends, and enlarge and stabilize islands (Lovich 1996).

Using the assumption that a single tree can use 250 gallons per day, a single tree has the potential to consume about 0.28 afy. To meet the full volume of 215 afy, a total of about 800 trees would be required for removal.

A program to remove significant stands of Tamarisk within the Basin could reduce impacts to the groundwater supply. The amount of groundwater saved would then help to mitigate the impact caused as a result of water use by the Project. Further, a removal program would also provide substantial biological benefit by removing an invasive species. This species out-competes native vegetation and alters the natural desert ecosystem functions and values by converting the habitats into monocultures void of the diversity that supports native flora and fauna populations. There are known locations of Tamarisk around the perimeter of the Basin (**Figure 2**).

2.4 Fallowing of Agricultural Land

Under this option, the Project would lease or purchase agricultural farmland (or lease the water rights) within the Basin and fallow the land for the lifetime of the Project. This water can then be used for other purposes, in this case as an offset for Project water supply. The fallowing is generally rotated between tracts of land, with no tract of land being fallowed for more than five years (PVID 2010). The minimum size of each tract of land is normally considered to be five acres.

According to the Kern County Department of Agriculture (KCDA 2009), more than 970 acres of alfalfa are grown by private growers within the Basin, and much of this acreage is farmed along Brown Road north of the Project site (**Figure 3**). Alfalfa cultivation requires 5.1 af of water per acre (DWR 1986). Therefore, to mitigate the full volume of water supply of 215 afy, a total of 42 acres per year would need to be fallowed.

2.5 Xeriscaping

In the Mojave Desert of the southwestern United States, 60 to 90 percent of potable water drawn by single-family residences in municipalities is used for outdoor irrigation (Sovocool et.al. 2001). A water conservation measure that is gaining in popularity among municipalities and water districts of desert communities is xeriscape (low-water use or water-smart) landscaping in place of traditional natural turf.

The Alliance for Water Awareness and Conservation (AWAC) is a coalition of 25 regional organizations (municipalities, water districts, local colleges and universities, etc.) created in 2003 in response to the growing water demand that exceeds available supply throughout the 4,900-square mile area of the Mojave Desert in Southern California. It is the mission of AWAC to promote the efficient use of water and increase communities' awareness of conservation as an important tool to help ensure an adequate water supply (AWAC 2009). The IWV Water District is not a member of AWAC although they have indicated their interest in joining AWAC in 2010 or 2011 (IWV Water District 2010b). Both AWAC and IWV Water District promote xeriscape landscaping as a viable water conservation measure.

Xeriscape basic design guidelines include the following elements (AWAC 2009):

- Sound Landscape Planning and Design – planting trees near the house will provide shade and will serve to cool the house. Group plants with similar water needs together. Homeowners should keep in mind the mature size of the plants they choose for their landscape.
- Limitation of Turf to Appropriate Areas – grass should only be planted where it provides functional or recreational benefits.
- Use of Water-Efficient and Native Plants – these types of plants thrive with less water in hot, dry climates. A water-smart garden may include many elements, such as trees, grasses, shrubs, ground covers, and flowers. Young trees and shrubs will require water more often; but after they are established, they can be watered thoroughly on an infrequent basis. This will encourage them to grow deep roots and be tolerant of hot, dry conditions.
- Efficient Irrigation – install an appropriate irrigation system that includes an automatic sprinkler system, which targets plantings and avoids runoff. Installing a drip or bubbler systems to water shrubs, trees, and flower beds puts water directly in the root zone and saves hundreds of gallons of water. Irrigating early in the day and late in the evening also conserves water.
- Soil Amendments – to help shrubs and flowers thrive in a water-efficient landscape, adding 4 inches of organic material to the soil will increase the soil's ability to absorb and store water for plant use. The plants will be healthier, and watering can be kept to a minimum.

- Use of Mulches – a layer of mulch covering the soil surface around plants will reduce evaporation, help prevent soil compaction, conserve water and protect plant roots from both heat and cold temperatures. Good mulch materials include rocks, bark, gravel, wood chips, or compost.
- Appropriate Landscape Maintenance – weed control, proper mowing, proper fertilization, pest control and an efficient irrigation system will all help conserve water.

Increasingly, water districts and local municipalities have offered cash rebates to homeowners as an incentive to convert their natural turf grass yards to xeriscape, a program more commonly referred to as "cash for grass." Cash for grass programs are in place in several states including California, New Mexico, Nevada, and Texas as noted by Addink (2005) and are summarized as follows:

Table 2-1 Summary of Xeriscaping Programs "Cash For Grass" Southwestern and Southern United States (Addink 2005)

Location	Gallons Saved per Square Foot	Square Feet needed to Save One Acre-foot of Water
North Marin County, California	33	9,874
Albuquerque, New Mexico	19	17,150
Southern Nevada	56	5,256
El Paso, Texas	18	18,103

Notes:

Addink, S., 2005, "Cash for Grass" – A Cost Effective Method to Conserve Landscape Water?, University of California Riverside – Turfgrass Research Facility. **http://ucturf.ucr.edu/**

Acre-foot = 326,829 gallons

From the study of various "cash for grass" programs, some key conclusions drawn by Addink (2005) were:

- The water savings was partly due to the replacement of turf with xeriscape plants, but the savings also was due to the installation of a more efficient irrigation system.
- Overwatering of the xeriscaping was observed in some of the studies. In the case of the New Mexico study, Addink (2005) found that 17 percent of the participants used more water after putting in the drought-tolerant plants.

The "cash for grass" program enacted for Southern Nevada by the Southern Nevada Water Authority (SNWA) is an appropriate model for comparison to similar program for the City of Ridgecrest. The SNWA is a consortium of five water districts and municipalities in Clark County, Nevada and includes the greater Las Vegas area including Las Vegas Valley, and communities south and east of Las Vegas. SNWA manages the 300,000 af that Nevada has allocated from the Colorado River and approximately 200,000 af from return flow credits and groundwater aquifers; SNWA member agencies serve approximately 96 percent of Clark County's population (Sovocool, et.al. 2001). Monthly and annual climate and rainfall totals are similar between the Indian Wells Valley Area and Las Vegas according to data from the Western Regional Climate Center (WRCC 2010). As shown in Table 2-2, the average annual rainfall is similar (4.18 inches in Inyokern, 4.15 inches in Las Vegas); the average annual maximum temperatures are similar (80.5 degrees Fahrenheit [°F] for Inyokern, 80.1°F for Las Vegas), although the average annual minimum temperature is lower in Inyokern (47.2°F) than Las Vegas (54.1°F).

Table 2-2 Climate and Precipitation in Inyokern, California and Las Vegas, Nevada

Area	Climate	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual[1]
Inyo-kern	Ave. Max. Temp (ºF)	59.6	64.9	70.4	77.8	87.0	96.7	102.7	101.2	94.2	83.3	69.0	59.7	80.5
	Ave. Min. Temp (ºF)	30.7	34.6	38.7	44.4	52.9	60.5	66.2	64.6	58.1	48.2	37.3	30.3	47.2
	Ave. Total Precip (in)	0.73	0.95	0.56	0.17	0.07	0.02	0.16	0.22	0.21	0.10	0.39	0.59	4.18
Las Vegas	Ave. Max. Temp (ºF)	57.1	62.5	69.5	78.2	88.5	98.6	104.6	102.2	94.6	81.4	66.5	57.3	80.1
	Ave. Min. Temp (ºF)	34.4	38.9	44.3	51.7	61.1	69.9	76.5	74.8	66.4	54.3	41.9	34.7	54.1
	Ave. Total Precip (in)	0.49	0.57	0.45	0.20	0.15	0.07	0.43	0.44	0.32	0.26	0.37	0.40	4.15

Notes:
Source - Western Regional Climate Center, 2010, http://www.wrcc.dri.edu/
(Climate Stations 044278 – Inyokern, CA and 264436 – Las Vegas Airport, NV)
Data for Station 044278 is from 1940 – 2009 and Station 264436 is from 1937 – 2009.
[1] Refers to the annualized average of monthly temperature and precipitation values.

Key:
Ave – Average
Max – Maximum
Temp - Temperature
ºF - degrees Fahrenheit
Precip – Precipitation
in – inches

The average annual evapotranspiration (ET) rate in Indian Wells Valley area is 66.5 inches per year (CIMIS 2009) while the ET rate for Las Vegas is about 74 inches per year (Addink 2005). Given the relative similarity of climatic conditions, it would be anticipated that the savings rate for implementation of a xeriscaping program in Ridgecrest would be similar to the 56 gallons per square foot savings rate reported for the SNWA study.

According to Lucinda Crosby, Conservation Coordinator for the IWV Water District, (natural) turf in Ridgecrest requires 73 gallons of water per square foot per year (gpft^2/yr) to thrive (IWVWD 2010b). She indicated that xeriscape plants only need 17 gpft^2/yr to thrive, resulting in a water savings of 56 gpft^2/yr.

2.6 Water from the LADWP Aqueduct

According to the LADWP - Southern District, unless direction is given otherwise by the Aqueduct Manager, construction water for projects is available though it will only be granted to government-owned agencies or private utilities engaged in public works projects (e.g., highway construction, windmill construction for public power supply, etc.). As the Project once constructed would be a private utility engaged in a public works program, this option is being explored to offset water supply for its construction water use (1,500 af). A successful application process would lead to a connection to the aqueduct and metering of the water supply for construction water offset. Conveyance of the water from the aqueduct has not been determined at this time, and would be an important component of this option. The LADWP aqueduct is located approximately 10 miles west of the Project site and is located in the foothills of the Sierra Nevada (**Figure 4**).

3.0 Feasibility of Water Mitigation Options

In this section, each option identified in Section 2.0 is evaluated as to its feasibility for timely implementation of offsetting the Project water supply. In evaluating each option, the following criteria were applied:

- Could the option provide the full offset volume of water?
- Could the option be implemented at the start of construction?
- Could the option upon implementation offset the full volume of Project water use or would there be a phase-in period such that only after a period of time the full offset volume would be realized?

The goal of the feasibility study is to identify one or more options to offset water use on a 215 afy basis for the term of the Project.

3.1 Low-Flow Irrigation

Replacement of existing landscape irrigation systems with low-flow irrigation systems at City parks and recreational facilities within the City of Ridgecrest and at County of Kern facilities would appear to be a plausible option to reduce the amount of water use in the Basin. This option is predicated on the amount of available land that has not been converted to date and could be converted to low-flow irrigation. In the assessment of the feasibility of this option, the Parks and Recreation Department, City of Ridgecrest Schools, and Kern County were contacted to determine the availability of landscaping for conversion to low-flow irrigation.

3.1.1 City of Ridgecrest Parks and Recreation Department Landscaping

The City of Ridgecrest Parks and Recreation Department operates and maintains several recreational facilities and parks, all of which contain natural turf areas that require landscape irrigation. A potential water mitigation offset measure would be for the Project to install low-flow irrigation systems in the landscaped areas of the City's parks and recreational playing fields. There are at least six parks or recreational facilities with youth sports fields totaling more than 100 acres in the City of Ridgecrest according to the City's Park and Recreation Department (City of Ridgecrest 2010). The main water usage by the department is summarized as follows.

Table 3-1 Summary of Water Usage City of Ridgecrest Recreation and Parks Department

Facility	Facility Description	Facility Size	Annual Water Usage
Freedom Park	Open Turf	19.8 acres	Not Listed by the City of Ridgecrest
Jackson Sports Complex	Softball fields, soccer fields, and tennis courts	56 acres	36 afy
Kerr McGee Youth Sports Complex	Five baseball fields and one football field	11.7 acres	11 afy
Pearson Park	Playground with basketball courts and lawn with trees	4.5 acres	4 afy

Table 3-1 Summary of Water Usage City of Ridgecrest Recreation and Parks Department

Facility	Facility Description	Facility Size	Annual Water Usage
Upjohn Park	Combined playground, basketball courts, and lawn	6 acres	4.5-afy
Hellmers Park	Lawn and trees	5 acres	5 afy
Roadway Medians in Ridgecrest	Landscaped roadway medians	Not provided by City	3 afy
Pinney Community Swimming Pool	Recreational swimming pool	Not provided by City	Not provided by City

Although there are about 64 afy of water offset through the parks and other landscaping, according to the Parks and Recreation Department, most of the sprinklers already installed at these facilities are low-flow or water efficient systems (City of Ridgecrest 2010). Mr. Ponek, the Director of the Ridgecrest Parks and Recreation Department, indicated that the toilets and showerheads at the recreational facilities have not been upgraded with low-flow devices, but the toilets and showers are not heavily used and upgrading to low-flow would not likely create significant water savings. It is Mr. Ponek's opinion that unless parks and medians are closed or turf and landscaping is removed, a significant savings in water usage does not seem possible.

The community of Ridgecrest is in need of additional recreational facilities with one more regulation football field, four more baseball fields, two more softball fields, and two additional soccer fields (approximately 35 acres total) possibly being added by 2015 (Ponek 2010). While these might be candidates as future mitigation options, the City would likely require low-flow systems in the development, and as such, even if the Project would fund the installation there would not be a net savings in water to the Basin.

3.1.2 City of Ridgecrest Government Facilities Landscaping

Another potential water mitigation offset measure would be for the Project to replace the existing irrigation system with low-flow irrigation systems in landscaped areas of government facilities of the City of Ridgecrest. This would include landscaped areas at facilities such as City Hall and public school district (Sierra Sands Unified School District). The amount of landscaped area is approximately 23.2 acres (USGS 2009).

3.1.3 Kern County Government Facilities Landscaping

Kern County government facilities within the City of Ridgecrest include the Kern County Administrative Northeast Center, which includes the Superior Courthouse Building, County Administrative Building, the Ridgecrest Public Library, and Kern County Fire Station 74. The landscaped area for this complex of buildings is approximately 1.25 acres (USGS 2009). Kern County Fire Station 77 has a small natural turf lawn which is included in the acreage for the Kern County Administrative Northeast Center complex. These county facilities are landscaped with natural grass lawns and could be replaced with low-flow irrigation systems. The amount of water saved by converting to low-flow irrigation would create an offset amount available to the Project.

3.1.4 Feasibility of Low-Flow Irrigation as a Water Mitigation Option

Though some water savings is possible through the conversion at City or County government facilities, the amount of savings through implementation of a low-flow irrigation program is minimal, being less than 30 acres. As such, implementation of a low-flow conversion would not yield sufficient volume to

offset the entire water volume of 215 afy. At this time, there does not appear to be potential offset through the Parks and Recreation Department, as landscaping for those facilities has already been converted to low-flow irrigation.

The option should only be considered as part of a combination of options to address the full volume of yearly offset for the Project. Any consideration of this option in the future would depend upon implementation of one or more of the following more viable options that would appear to yield significantly higher volumes of water. It is important to note, that some of the landscaping mentioned above would be eligible for the xeriscaping program as described in Section 4.0. As the installation of low-flow irrigation systems is a subset of and an integral part of a xeriscaping program, some of the landscaping mentioned above would be eligible, and should be considered for the "cash for grass" program as described in Section 4.0.

3.2 Artificial Turf

Advertisements by manufactures of artificial turf list the "low cost" of maintenance and the "low water-requirements" among advantages of artificial turf over natural grass turf. However, maintaining synthetic turf systems is not as inexpensive or labor-free as the manufacturers would have prospective buyers believe, according to athletic turf managers at a Synthetic Turf Maintenance Seminar (Fouty 2005).

Synthetic turf fields require periodic watering to clean the playing surface as part of the normal maintenance as recommended by the Synthetic Turf Council (STC 2007). However, outdoor artificial turf fields tend to get very hot from exposure to sunlight to the extent that water is needed to cool the playing surface in order to avoid injury to players. According to a heat study of artificial turf surfaces versus natural turf surfaces by Brigham Young University (Williams and Pulley 2002), surface temperatures of artificial turf are substantially higher than temperatures of natural turf, such that constant wetting was necessary to lower temperatures in order for play to continue on artificial turf fields (e.g., football & soccer).

Williams and Pulley (2002) measured the surface temperatures of the artificial turf playing field that the University uses for sporting events as well as the temperature for other surfaces. Some of their key observations of artificial turf are summarized as follows

- The hottest surface temperature recorded on an artificial turf surface was 200°F on a day when the highest ambient air temperature measured for the day was 98°F.
- Irrigation of the artificial turf surface significantly cooled the surface from 174°F to 85°F; however, after 5 minutes, the surface temperature rebounded to 120°F and by 20 minutes later, the surface temperature had rebuilt to 164°F.
- The amount of sunlight has greater impact on the surface temperature of artificial turf than the air temperature. In October, when the air temperature was 80°F, the artificial turf surface temperature reached 112° F.

The Williams and Pulley study concluded that the heating characteristics of artificial turf make cooling the surface during sports events a priority. The study led the Safety Office at Brigham Young University to establish a surface temperature limit of 120°F as maximum temperature that surface could reach before measures were taken to cool the playing surface (when the surface temperature reaches 122°F, it takes less than 10 minutes to cause injury to skin). Williams and Pulley (2002) noted that heat control added significant cost to the maintenance budget for artificial turf fields.

Synthetic turf fields generally incorporate an efficient drainage system beneath the playing surface to divert runoff during heavy rain events and when the surface is cleaned. Without the drainage system, moisture build-up in the infill of the synthetic turf would foster mold and mildew growth, which would

shorten the life span of the synthetic surface and potentially cause adverse health effects among users of the playing fields. Unfortunately, the same drainage system would shorten the water retention time of the artificial turf field as water is added to cool the playing surface. Thus, the artificial turf drainage system would require more water to keep the playing surface within tolerable temperatures (below 120°F).

The volume of water that was used to cool an artificial turf field during the course of a year was not quantified in their study, and would be expected to be variable based on climatic conditions.

3.2.1 Quantity of Landscape Available

This option entails the replacement of selected portions of the natural turf at the City's recreational facilities. The amount of landscape that would be available to replace is the same area or acreage of City parks and facilities shown on Table 3-1.

3.2.2 Feasibility of Artificial Turf as a Water Mitigation Option

Replacing natural turf with artificial turf at the City of Ridgecrest's recreational facilities may result in some savings in the annual amount of water that is used by comparison to natural turf, but because of the potential need to use water to cool the surface of synthetic turf (especially in a desert environment such as Ridgecrest), it is difficult to quantify the amount of water savings.

As with the low-flow irrigation option, the combined acreage of natural turf at the City's recreational facilities is insufficient to provide the full offset volume (215 afy), and as such, the option would need to be part of several other alternatives to meet the offset objective. Further, with the Project start of construction scheduled to begin in late 2010, it is unlikely that conversion to artificial turf fields could be accomplished before Project construction activities begin.

Given the uncertainty in the actual water savings due to the maintenance requirements during the hotter summer months, the potential for injury and the limited acreage for replacement of turf, artificial turf is not considered a viable alternative at this time to offset the Project water supply. This option may be considered in the future depending upon the successful outcome of implementation of more favorable options.

3.3 Fallowing of Agricultural Land

In an agricultural fallowing program, a landowner is paid an annual fee to not grow crops on a specific acreage of land that otherwise would have been irrigated; this produces a volume of "Saved Water". This water can then be used for other purposes. The fallowing is generally rotated between tracts of land, with no tract of land being fallowed for more than five years. The minimum size of each tract of land is generally considered to be five acres. The fee paid to the landowner, is based on the value of the crop that would have been cultivated. Following the model used by the Palo Verde Irrigation District (PVID) for fallowing of agricultural land in the Blythe area, the steps to implement a fallowing program include identifying a willing landowner, establishing a water factor per acre of land fallowed (e.g., 5.1 af per acre as for alfalfa), and developing a lease agreement that would establish the term of the fallowing and crop rotation, payment terms entry, inspection privileges and means to verify that the water is not being used for other purposes.

3.3.1 Quantity of Agricultural Land Available

Several crops are grown in the communities of Inyokern and Phelan, which are near Ridgecrest. Over 970 acres of alfalfa, more than 288 acres of pistachios, and slightly more than 2 acres of tomatoes are grown in this area as shown in **Figure 3**. As noted in Section 1.3, Brown Road Farming north of the

Inyo-Kern Airport is the largest water user in the Basin, representing about 30 percent of the total volume of all the major water users since 1975.

3.3.2 Feasibility of Fallowing as a Water Mitigation Option

With the amount of land in which alfalfa is grown in the communities near Ridgecrest, there is sufficient land such that fallowing part of the land would mitigate the full potential impact to groundwater supply as a result of water use by the Project. Fallowing agricultural land is a mechanism that has been used successfully by the PVID in Riverside County to generate groundwater savings that can offset the water use required for other purposes in the Palo Verde Valley Groundwater Basin.

With the implementation of the option, the full volume of the offset could be realized, and through successful negotiation, the option could be brought online in time for the start of the construction program. As a result, fallowing agricultural land is a feasible option to mitigate the impact to groundwater resources in the Basin and will be carried forward as a plan option.

3.4 Xeriscaping of Residential Properties

Xeriscaping or “cash for grass” is a viable mitigation option that can meet the Project water supply offset requirements. The IWV Water District has indicated their interest in establishing a cash for grass water-smart landscaping program for the residents within their district, which includes the City of Ridgecrest (IWV Water District 2010b). The IWV Water District is reviewing elements of xeriscaping and has indicated their cash for grass program would incorporate elements from AWAC as well as elements of the cash for grass program initiated by SNWA.

Addink (2005) noted that “Good landscape water management is more important than plant material change.” His assessment indicated that a majority of the water savings in the Albuquerque, Las Vegas, and North Marin studies may be attributed to more efficient irrigation practices. Factors such as plant spacing, vegetation coverage, plant size, and growth rate can be more important determinants of water use than plant selection.

3.4.1 Quantity of Landscaping Available for Xeriscaping

To develop an estimate of landscaping within the Basin that could be included in a cash for grass program, AECOM used digital aerial photographs from the US Geological Survey (USGS) High Resolution State Ortho-imagery for Kern County, California and geographic information system software to create polygons representing natural turf lawns or playing fields over a representative area within the City limits of Ridgecrest. For each lawn or natural turf displayed in the aerial photographs, a polygon was created that represents the area of landscaping. Polygons were aggregated by land-use type within the City of Ridgecrest, under residential, commercial and industrial properties. The sum of the turf area was divided by the total area of the property to produce the percent coverage within each land use type. This percentage was then multiplied by the total area of each land use type to develop an estimate of the total acreage of landscaped area with natural turf for each land use type in the City of Ridgecrest. **Figure 5** shows the distribution of land use types within the City that were used to estimate the available acres of turf that could be converted to xeriscape.

In **Table 3-2**, the “Sample Acres” category is the area of a land use that was used to calculate the percentage. “Sample Lawn” category is the acreage of lawns within the sample area (Note that the rural sample area is larger than the rural acreage, this is because the sample was located out of the City of Ridgecrest city limits). Actual acreage is the number of acres in the City of Ridgecrest for that land use category (from the City of Ridgecrest General Plan). Lawn acreage is the actual acreage multiplied by the percent lawn.

Table 3-2 Estimate of Turf Acreage within the City Of Ridgecrest

Land Use Category	Sample Acres	Sample Lawn	Percent Lawn	Actual Acreage (acres)	Lawn Acreage (acres)
Residential					
Rural	817.41	2.05	0.25%	664	1.66
Estate	68.73	4.66	6.78%	700	47.48
Low Density	77.14	7.79	10.10%	2659	268.58
Medium Density	51.93	2.27	4.37%	675	29.49
Nonresidential					
Commercial	53.37	3.49	6.55%	2101	137.54
Industrial	76.88	0.15	0.20%	210	0.42

From this assessment, the following information was found:

- Total turf acreage – 485.17 acres;
- Total turf residential – 347.21 acres; and
- Total turf commercial/industrial – 137.96 acres.

The amount of natural turf landscaping in the City of Ridgecrest that is potentially available for conversion to xeriscaping is estimated to be approximately 485 acres. This represents the combined total for residential and nonresidential (i.e., commercial and industrial) land use in the City.

Using 215 afy as the basis for the annual volume of water to be offset and 56 gallons per square foot as the amount of water that can be saved by conversion from turf to xeriscape, an estimated 29 acres of turf would need to be converted. Assuming 2,000 square feet per residence (IWV Water District 2010c), this equates to total of about 625 homes in the City. This number of participating households is equivalent to about 10.1 percent of the 6,191 owner-occupied households in Ridgecrest (Ridgecrest Demographics 2010). This does not include multi-family dwellings or households that are leased or rented in Ridgecrest.

From this assessment, there appears to be available acreage to convert turf to xeriscape within the City to meet the yearly offset volume of 215 afy.

3.4.2 Feasibility of Xeriscaping as a Water Mitigation Option

Implementation of a xeriscaping program has the potential to meet the required offset volume for Project water use. It is not probable that the entire volume would be offset by the start of construction or several years following the start of construction based on the experience of other programs. For example, in the case of the SNWA program, residents have up to six months to convert to xeriscape landscaping (with accompanying installation of low-flow irrigation system) from the time in which the resident submits the application to enroll in the Cash for Grass Rebate Program. Although there would be financial incentive induced by the Project to convert from turf to xeriscape, it would be anticipated that homeowners in the Ridgecrest area would also participate in the program at a similar rate.

As an outdoor water conservation program, the conversion to xeriscape program has one of the lowest assumed customer acceptance percentages (five percent) according to Addink (2005). In a survey of 1,800 residential homeowners in Phoenix, for example, Addink notes that "70 percent of the homeowners preferred a landscape dominated by the color green that had at least some lawn area." In Utah, "citizens have a passion for green lawns with gardening as the number one hobby in the state" (Addink 2005).

While there would be a lag in the final implementation of the offset using a cash for grass program, the option would ultimately lead to the required savings and this savings would extend beyond the lifetime of the Project. For this reason, the cash for grass program is being retained and included in the plan for offsetting the Project water supply.

3.5 Water from the LADWP Aqueduct

If water can be provided for the construction supply to the Project, it would represent an outside source of water brought into the Basin. The application process includes initial approvals from the Aqueduct Manager and subsequent development of an agreement and access conditions to the aqueduct through the Bishop Real Estate Office and Mojave Superintendant. Because the option has the potential to provide the full water volume for construction, and potentially in a timely fashion, it is being pursued as a feasible offset option. Analysis of the connection and conveyance required to bring the water to the Project or serve as an offset within the Basin is not known at this time and will be considered upon successful application for a connection.

3.6 Tamarisk Removal

As noted in Section 2.0, the purpose of a Tamarisk Removal Program would be to provide for an additional mechanism to offset water supply by the Project. This component not only provides benefits to the groundwater system, but also provides a substantial biological benefit by removing an invasive species that out-competes native vegetation and alters the natural desert ecosystem functions and values by converting the habitats into monocultures void of the diversity that supports native flora and fauna populations.

3.6.1 Tamarisk Population

The known locations in eastern Kern County and Inyo County with significant Tamarisk locations are shown on **Figure 2**. As noted in Section 2.3, a total of 800 trees would be required to be removed in order to meet the project water supply offset under an assumption that each tree consumes 250 gallons of water per day. In consultation with the Bureau of Land Management (Glenn Harris 2010), there are insufficient numbers of tamarisk trees in the Indian Wells Valley Groundwater Basin to make a significant difference in the offset volume for the Project.

3.6.2 Feasibility of Tamarisk Removal as a Water Mitigation Option

As a result of an absence of significant population, the full amount of water offset for the Project cannot be realized. As such, exploration of a Tamarisk Removal Program is not a feasible option and is not carried forward at this time. This option may be considered in the future in conjunction with other programs should the total water savings goals not be achieved.

3.7 Summary of Feasible Options for Offsetting Project Water Supply

Table 3-3 below provides a summary of the feasibility study of potential options for offsetting the Project water supply. The options being carried forward into the Plan are those that have the potential to completely offset the water supply in a reasonable time frame following initiation of construction activities. Options such as low-flow irrigation and tamarisk removal are suitable for only a portion of the

required offset and as such may be considered in the future if required as one or more of the more robust options prove infeasible.

Table 3-3 Summary of Feasibility Study of Potential Offset Options to Mitigate Project Water Supply

Offset Option	Capable of Fully Meeting Project Water Supply (215 afy)	Option Implementable at the Start of Construction	Option to be Considered Further and Incorporated in Mitigation Plan
Low-Flow Irrigation	NO	YES	Option retained for future consideration. Possibly implemented through "cash for grass", as it is a subset of that program.
Artificial Turf	NO	NO	Option not being retained for consideration.
Tamarisk Removal	NO	YES	Option retained for future consideration as needed to supplement primary options.
LADWP Aqueduct	YES	UNCERTAIN[1]	Option included in Plan as a primary option.
Fallowing of Agricultural Land	YES	YES	Option included in Plan as a primary option.
"Cash for Grass" - Xeriscaping	YES	YES	Option included in Plan as a primary option.

Notes
1 – At this time, it is not clear on the period required to secure a connection.

4.0 Proposed Mitigation Offset Plan

From the feasibility study of potential options, the following were selected to be the initial focus of the water supply offset plan:

- Water Supply through the LADWP;
- Xeriscaping ("cash for grass") of residential and commercial landscaped areas; and
- Fallowing of agricultural land within the Basin.

Options such as low-flow irrigation and tamarisk removal will be considered as necessary depending on the outcome of the implementation of the construction water supply through the LADWP aqueduct, xeriscaping program though the IWV Water District or agricultural fallowing. These options may be implemented to make up the difference should one or more of the primary options not be realized.

The above portfolio of mitigation measures either solely or in combination is expected to provide enough water to meet the required offset of 215 afy. Table 4-1 summarizes the contribution expected from each measure.

Table 4-1Summary of Water Savings Potential - Primary Water Offset Options

Offset Option	Potential Water Savings
Water Supply through the LADWP Aqueduct	1,500 af for construction water only.
Xeriscaping of Residential and Commercial Properties	215 afy, assuming 56 gallons per square foot savings by replacing turf with xeriscape. At this savings rate about 29 acres of turf would need to be converted; 29 acres represents about 6 percent of the estimated acreage (485 acres) in the City.
Fallowing of Agricultural Land	215 afy, assuming fallowing of alfalfa and a water use rate of 5.1 afy/acre. At this usage rate, about 42 acres are required on an annual basis; 42 acres is about 4 percent of the more than 970 acres of alfalfa grown within the Basin. Much of this acreage is farmed along Brown Road.

At this time, all the options discussed in the following subsections are being pursued equally as viable alternatives to further understand their implementability in meeting the Project construction start date and water offset requirement. Should one or more options prove to be feasible, a multi-option approach may be undertaken and the plan will be updated to reflect apportionment of the water supply between one or more options.

4.1 Water Supply from the LADWP

Access to the aqueduct would provide water from outside the Basin to offset water supply for construction of the Project. The application and approval process requires initial approval of the Project

as a “public works” project through an initial contact with the Aqueduct Manager in Bishop, California. Following approval by the Aqueduct Manager, the application process is managed by Bishop Real Estate Office and the Mojave Superintendant, who will establish the terms and requirements of the agreement, location of the connection, size of connection and required service.

Ridgecrest Solar I, LLC has initiated contact with the Aqueduct Manager though a formal letter of request has not been provided. Further details leading to an understanding of the viability of this option and a schedule for implementation are not yet provided but will be when they are understood.

4.2 Xeriscaping of Residential Landscapes

The IWV Water District is currently in the process of developing a Cash for Grass Rebate Program for the City of Ridgecrest. The program consists of converting residential and commercial areas landscaped with grass/turf and replacing them with xericscape. The IWV Water District plans to model their program after the cash for grass program by the AWAC (IWV Water District 2010c). The AWAC cash of grass program details are summarized in Appendix A.

To meet the required offset volume, the Project would underwrite a portion of the xeriscaping program as planned by the IWV Water District to the 625 homes needed to offset the water supply. In providing this support, the Project would offer financial incentives to the property owners within the City to convert their landscape. The administration and monitoring of the implementation would be performed by the IWV Water District. Initial discussions between RSPP and the IWV Water District have begun to determine how the Project can participate in the implementation of the cash for grass program. The schedule for implementation of the program is planned following receipt of the license from the CEC and to be coincident with the initiation of the Project construction.

To assess the effects of water-use savings and to verify the quantity of water that is offset as a result of conversion to a xeric landscape, pre- and post-xeric conversion water consumption monitoring would be performed. For each participating property, monthly consumption data provided by IWV Water District would be summed to get annual and average monthly consumption values for each year from the five years before conversion (or as many records as are available) and for each year thereafter following post-conversion.

In return for the cash rebate incentive for converting to xeric landscape, the residents would need to agree to ongoing monitoring of their xeric landscape water consumption. This would be accomplished in two ways:

1. Main water meter data would be taken from normal monthly meter reading.
2. Residents would agree to install a sub-meter that monitored irrigation consumption on the xeric landscape only. Sub-meters would be read monthly, as with main water meters.

Annual consumption on a per area basis would be calculated for participating properties. This is accomplished by summing the monthly consumption values for each sub-meter and dividing by the measured area of the xeric landscape. In this way, accurate measures of consumption for each xeric landscape could be measured on a property-by-property basis.

Based on the monitoring program, a continuous assessment of the water savings would be provided that can be used to evaluate the total savings against the require offset on an annual basis. These data can be used to identify if a sufficient number of homes or commercial properties have been included in the program to meet the required offset volume. As the amount of irrigation is directly related to precipitation and ET rates, it is proposed that the total volume of water saved be estimated on an annual basis and that additional properties (or square feet of landscaping) that would be needed to meet the required offset be estimated on running average from all the annual estimates calculated to date.

Further, it is proposed that upon the water savings meeting the required volume, monitoring be conducted for a period of five years to ensure that the annualized water savings continues to exceed the required offset.

To manage properties that would choose to remove their xeriscape, it is proposed that through the agreement that would be required with the IWV Water District to implement, a condition be provided that if the xeriscape was removed the costs for installation, monitoring and administration up an to the date of removal be levied to the property owner.

4.3 Agricultural Fallowing

The fallowing program would focus on alfalfa crops that are grown by Brown Road Farming on over 970 acres of farmland north of Inyokern, approximately 12 to 16 miles north of the Project site. The proposed plan would be similar to the agricultural land fallowing program that is currently in use by the PVID in the County of Riverside and the City of Blythe in the Palo Verde Mesa Groundwater Basin.

A land fallowing program would include some or all of the following elements:

1. Meet with the Brown Road Farming landowner(s) and determine if they would be willing to participate in the fallowing program;
2. Establish a “water factor per acre” to determine the acreage of land that will need to be fallowed to obtain the required volume of water. (PVID/Metropolitan Water District [MWD]) has established a single “water factor per acre” for their fallowing program in the Palo Verde Valley/Palo Verde Mesa area.) For the Basin, a determination should be made on using a single “water factor per acre” or using one that is crop specific for the Ridgecrest area. (For the South Lahontan Basin area, which includes the Indian Wells Valley Groundwater Basin, the average alfalfa crop water use is about 5.1 afy per acre [DWR 1986]).
3. Develop contracts/lease agreement with the property owner that, include but are not limited to the following provisions:
    a) Establish what land is suitable for inclusion in this program. Suitable land would be that which has historically been used for agriculture (alfalfa) and previously irrigated and would be irrigated if not included in this program.
    b) Establish the total acreage to be fallowed and the crop rotation.
    c) Establish the minimum size of each parcel that could be fallowed (i.e., minimum of a 5-acre parcels to make up total acreage to be fallowed).
    d) Establish the time frame for each parcel of land to be fallowed, before rotation to reuse.
    e) Establish conditions granting rights of entry for inspection purposes, to confirm the land has been fallowed.
    f) Establish non-assignment of unused water (i.e., landowner acknowledges that it does not have the right to, and shall not transfer or assign (by lease, license, grant or any other form of agreement) any rights the Saved Water that is developed through the Fallowing pursuant to this contract/lease agreement).
    g) Establish a method of verifying the water saved is not being used for other purposes or by other entities.
    h) Establish a payment schedule for the length of the Program.

The proposed land fallowing program would include the IWV Water District in the agreement (similar to the role that the MWD plays in the PVID fallowing program) in that water use would be monitored on a

monthly and annual basis by the IWV Water District to ensure that the annual water use by the grower does not exceed the negotiated water offset amount.

To ensure that land fallowed for water use offsets remains fallowed, a monitoring program will be implemented. The IWV Water District does not provide water for irrigation to all growers; therefore, there are no meters or other means for monitoring water use other than visual inspection of the properties to ensure that they are not being irrigated. The monitoring program should consist of site visits on a regular or periodic basis to visually verify that properties participating in the fallowing program are complying with their contract requirements. Visual verification can be through site visits and/or review of aerial photography.

To date there have been no discussions between RSPP and the Brown Road Farming landowner on how the Project can implement a fallowing program. The schedule for implementation of the program is planned following receipt of the license from the CEC and to be coincident with the initiation of the Project construction.

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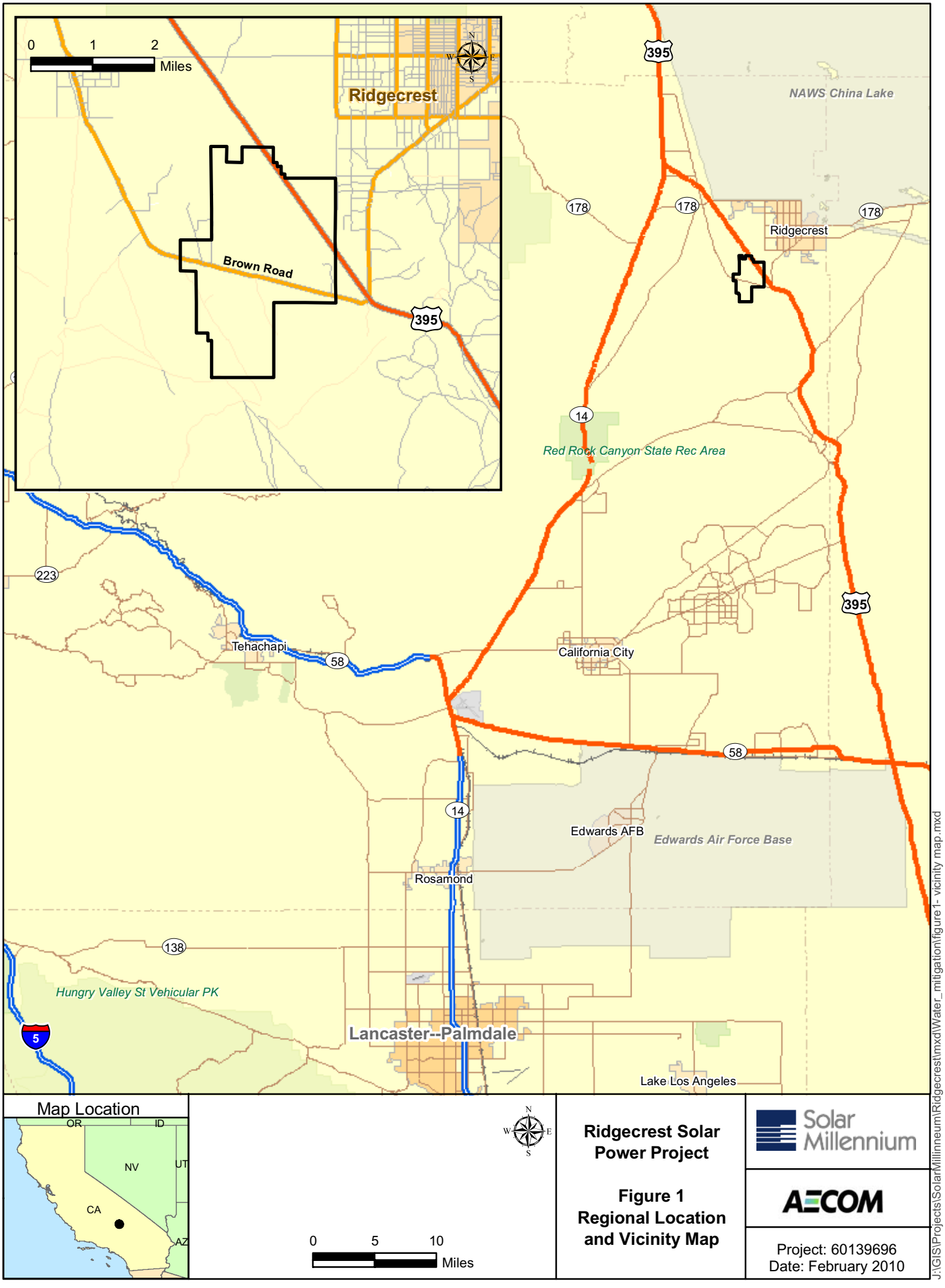
0 1 2
Miles
Ridgecrest
Brown Road
395
NAWS China Lake
178
178
178
Ridgecrest
14
Red Rock Canyon State Rec Area
223
Tehachapi
58
California City
395
58
14
Edwards AFB
Edwards Air Force Base
Rosamond
138
Hungry Valley St Vehicular PK
5
Lancaster--Palmdale
Lake Los Angeles
Map Location
OR
ID
NV
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CA
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Miles
Ridgecrest Solar Power Project
Figure 1
Regional Location and Vicinity Map
Solar Millennium
AECOM
Project: 60139696
Date: February 2010
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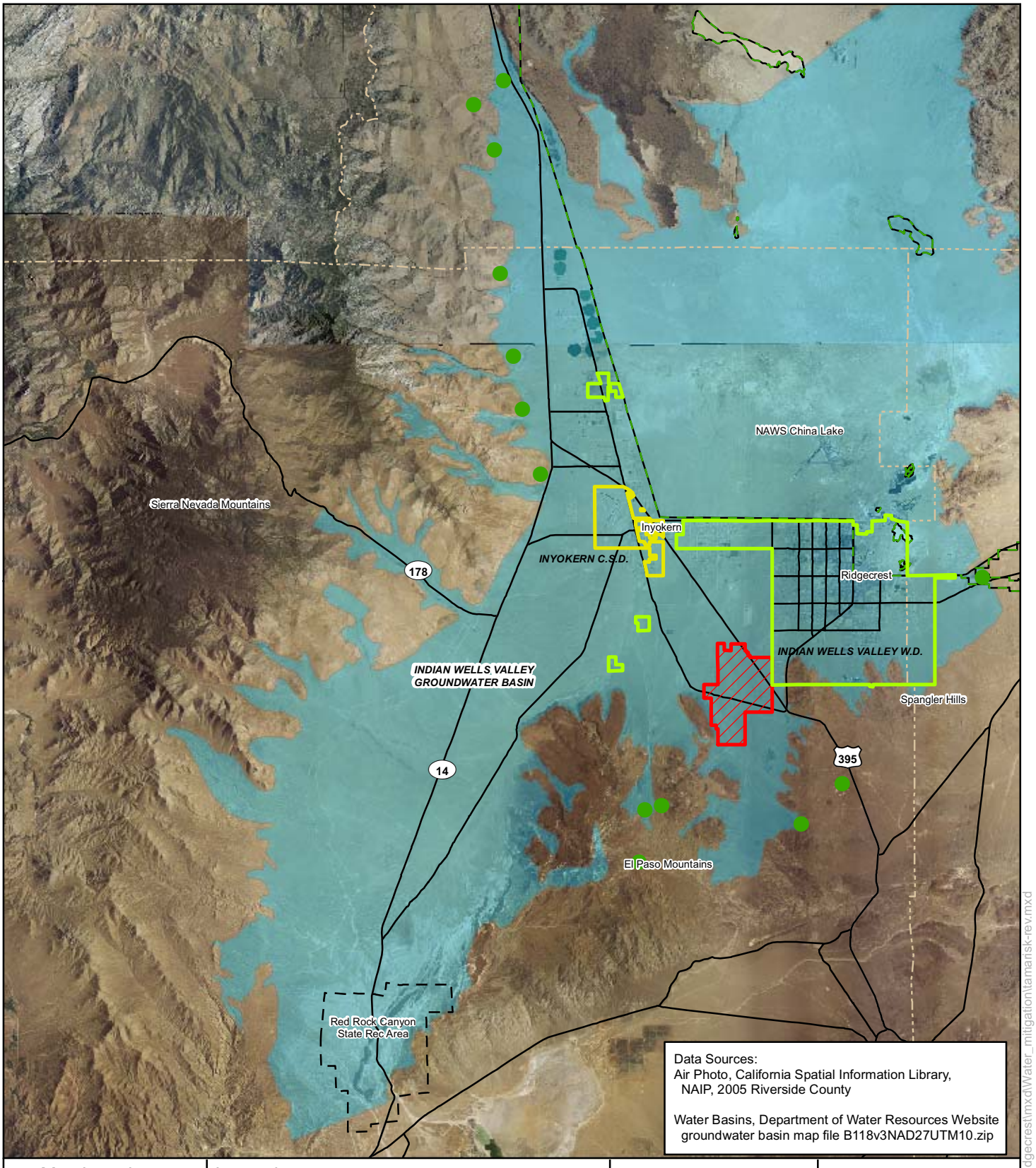

Data Sources:
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Map Location

Legend

- Project Right-of-Way
- Inyokern C.S.D.
- Indian Wells Valley Groundwater Basin
- Indian Wells Valley Water District
- NAWS China Lake Boundary
- Approximate Location of Known Tamarisk (Source: BLM 2010)

0 4 8 Miles

N W E S

Ridgecrest Solar Power Plant

Figure 2
Known Tamarisk Locations in the Vicinity of RSPP

Solar Millennium

AECOM

Project: 60139696
Date: February 2010

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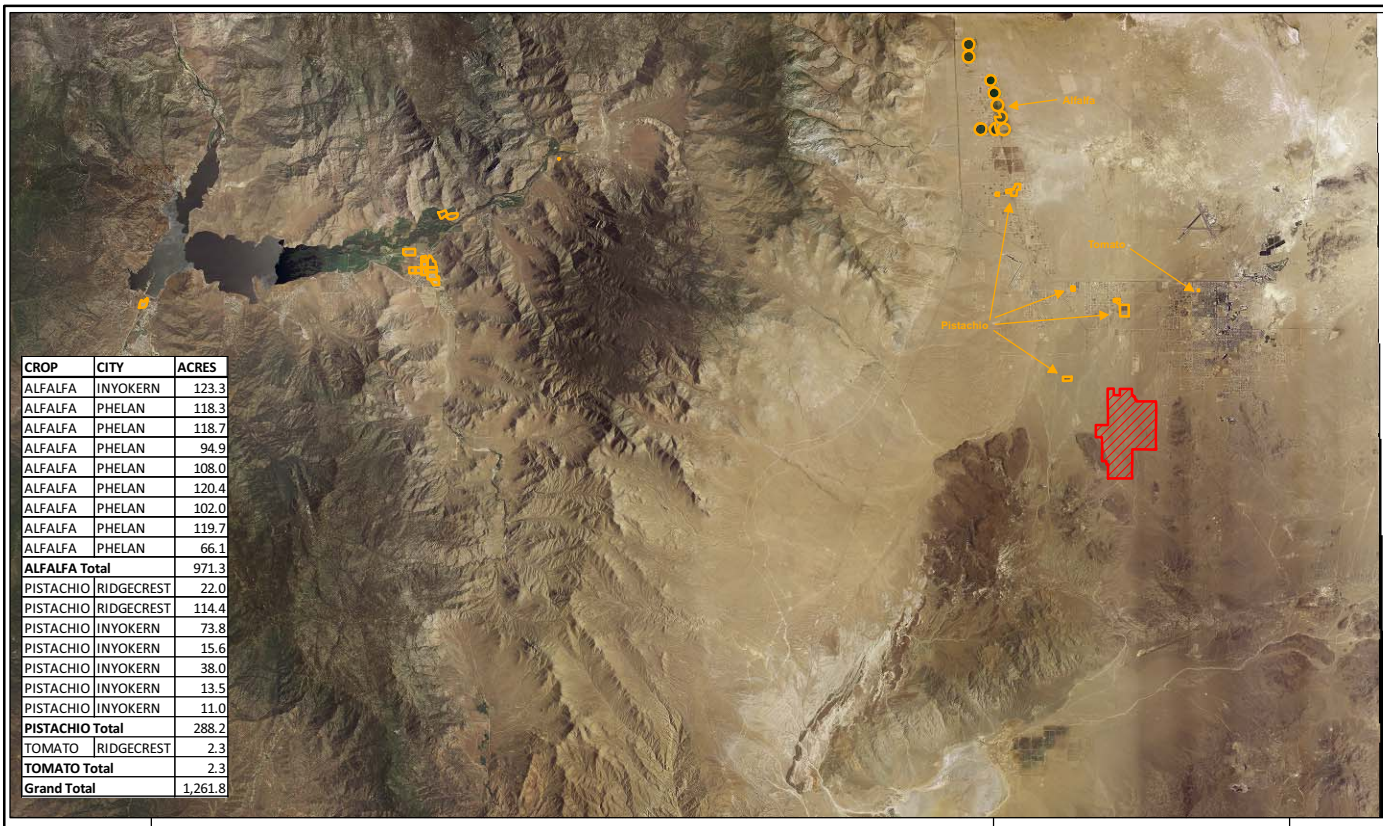

CROP	CITY	ACRES
ALFALFA	INYOKERN	123.3
ALFALFA	PHELAN	118.3
ALFALFA	PHELAN	118.7
ALFALFA	PHELAN	94.9
ALFALFA	PHELAN	108.0
ALFALFA	PHELAN	120.4
ALFALFA	PHELAN	102.0
ALFALFA	PHELAN	119.7
ALFALFA	PHELAN	66.1
ALFALFA Total		971.3
PISTACHIO	RIDGECREST	22.0
PISTACHIO	RIDGECREST	114.4
PISTACHIO	INYOKERN	73.8
PISTACHIO	INYOKERN	15.6
PISTACHIO	INYOKERN	38.0
PISTACHIO	INYOKERN	13.5
PISTACHIO	INYOKERN	11.0
PISTACHIO Total		288.2
TOMATO	RIDGECREST	2.3
TOMATO Total		2.3
Grand Total		1,261.8

Map Location

N
W E
S

4 0 4 Miles

1:253,440

Legend

Project Right-of-Way

Kern County Crop Land 2009

Data Sources:
Air Photo: California Spatial Information Library (CaSIL) NAIP, 2005
//casil.ucdavis.edu/casil/imagerybasemapslandcover/imagery/naip-2005/county_mosacis/kern
Permitted Crop Boundaries from Kern County Department of Agriculture, online at
http://www.co.kern.ca.us/gis/downloads.asp
and Measurement Standards
Basemap, (Roads, streams, cities), ESRI

Ridgecrest Solar Power Project

Figure 3
Ridgecrest Area Agricultural Resouces

Solar Millennium

AECOM

Project: 60139696
Date: February 2010

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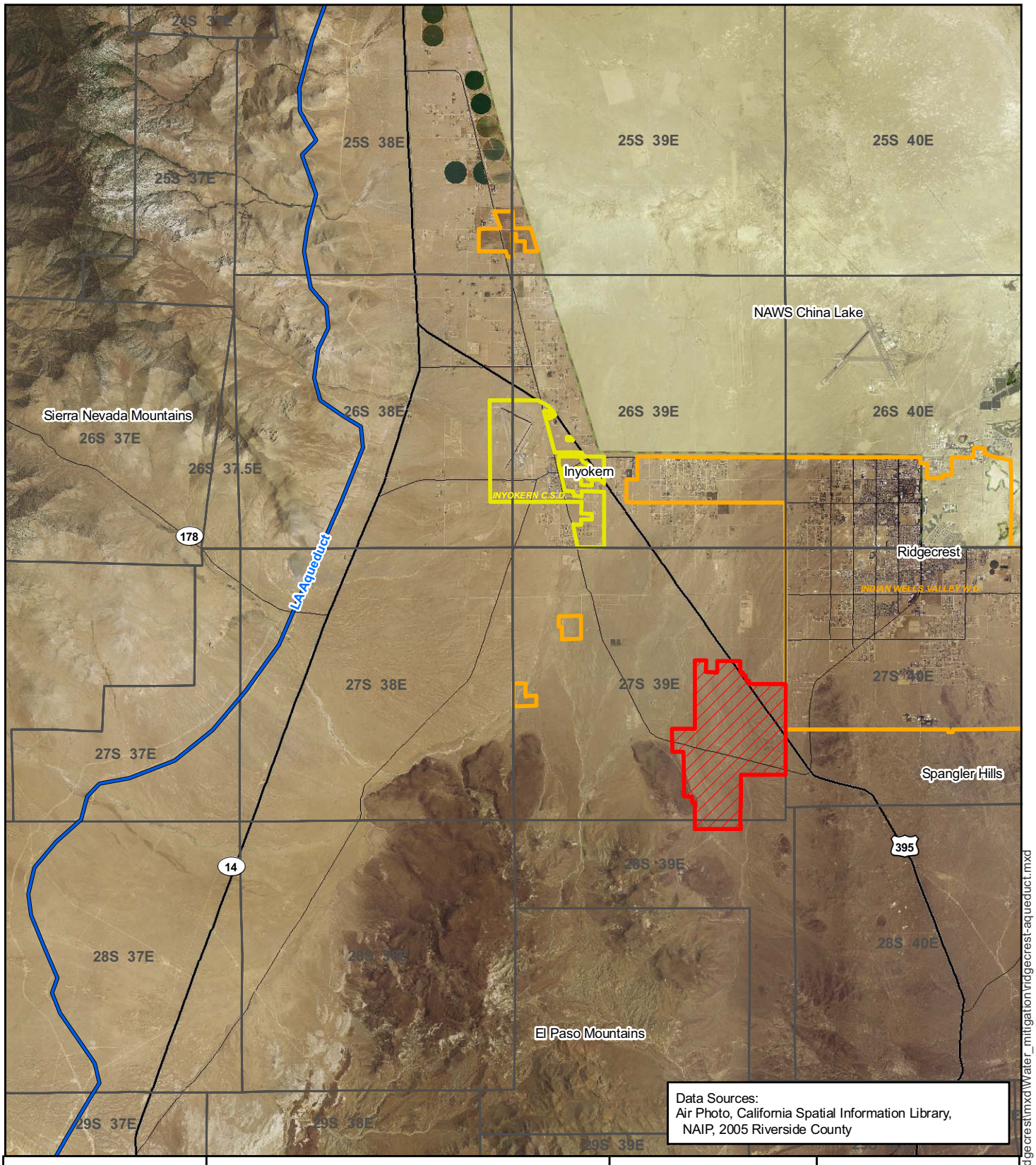

Map Location

Legend

- Project Right-of-Way
- Township and Range
- NAWS China Lake Boundary
- LA Aqueduct
- Indian Wells Valley W.D.
- Inyokern C.S.D.

0 3 6 Miles

N W E S

Ridgecrest Solar Power Project

Figure 4
Los Angeles Aqueduct Location Map

Solar Millennium

AECOM

Project: 60139696
Date: February 2010

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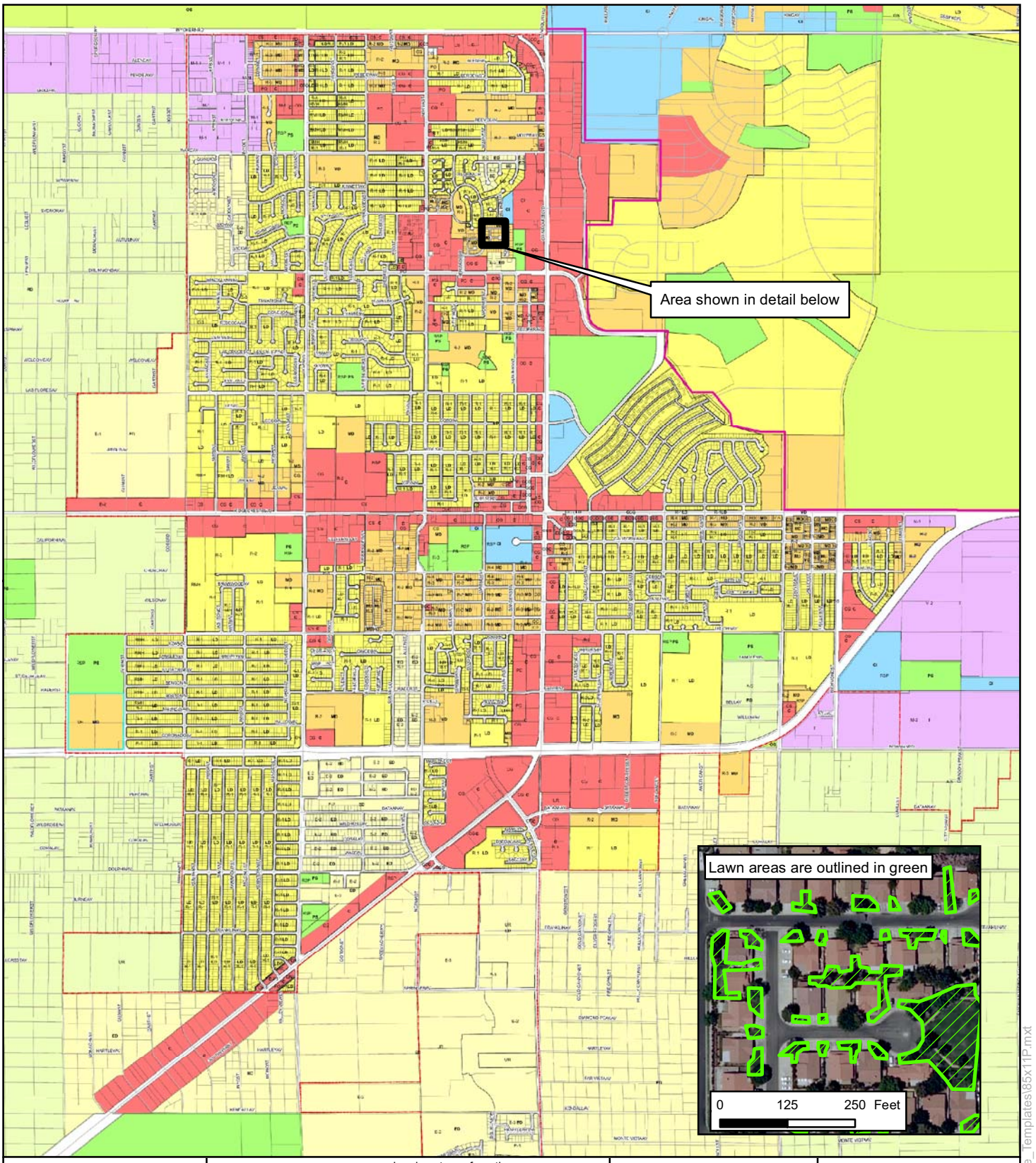

Map Location

Legend

General Plan

- RD=Rural Residential Density
- ED=Estate Residential Density
- LD=Low Residential Density
- MD=Medium Residential Density
- C=Commercial and Office
- I=Industrial
- CI=Civic and Institutional
- PS=Parks and Schools
- OS=Natural Open Space

Landuse types from the 2008 General Plan Map with Zoning as of January 1, 2008, found online at http://ridgecrest-ca.gov/uploadedFiles/Departments/Public_Services/Planning_Department/General%20Plan%20and%20Zoning%20with%20lots%201-2008%2030x42.pdf

N
W
E
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1 inch = 3,000 feet

0 3,000 6,000 Feet

Ridgecrest Solar Power Project

Figure 5
Landuse for the City of Ridgecrest

AECOM

Project: 60139696-5230
Date: February 2010

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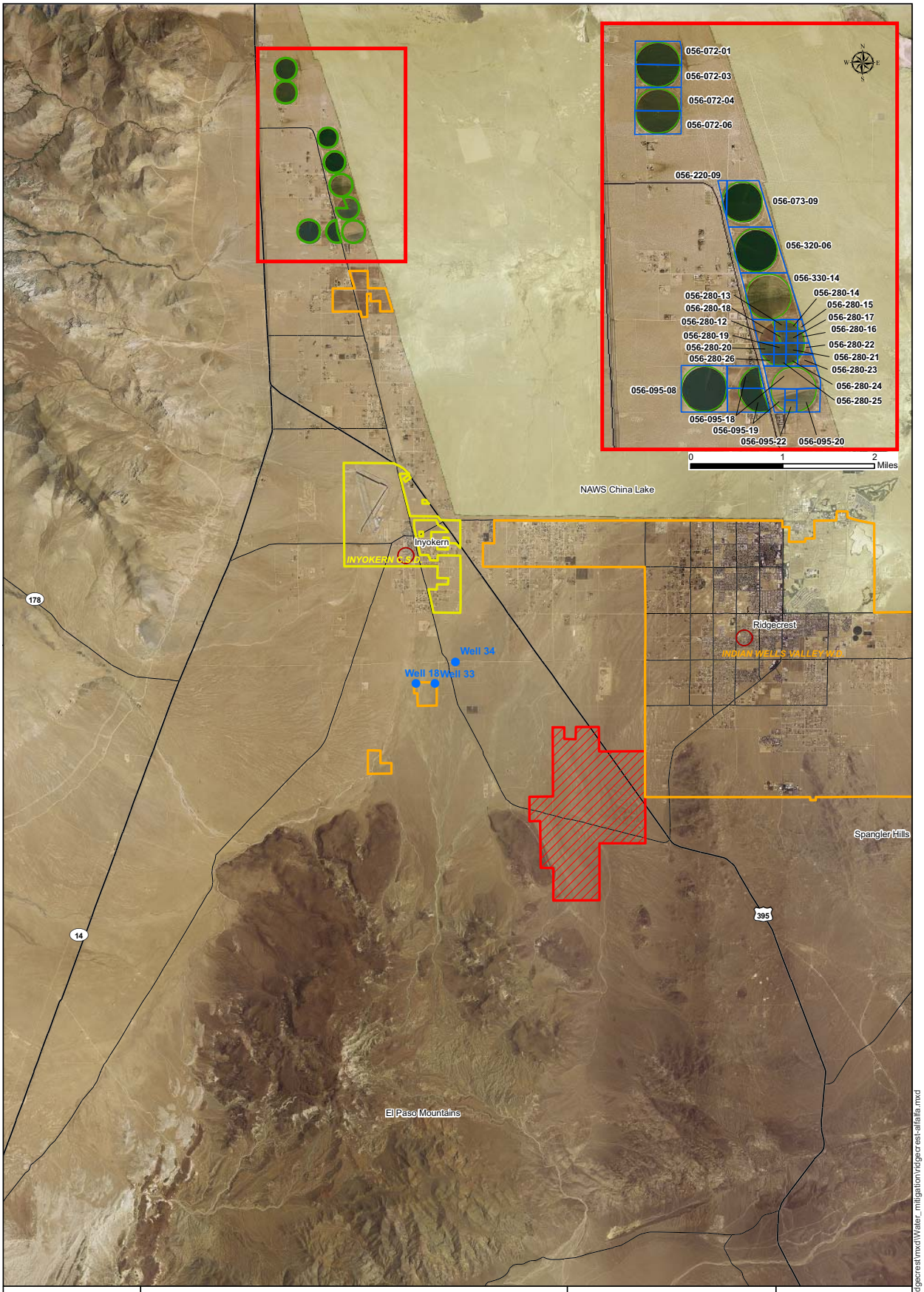

Map Location

Legend

- Project Right-of-Way
- Parcel Boundaries
- 056-280-25 Parcel Number
- Alfalfa Field
- Indian Wells Valley W.D.
- Inyokern C.S.D.
- Geographic/Cultural Area of Interest
- NAWS China Lake Boundary
- Indian Wells Valley Water District Wells

0 2 4 Miles

Ridgecrest Solar Power Project

Figure 6
Parcel Numbers of Alfalfa Fields Near RSPP

Solar Millennium

AECOM

Project: # 60139696
Date: February 2010

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Appendix A

AWAC Xeriscape Program Details

The District plans to model their program after the "cash for grass" program by the Alliance for Water Awareness and Conservation (AWAC) (Personal Communication, Tom Mulvihill, January 13, 2010). The AWAC cash of grass program details are summarized below.

Eligibility Requirements

- Program application must be submitted and pre-approved by the District before any lawn is removed and before beginning the landscape conversion project.
- The District may require the participant's presence during the site pre-inspection prior to receiving approval for the project.
- Areas to be converted must be living and maintained lawn.
- Residential landscape conversion limits - zero square feet (sq. ft.) up to 6,000 sq. ft. maximum.
- Commercial/Industrial/Institutional (CII) landscape conversion limits - zero sq. ft. up to 20,000 sq. ft. maximum.
- Applicant must participate in a post-inspection to receive final approval and sign-off of the landscape and irrigation system conversion.

Landscaping Requirements

- A minimum of 25 percent living plant coverage must be achieved within the converted area at plant maturity. This requirement will be determined during your pre-inspection.
- Plant lists are available through your local water district and the AWAC (www.hdawac.org).
- Remaining lawn areas are not considered as plant cover.
- Plants and lawn outside the converted area may be considered in the rebate calculation even if they are adjacent or overhanging into the area. This determination will be made during the pre-inspection.
- Impermeable surfaces that do not allow water to penetrate into the ground are not allowed. This includes concrete, plastic film used as landscape fabric, and all other non-permeable materials.
- Converted areas must be covered by a minimum 2-inch layer of permeable mulch.
- Mulches may include bark, rock, and un-grouted stepping stones.

Irrigation System Requirements

- Spray irrigation is not permitted in the landscape conversion area.
- If a spray irrigation system is currently being used, it must be converted to a low-volume drip system equipped with a pressure regulator, filter and emitters providing irrigation to new plantings.
- Each drip emitter must be rated at less than 20 gallons per hour (gph).
- If part of a lawn is converted, the sprinkler system must be properly modified to provide adequate coverage to the remaining lawn without spraying the converted area.

Rebate Amount and Details

- Rebate Amount - The AWAC cash for grass rebate amount is $0.50 per square foot for approved landscape conversions. Cash for grass rebate values are up to $3,000 for qualifying residential properties, and up to $10,000 for qualifying commercial, industrial and institutional properties. Rebate checks are issued within 60 days after the post-inspection to the billed customer named on the account.
- Rebate Terms - The terms of the agreement expire six calendar months from the date the District approves the application. The final inspection is not counted against the six-month time limit once the District has been notified that the project is complete. Only one rebate payment may be received under the agreement. The District reserves the right to reject or limit the number of applications being processed. Applications will be accepted on a first-come, first-serve basis and only while funding is available or until the program is discontinued.

Application Process

- Applications must be submitted to the District prior to commencement of any landscape conversions, otherwise the project will be ineligible for participation in the program.
- Applications are accepted on a first-come, first serve basis while funding is available.

Inspections

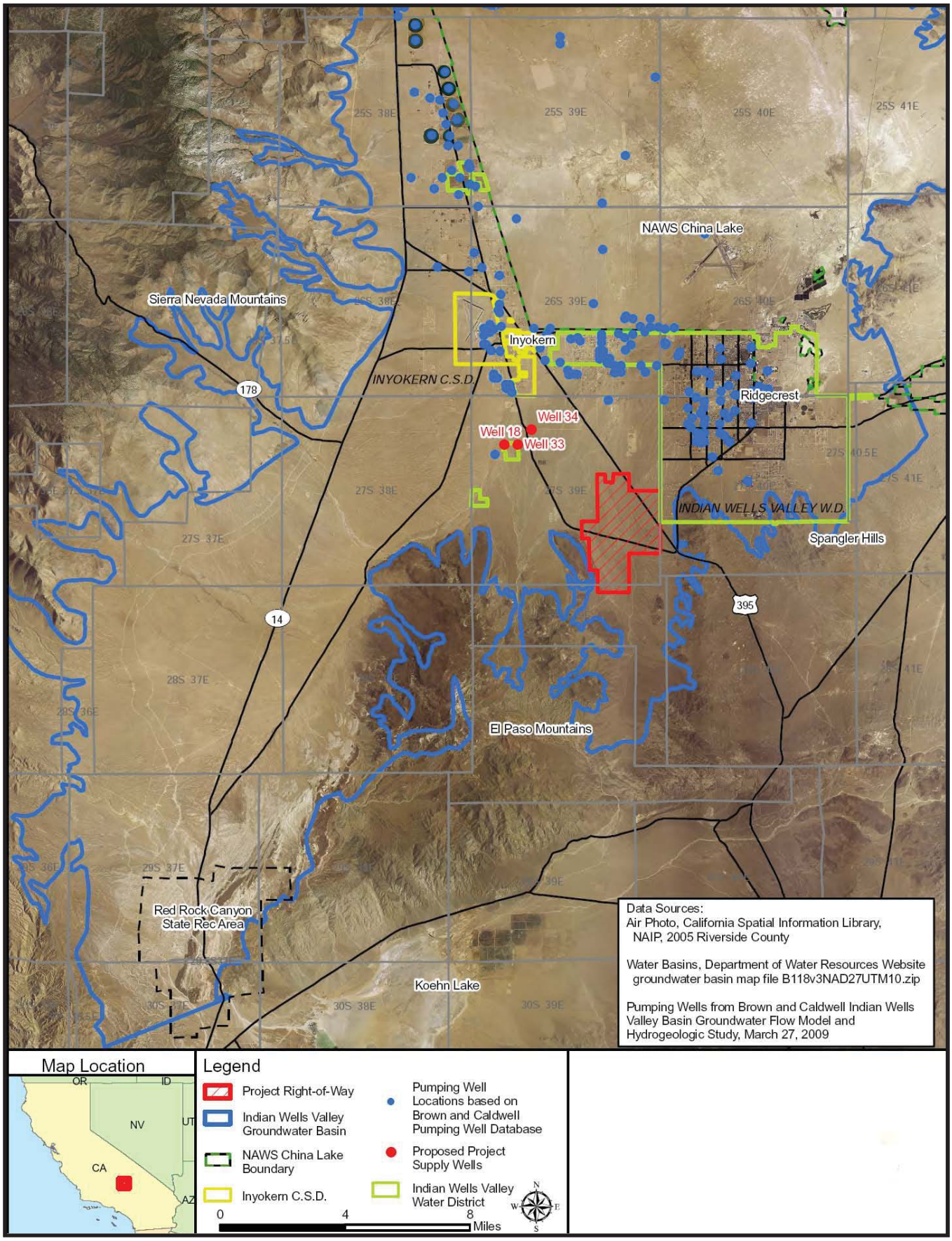
- Pre-Conversion Inspection - A pre-conversion inspection on the existing landscape will be conducted by the District. The application must be pre-approved before removing any lawn and beginning a conversion.
- Post-Conversion Inspection - Once the landscape project is finished, the owner is responsible for notifying the District to schedule a post-inspection. The post inspection will include taking photos of the converted landscape, obtaining converted landscape area measurements, irrigation system inspection, plant eligibility review for program compliance and rebate eligibility verification.

Conversion Sustainability Requirements

- The landscape conversion area must remain in compliance with all program conditions for a period of two years. If the landscaping is altered during this two year period, the participant may be required to refund some or the entire rebate if this requirement is violated. Landscape and plant maintenance, plant quality and appearance before, during, and after the conversion are the sole responsibility of the participant. This requirement is void upon property transfer of ownership

SOIL AND WATER - FIGURE 1

Ridgecrest Solar Power Project - Pumping Wells in the Indian Wells Valley Groundwater Basin

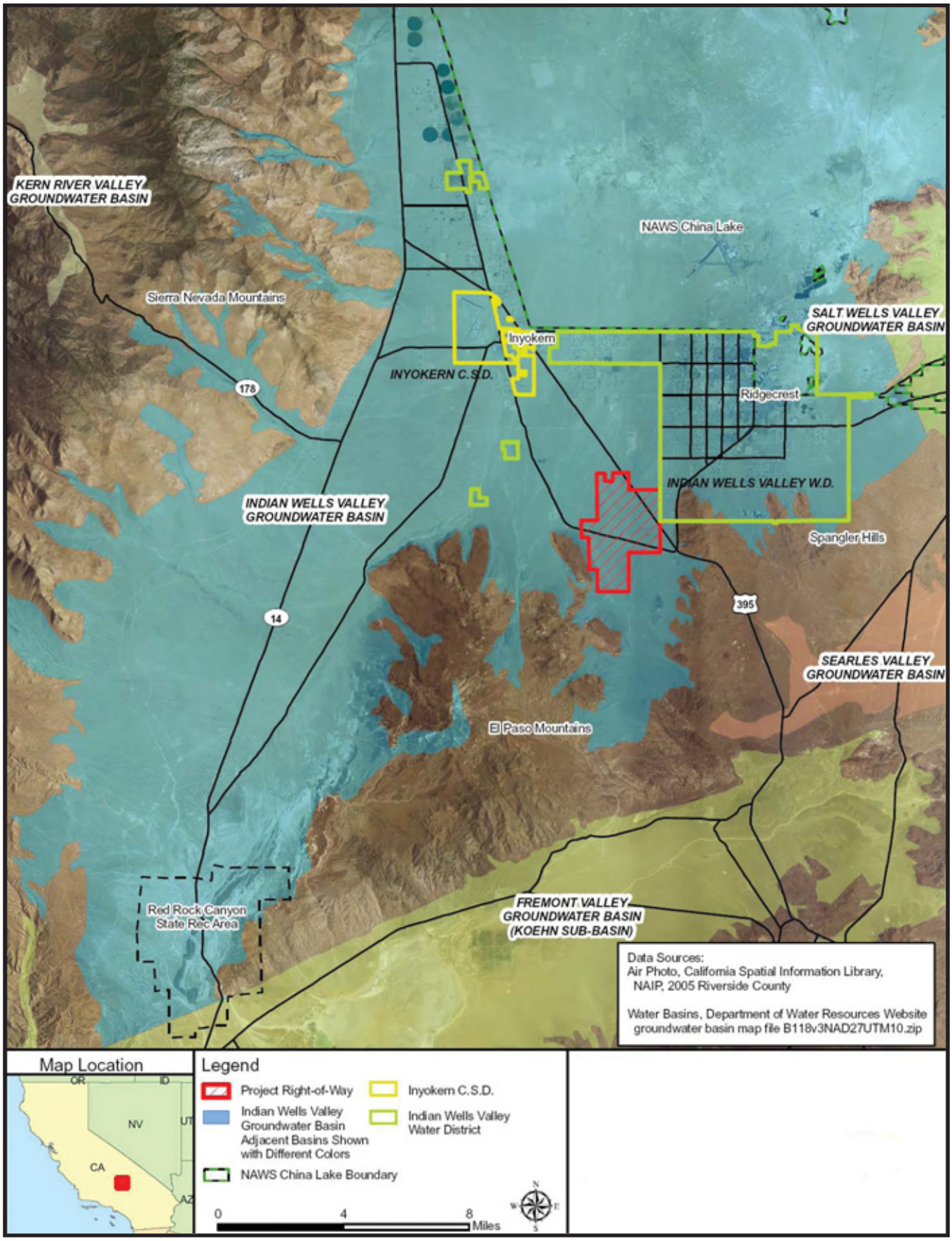


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2009a

SOIL AND WATER - FIGURE 2

Ridgecrest Solar Power Project - Regional Groundwater Basin

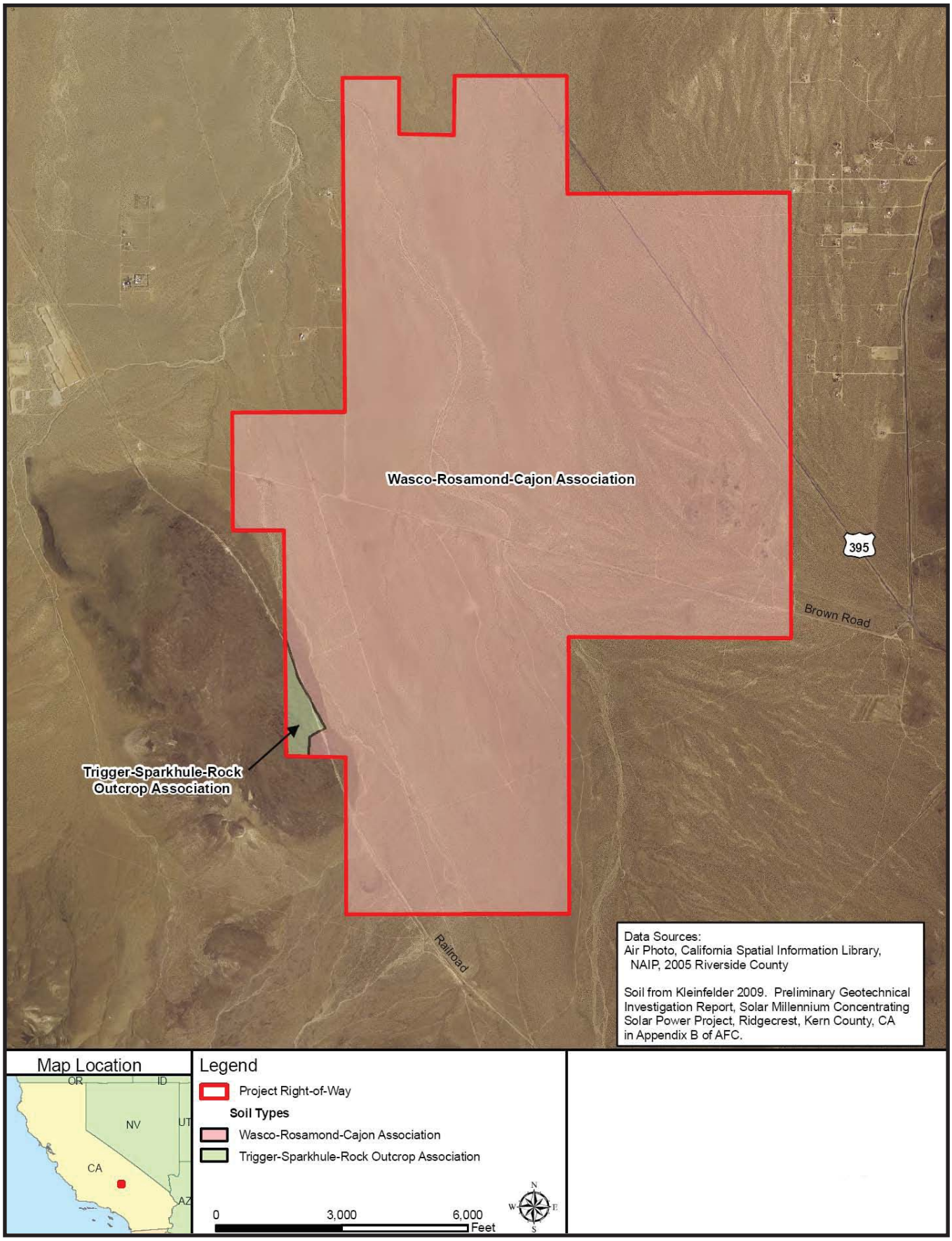


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2009a

SOIL AND WATER - FIGURE 3

Ridgecrest Solar Power Project - Site Soils Map

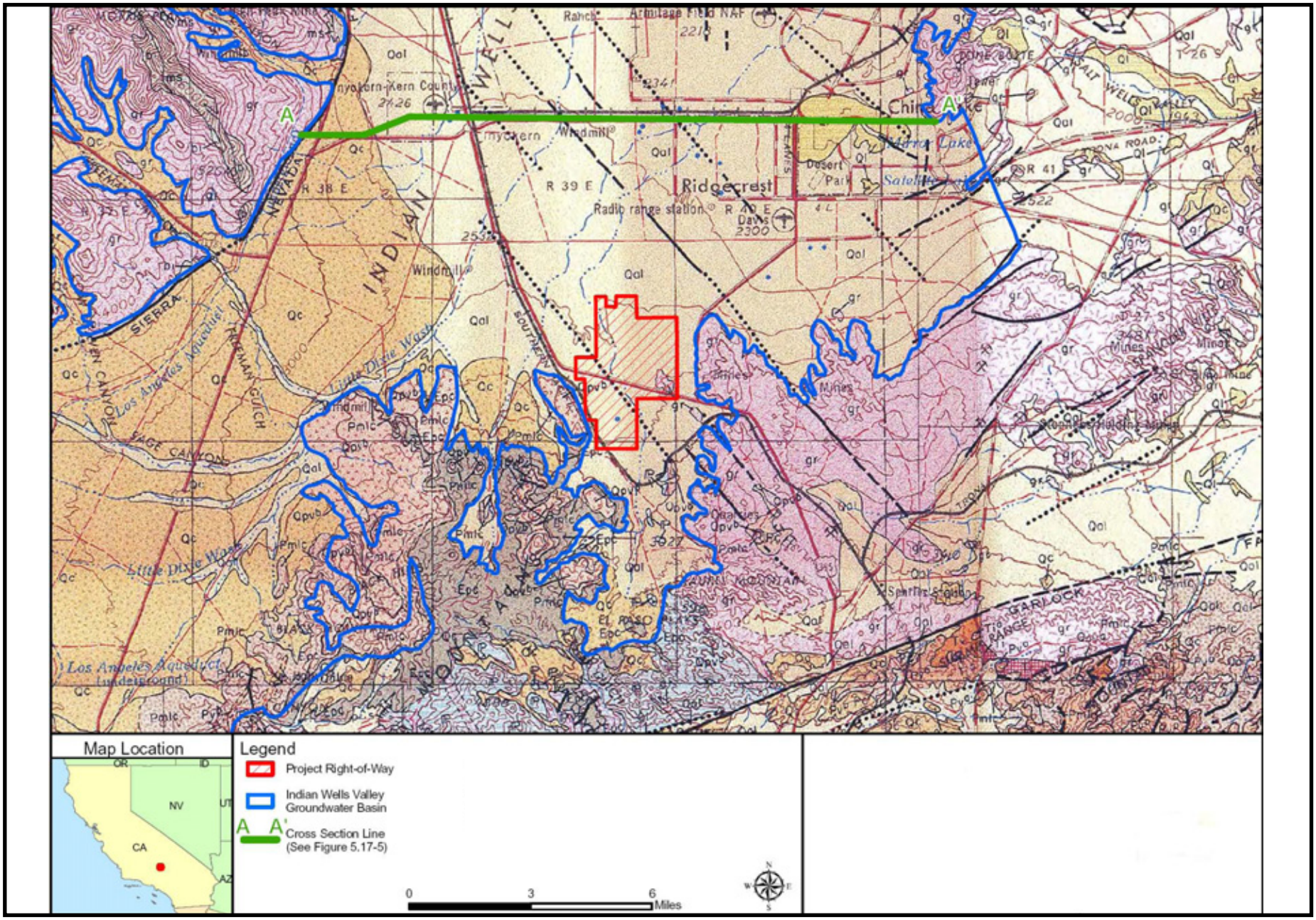


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2009a

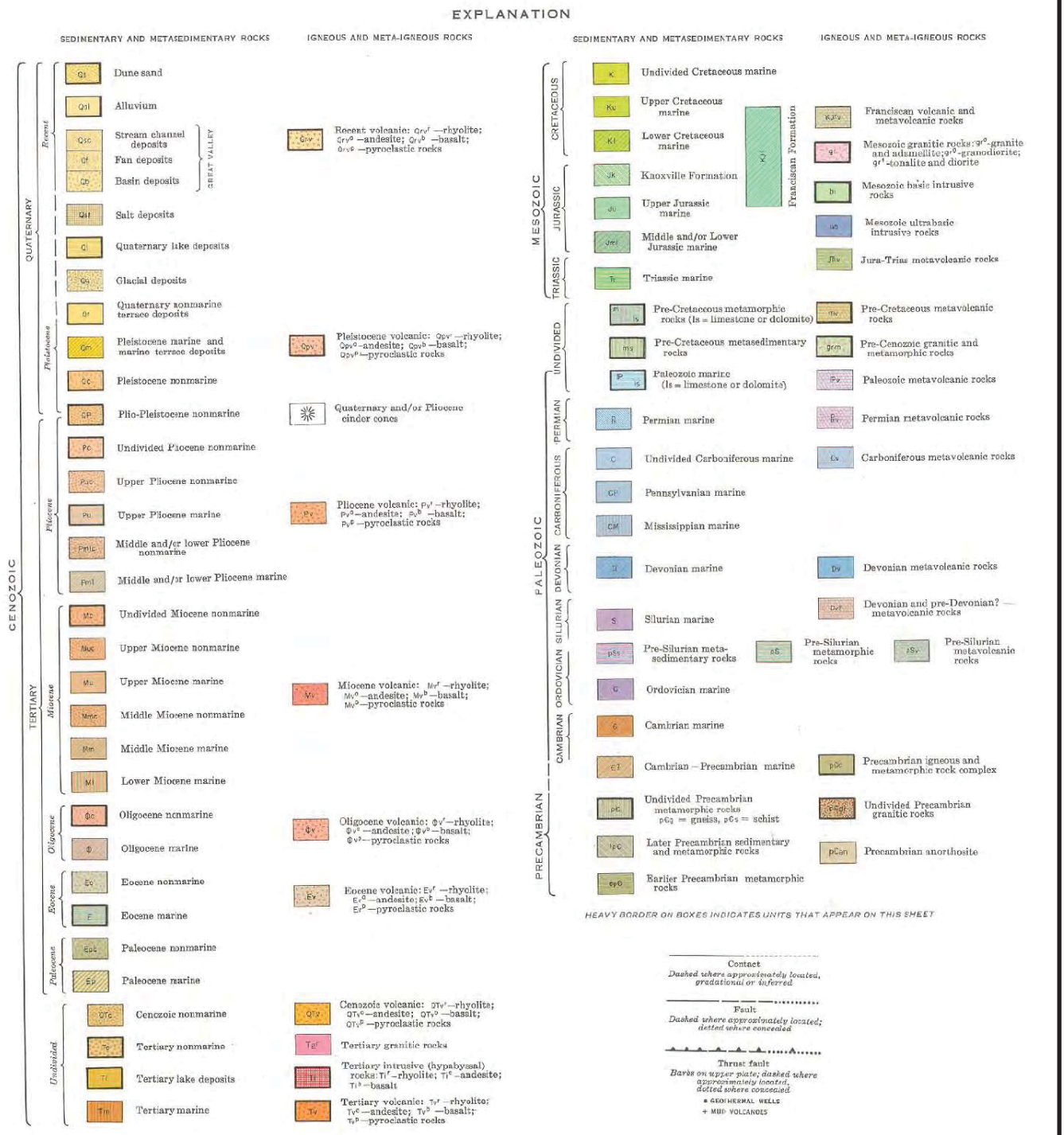
SOIL AND WATER - FIGURE 4

Ridgecrest Solar Power Project - Regional Geology Map



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

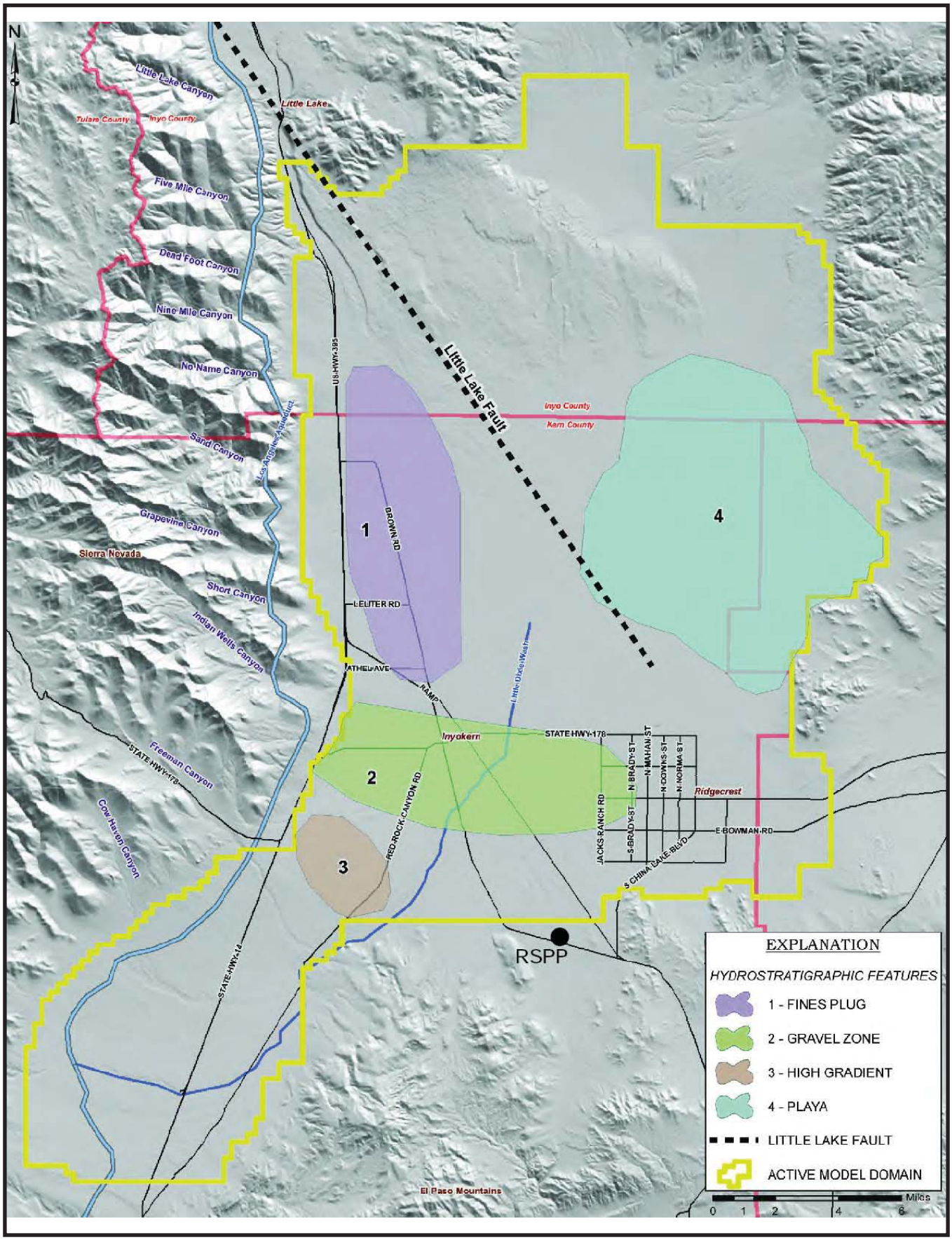
SOURCE: SM 2009a



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010
SOURCE: SM 2009a

SOIL AND WATER - FIGURE 6

Ridgecrest Solar Power Project - Hydrostratigraphic Features in the Indian Wells Valley Groundwater Basin

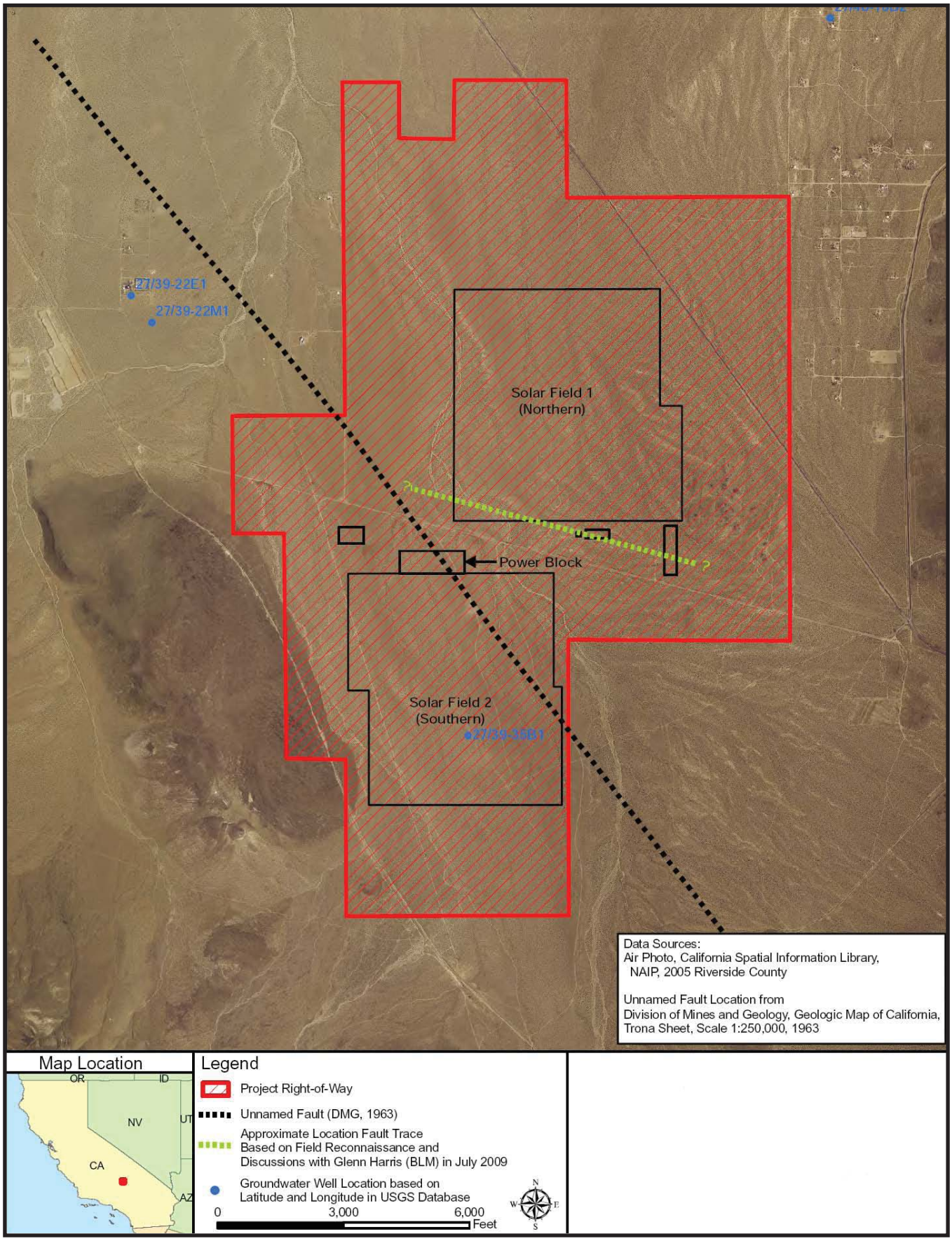


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2009a

SOIL AND WATER - FIGURE 7

Ridgecrest Solar Power Project - Inactive Fault Mapped Onsite

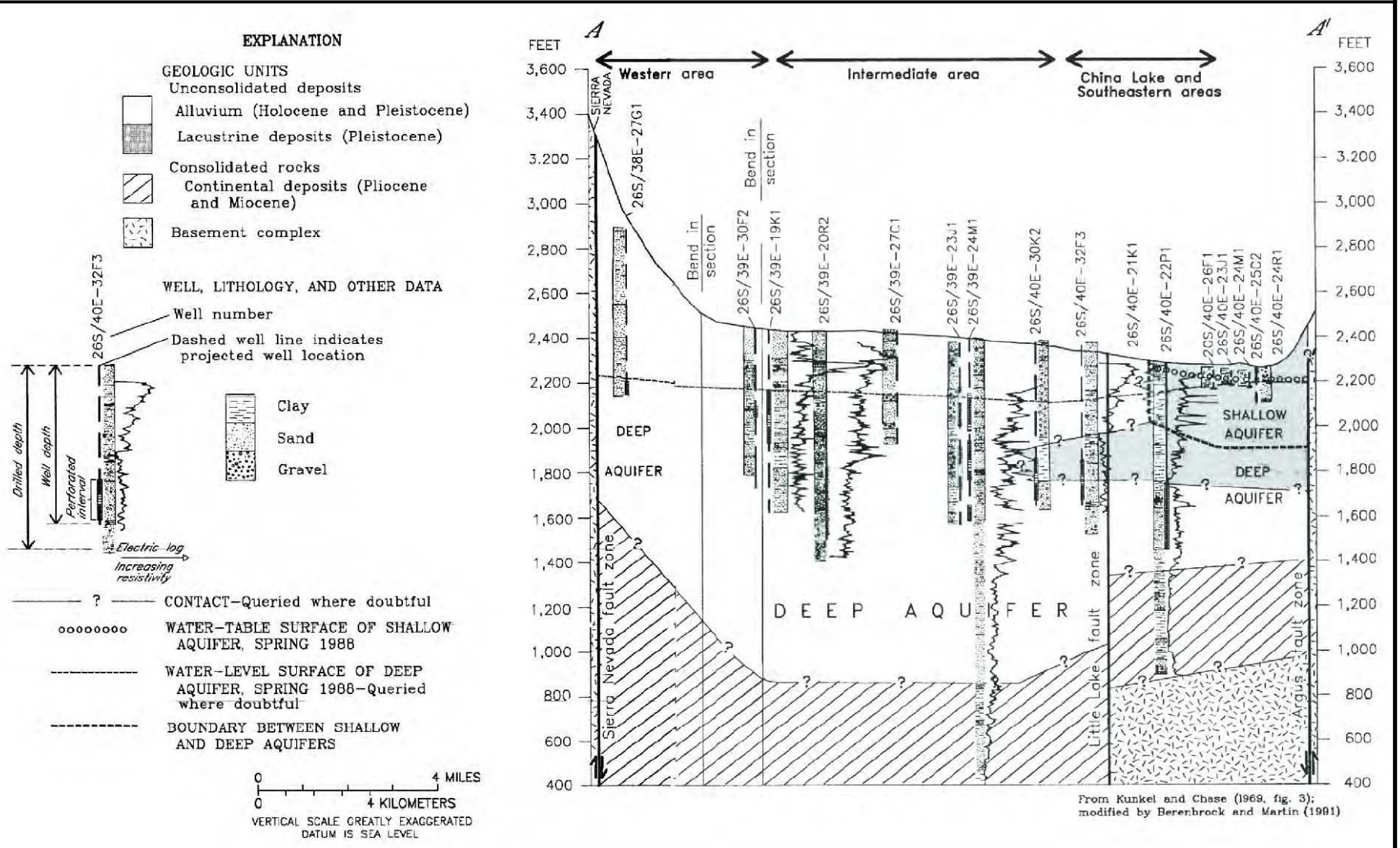


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2009a

SOIL AND WATER - FIGURE 8

Ridgecrest Solar Power Project - Cross-Section A-A'

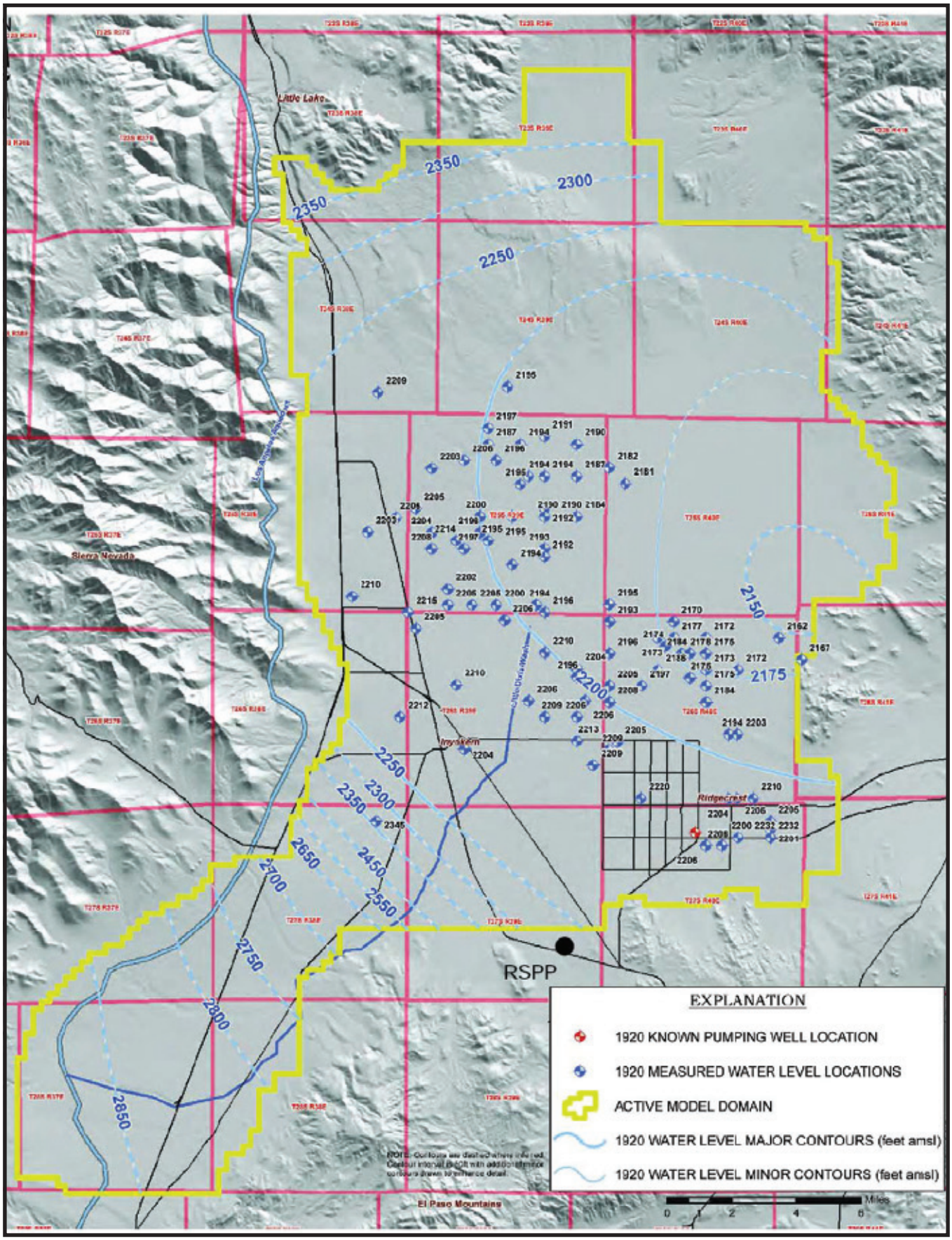


From Kunkel and Chase (1969, fig. 3); modified by Berenbrock and Martin (1991)

SOURCE: SM 2009a

SOIL AND WATER - FIGURE 9

Ridgecrest Solar Power Project - Groundwater Levels - 1920

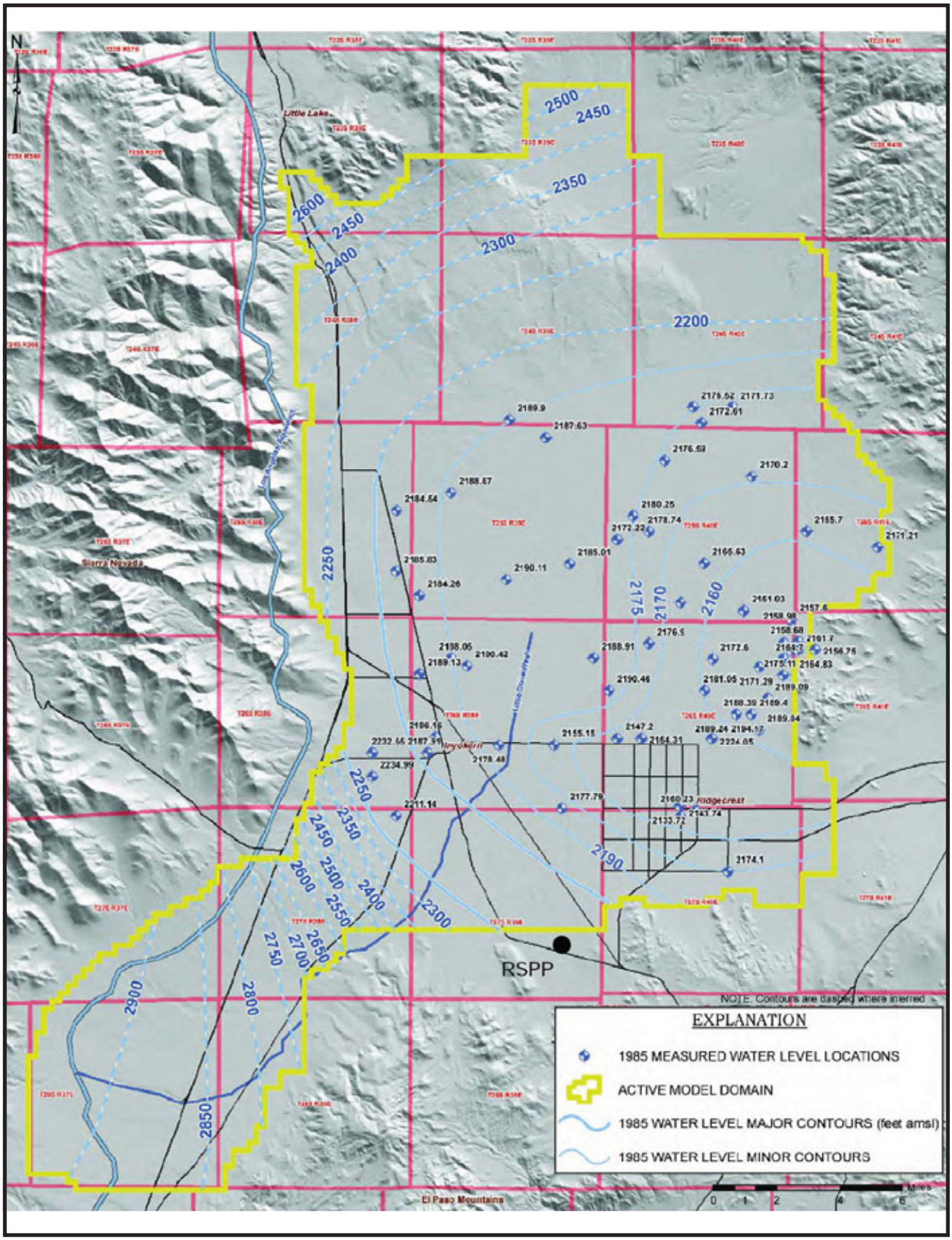


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2009a

SOIL AND WATER - FIGURE 10

Ridgecrest Solar Power Project - Groundwater Levels - 1985

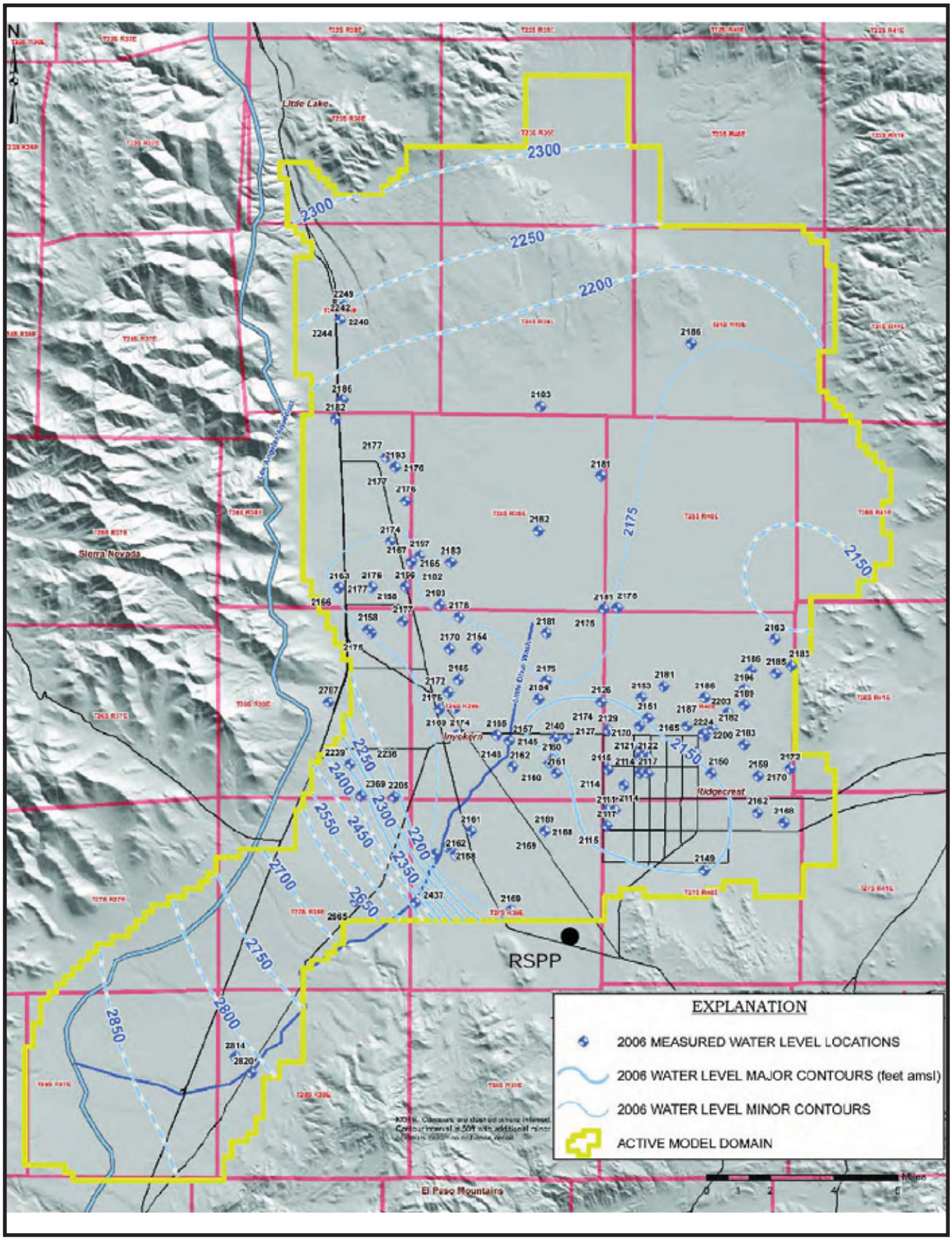


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2009a

SOIL AND WATER - FIGURE 11

Ridgecrest Solar Power Project - Groundwater Levels - 200

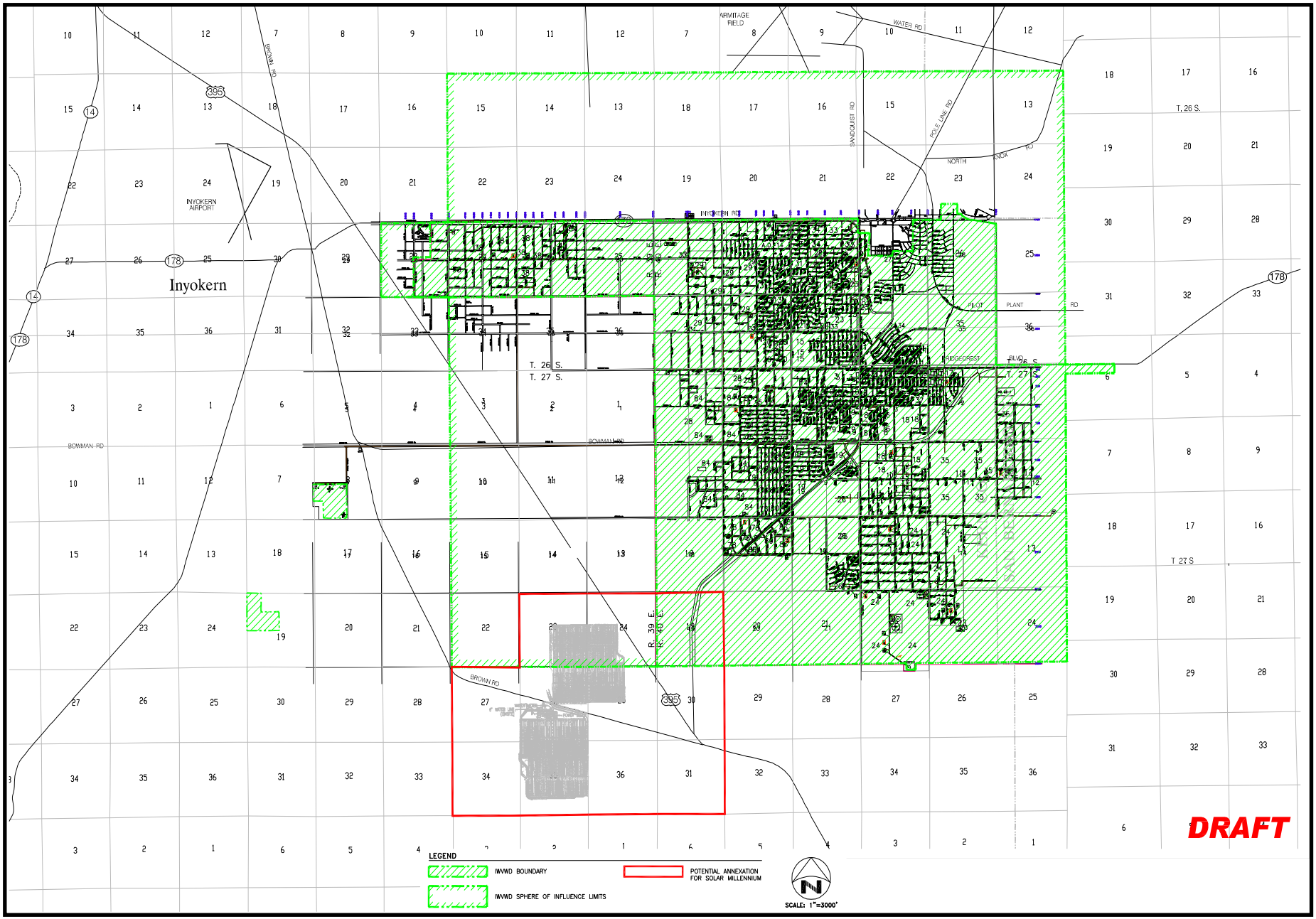


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2009a

SOIL AND WATER - FIGURE 12

Ridgecrest Solar Power Project - IWVWD Proposed Annexation of Project Site

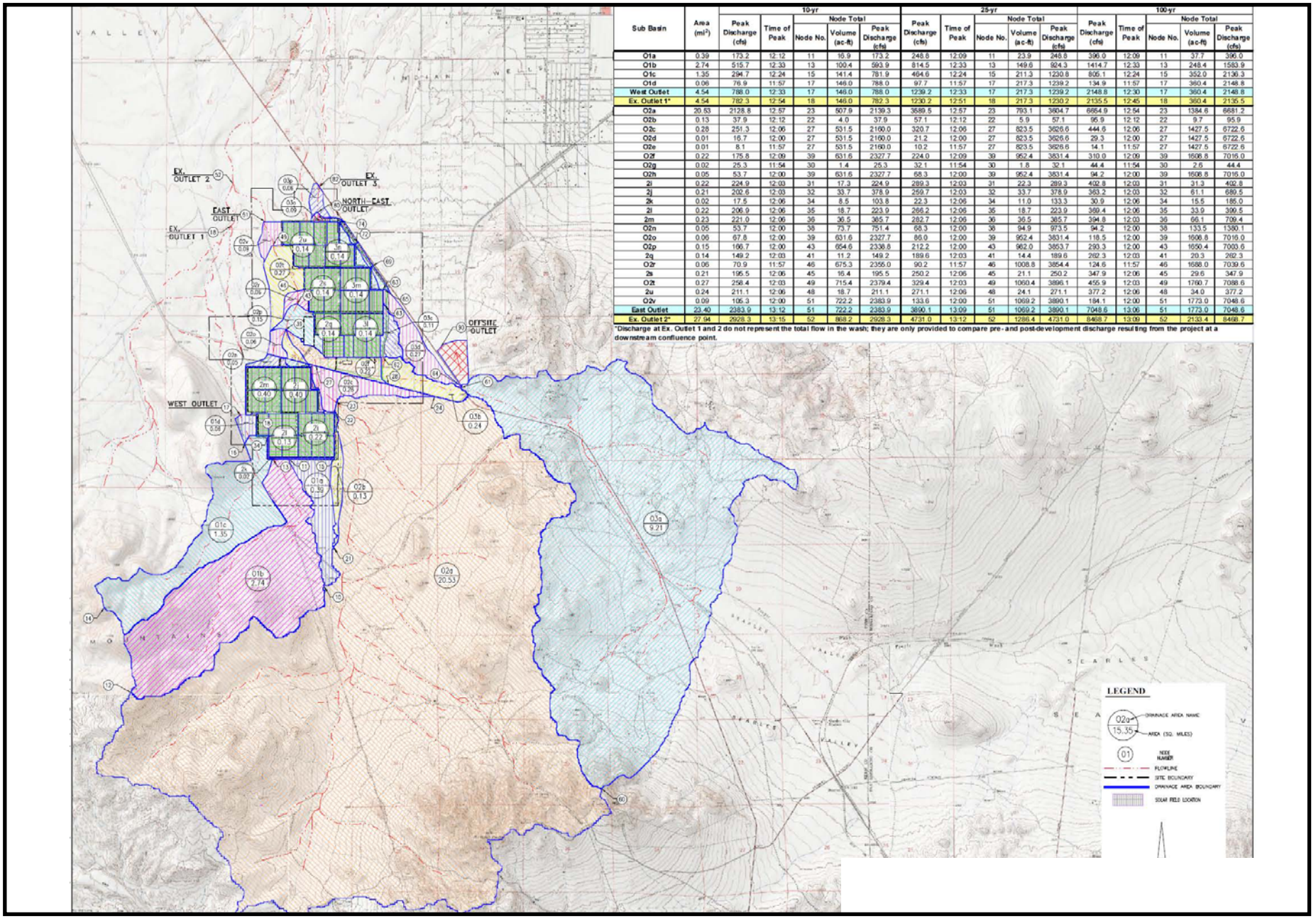


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2010a

SOIL AND WATER - FIGURE 13

Ridgecrest Solar Power Project - Developed Watershed



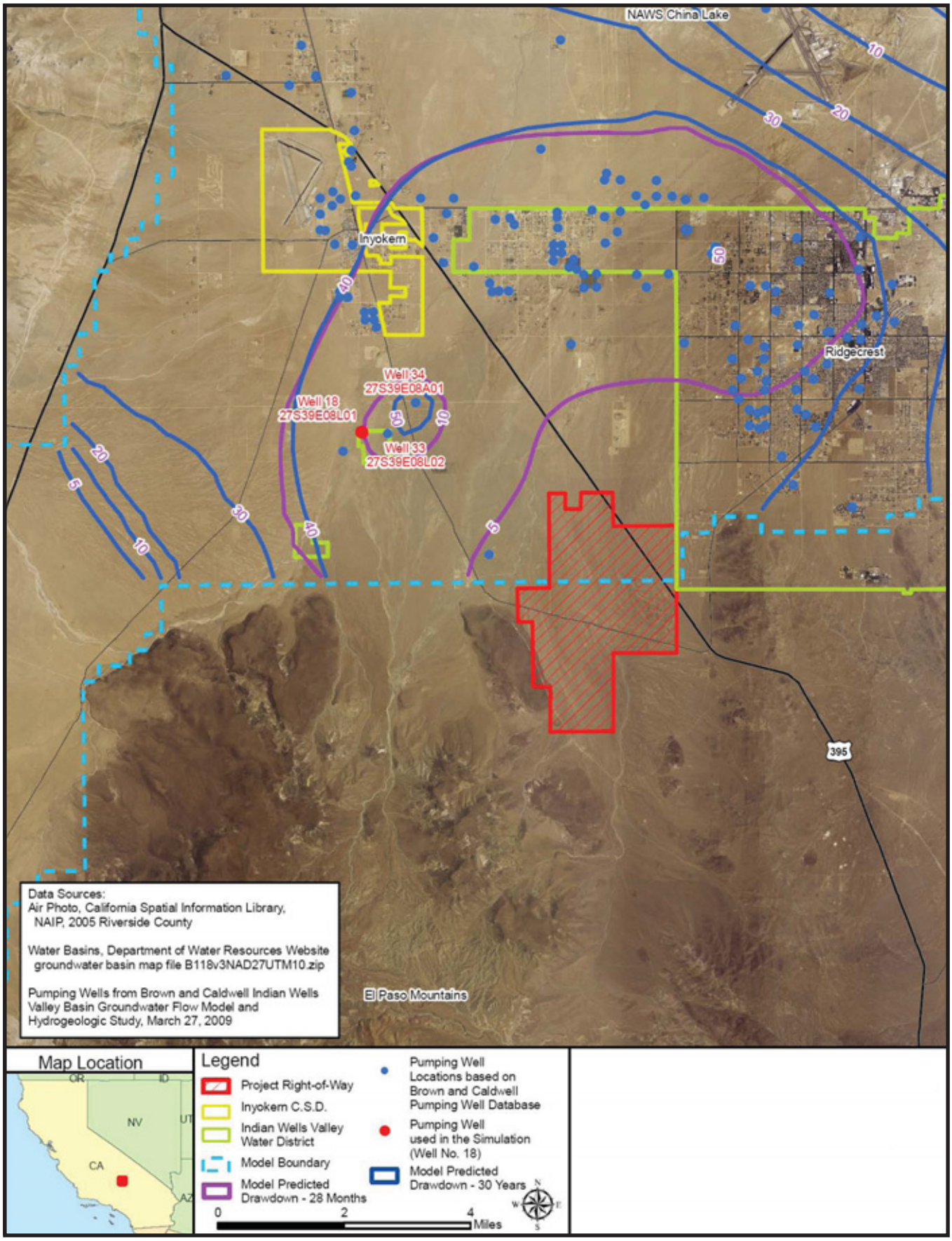
Sub Basin	Area (mi^2)	10-yr					25-yr					100-yr				
		Peak Discharge (cfs)	Time of Peak	Node Total			Peak Discharge (cfs)	Time of Peak	Node Total			Peak Discharge (cfs)	Time of Peak	Node Total		
				Node No.	Volume (ac-ft)	Peak Discharge (cfs)			Node No.	Volume (ac-ft)	Peak Discharge (cfs)			Node No.	Volume (ac-ft)	Peak Discharge (cfs)
O1a	0.39	173.2	12:12	11	16.9	173.2	248.8	12:09	11	23.9	248.8	396.0	12:09	11	37.7	396.0
O1b	2.74	515.7	12:33	13	100.4	593.9	814.5	12:33	13	149.6	924.3	1414.7	12:33	13	248.4	1583.9
O1c	1.35	294.7	12:24	15	141.4	781.9	464.6	12:24	15	211.3	1230.8	806.1	12:24	15	352.0	2136.3
O1d	0.06	76.9	11:57	17	146.0	788.0	97.7	11:57	17	217.3	1239.2	134.9	11:57	17	360.4	2148.8
West Outlet	4.54	788.0	12:33	17	146.0	788.0	1239.2	12:33	17	217.3	1239.2	2148.8	12:30	17	360.4	2148.8
Ex. Outlet 1*	4.54	782.3	12:54	18	146.0	782.3	1230.2	12:51	18	217.3	1230.2	2135.5	12:45	18	360.4	2135.5
O2a	20.53	2128.8	12:57	23	507.9	2139.3	3589.5	12:57	23	793.1	3604.7	6664.9	12:54	23	1384.6	6681.2
O2b	0.13	37.9	12:12	22	4.0	37.9	57.1	12:12	22	5.9	57.1	95.9	12:12	22	9.7	95.9
O2c	0.28	251.3	12:06	27	531.5	2160.0	320.7	12:06	27	823.5	3626.6	444.6	12:06	27	1427.5	6722.6
O2d	0.01	16.7	12:00	27	531.5	2160.0	21.2	12:00	27	823.5	3626.6	29.3	12:00	27	1427.5	6722.6
O2e	0.01	8.1	11:57	27	531.5	2160.0	10.2	11:57	27	823.5	3626.6	14.1	11:57	27	1427.5	6722.6
O2f	0.22	175.8	12:09	39	631.6	2327.7	224.0	12:09	39	952.4	3831.4	310.0	12:09	39	1606.8	7015.0
O2g	0.02	25.3	11:54	30	1.4	25.3	32.1	11:54	30	1.8	32.1	44.4	11:54	30	2.6	44.4
O2h	0.05	53.7	12:00	39	631.6	2327.7	68.3	12:00	39	952.4	3831.4	94.2	12:00	39	1606.8	7015.0
2i	0.22	224.9	12:03	31	17.3	224.9	289.3	12:03	31	22.3	289.3	402.8	12:03	31	31.3	402.8
2j	0.21	202.6	12:03	32	33.7	378.9	259.7	12:03	32	33.7	378.9	363.2	12:03	32	61.1	680.5
2k	0.02	17.5	12:06	34	8.5	103.8	22.3	12:06	34	11.0	133.3	30.9	12:06	34	15.5	185.0
2l	0.22	206.9	12:06	35	18.7	223.9	266.2	12:06	35	18.7	223.9	369.4	12:06	35	33.9	399.5
2m	0.23	221.0	12:06	36	36.5	385.7	282.7	12:06	36	36.5	385.7	394.8	12:03	36	66.1	709.4
O2n	0.05	53.7	12:00	38	73.7	751.4	68.3	12:00	38	94.9	973.5	94.2	12:00	38	133.5	1380.1
O2o	0.06	67.8	12:00	39	631.6	2327.7	86.0	12:00	39	952.4	3831.4	118.5	12:00	39	1606.8	7015.0
O2p	0.15	166.7	12:00	43	654.6	2338.8	212.2	12:00	43	962.0	3853.7	293.3	12:00	43	1650.4	7093.6
2q	0.14	149.2	12:03	41	11.2	149.2	189.6	12:03	41	14.4	189.6	262.3	12:03	41	20.3	262.3
O2r	0.06	70.9	11:57	46	675.3	2355.0	90.2	11:57	46	1008.8	3854.4	124.6	11:57	46	1688.0	7039.6
2s	0.21	195.5	12:06	45	16.4	195.5	250.2	12:06	45	21.1	250.2	347.9	12:06	45	29.6	347.9
O2t	0.27	258.4	12:03	49	715.4	2379.4	329.4	12:03	49	1060.4	3896.1	455.9	12:03	49	1760.7	7088.6
2u	0.24	211.1	12:06	48	18.7	211.1	271.1	12:06	48	24.1	271.1	377.2	12:06	48	34.0	377.2
O2v	0.09	105.3	12:00	51	722.2	2383.9	133.6	12:00	51	1069.2	3890.1	184.1	12:00	51	1773.0	7048.6
East Outlet	23.40	2383.9	13:12	51	722.2	2383.9	3890.1	13:09	51	1069.2	3890.1	7048.6	13:06	51	1773.0	7048.6
Ex. Outlet 2*	27.94	2928.3	13:15	52	868.2	2928.3	4731.0	13:12	52	1286.4	4731.0	8468.7	13:09	52	2133.4	8468.7

*Discharge at Ex. Outlet 1 and 2 do not represent the total flow in the wash; they are only provided to compare pre- and post-development discharge resulting from the project at a downstream confluence point.

SOURCE: SM 2010

SOIL AND WATER - FIGURE 14

Ridgecrest Solar Power Project - Baseline Model Production Drawdown

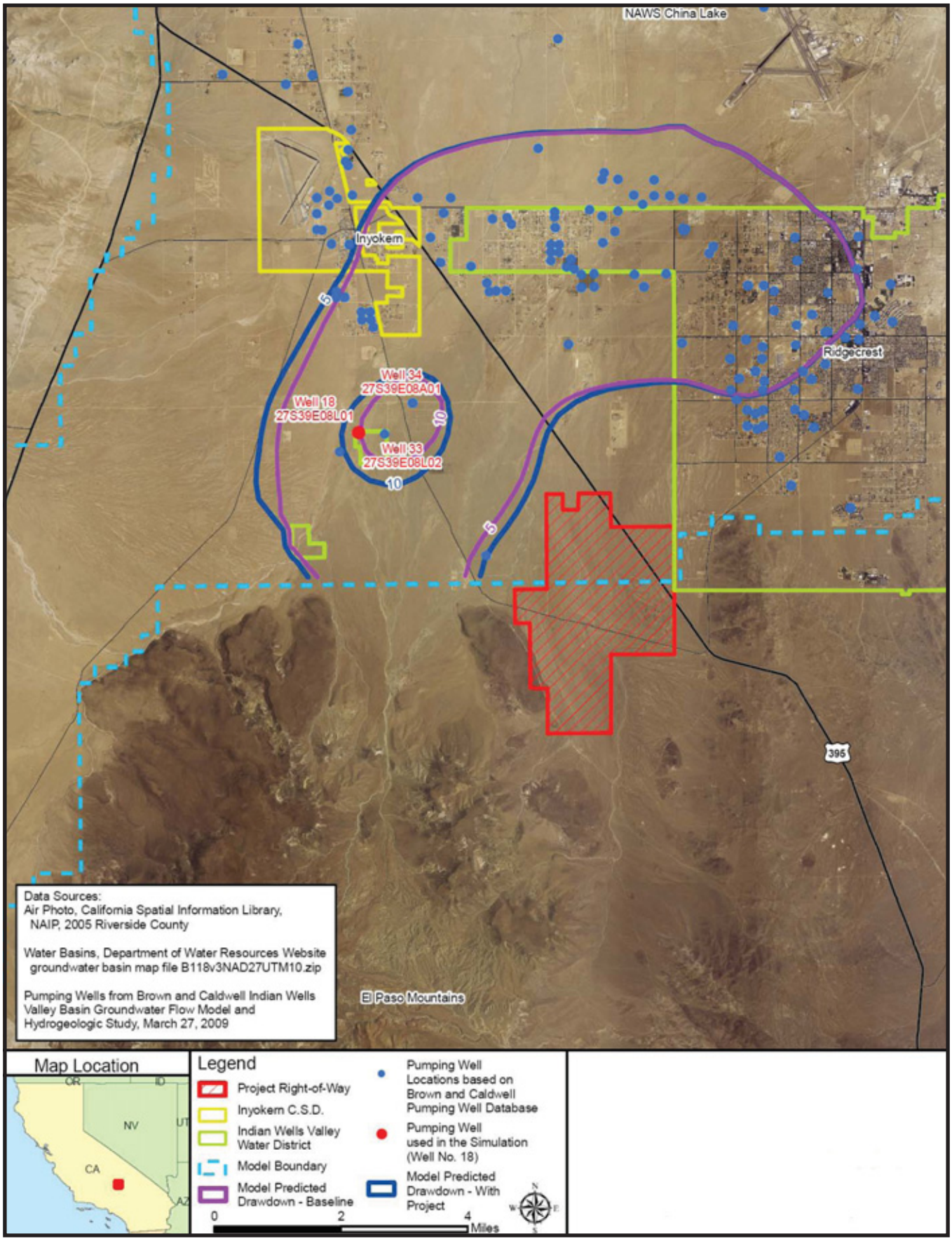


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2009a, Apendix J

SOIL AND WATER - FIGURE 15

Ridgecrest Solar Power Project - Baseline Plus Project Construction Pumping (End of 28 Months)

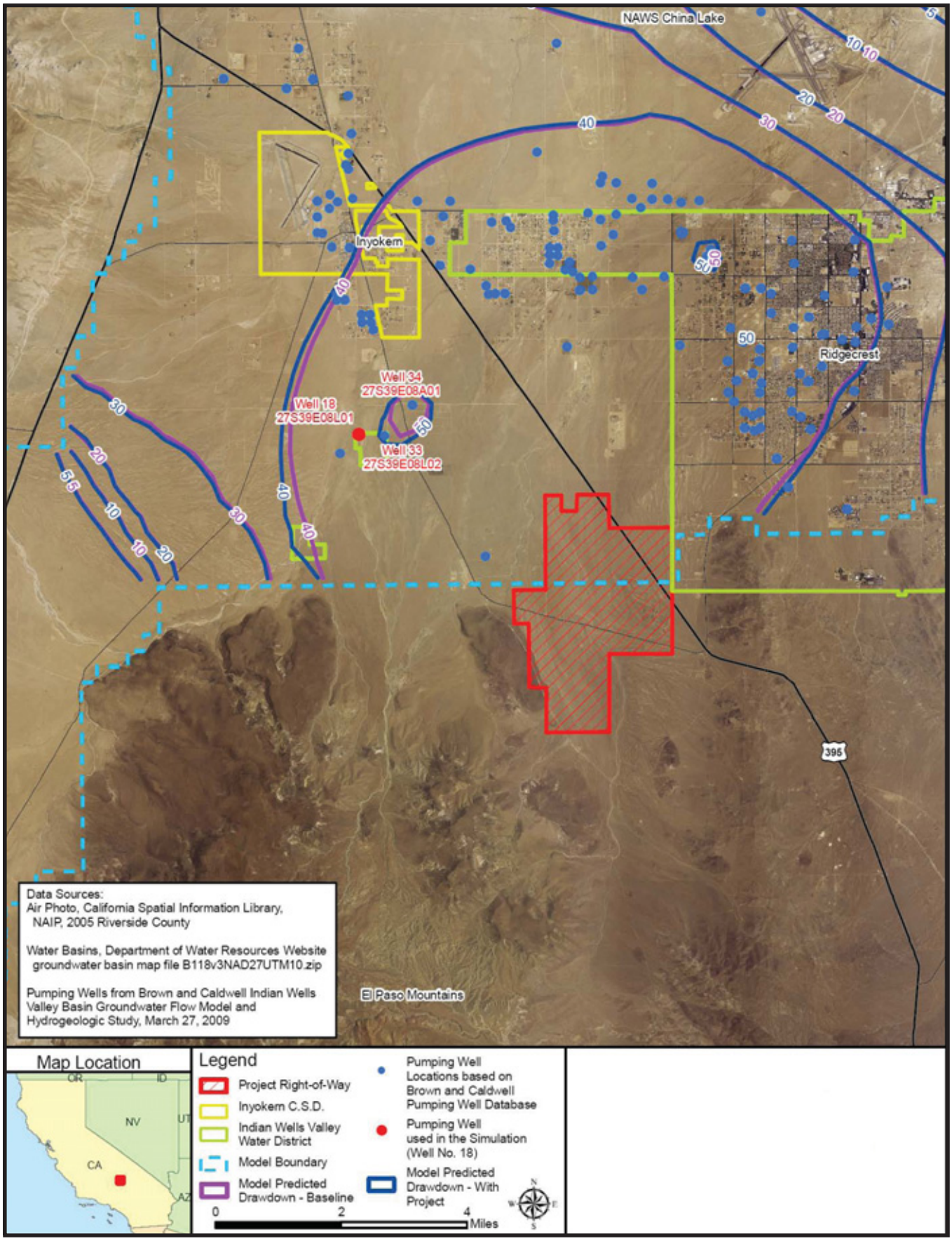


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2009a, Apendix J

SOIL AND WATER - FIGURE 16

Ridgecrest Solar Power Project - Baseline Plus Operational Pumping (After 30 Years)

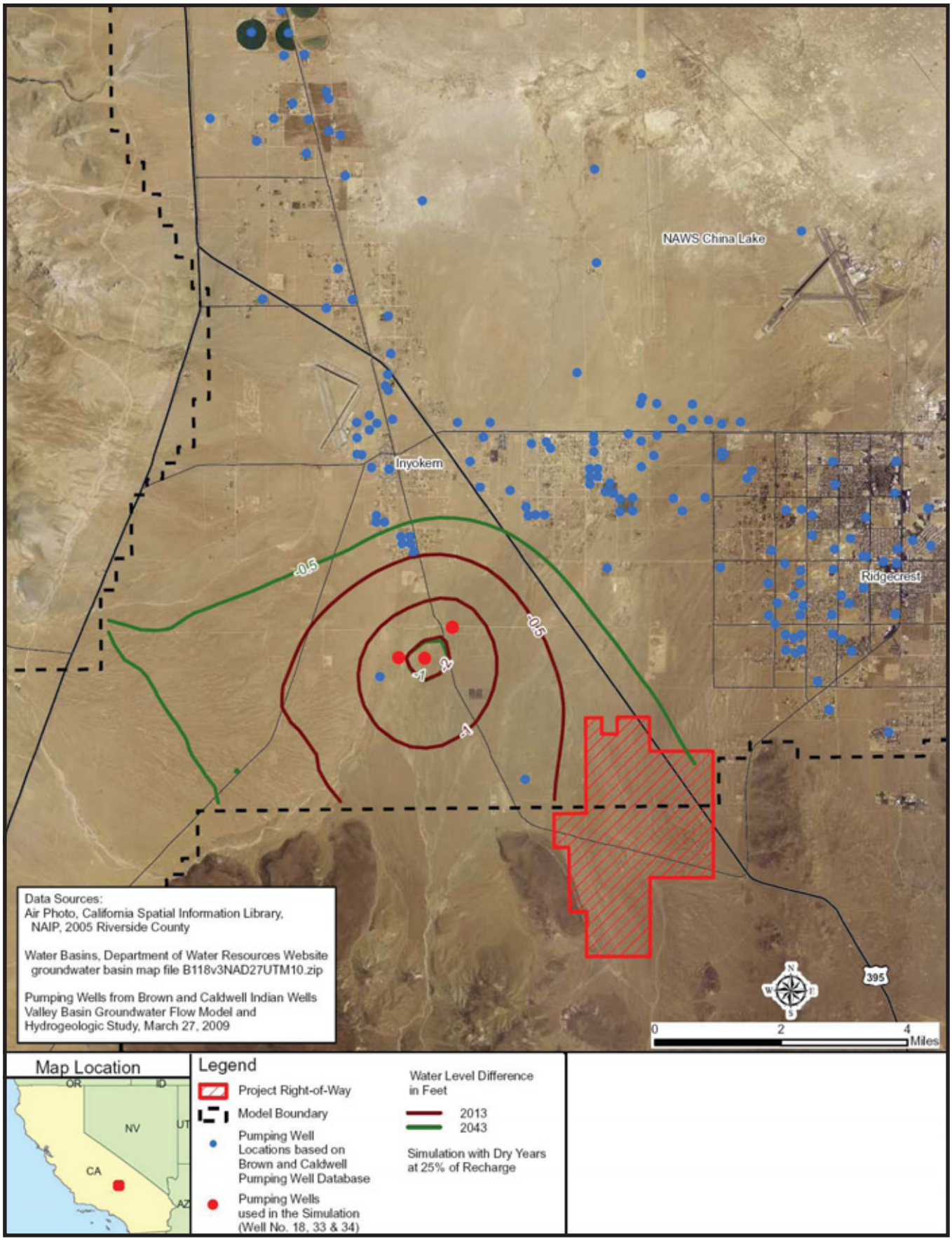


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2009a, Apendix J

SOIL AND WATER - FIGURE 17

Ridgecrest Solar Power Project - Predicted Water Level Difference 2013 and 2043 Scenario (3a) and Project (4a)

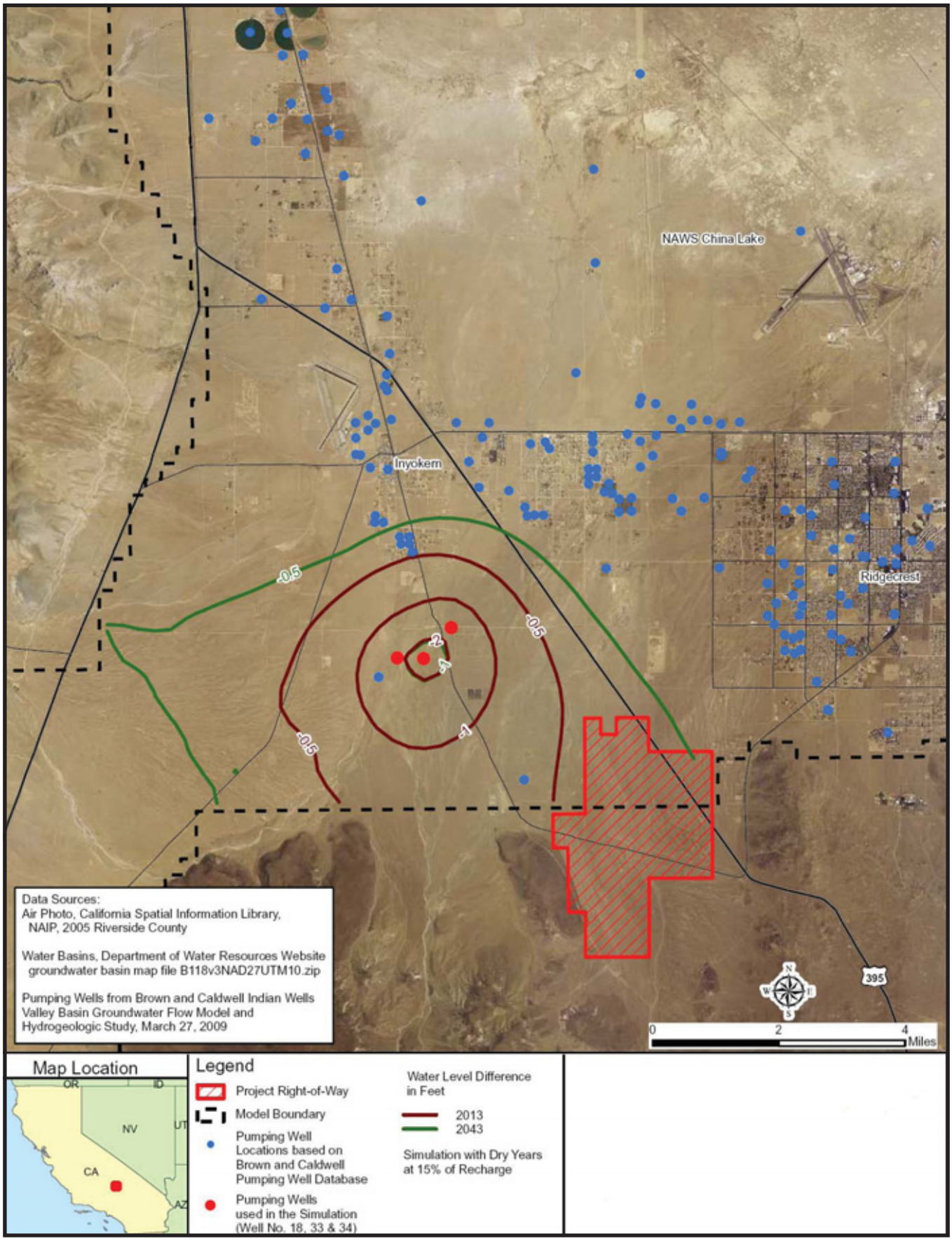


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2010a, DR 133

SOIL AND WATER - FIGURE 18

Ridgecrest Solar Power Project - Predicted Water Level Difference 2013 and 2043 Scenario (3b) and Project (4b)

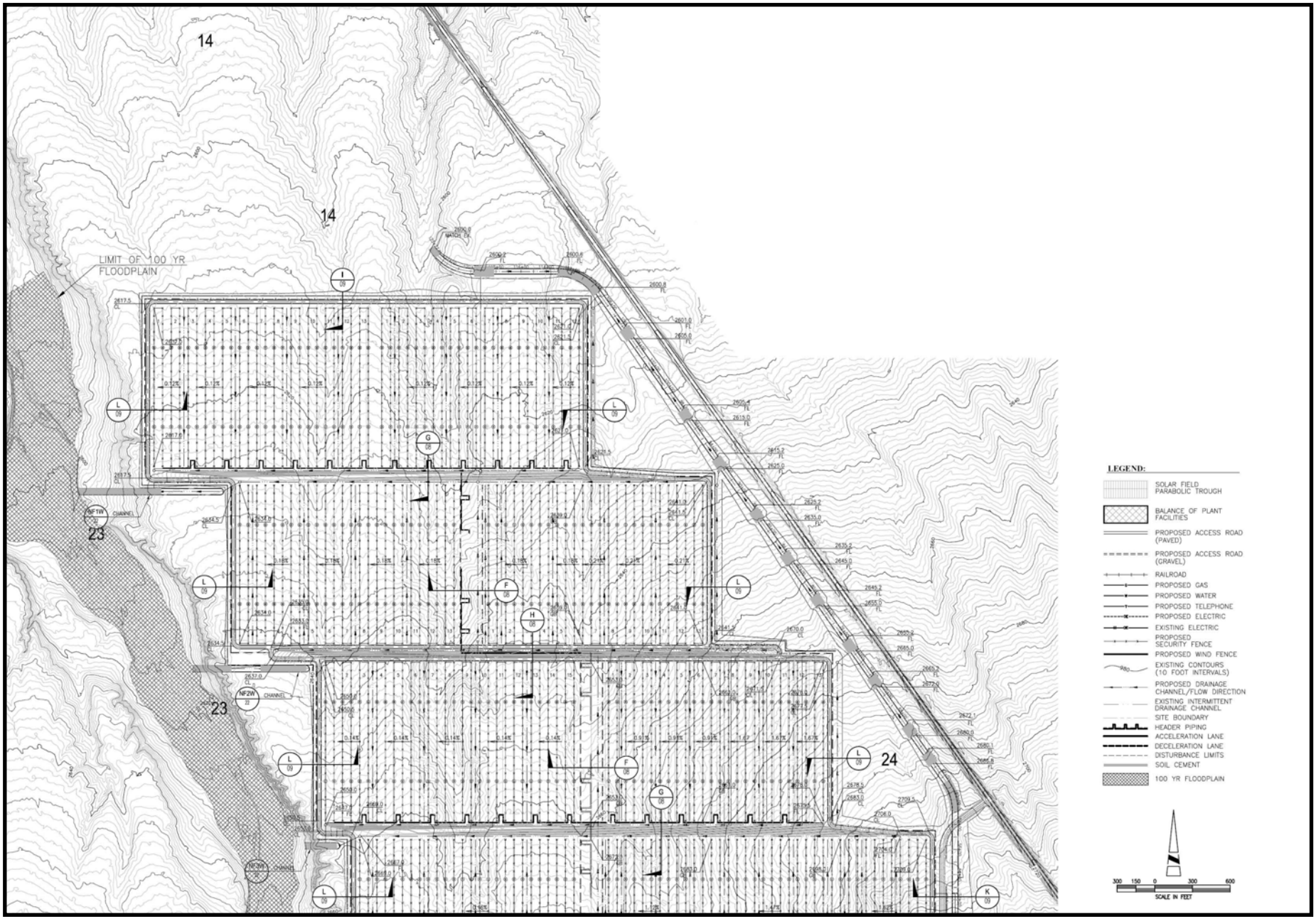


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2010a, DR 133

SOIL AND WATER - FIGURE 19

Ridgecrest Solar Power Project - El Paso Floodplain 1

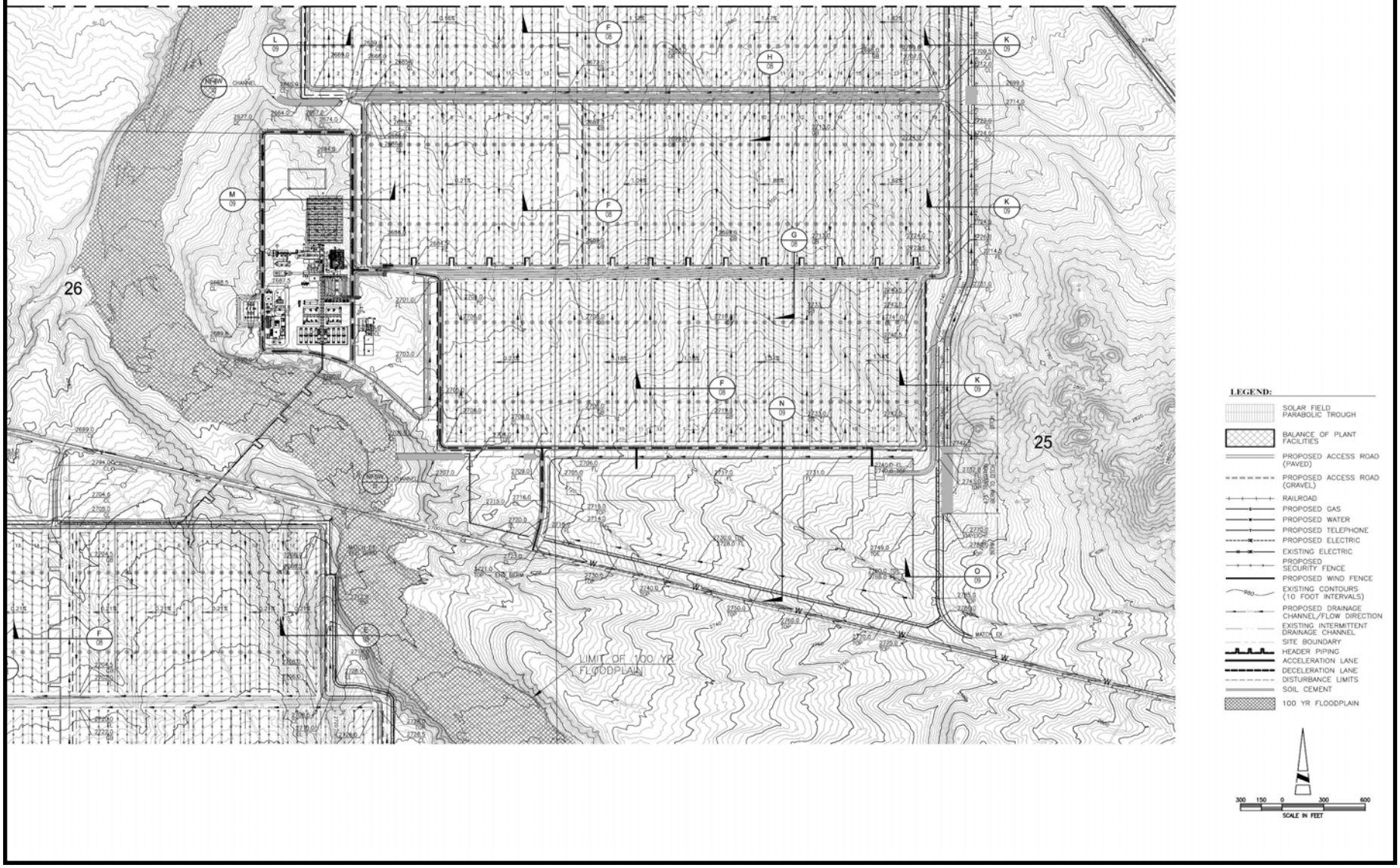


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2010

SOIL AND WATER - FIGURE 20

Ridgecrest Solar Power Project - El Paso Floodplain 2

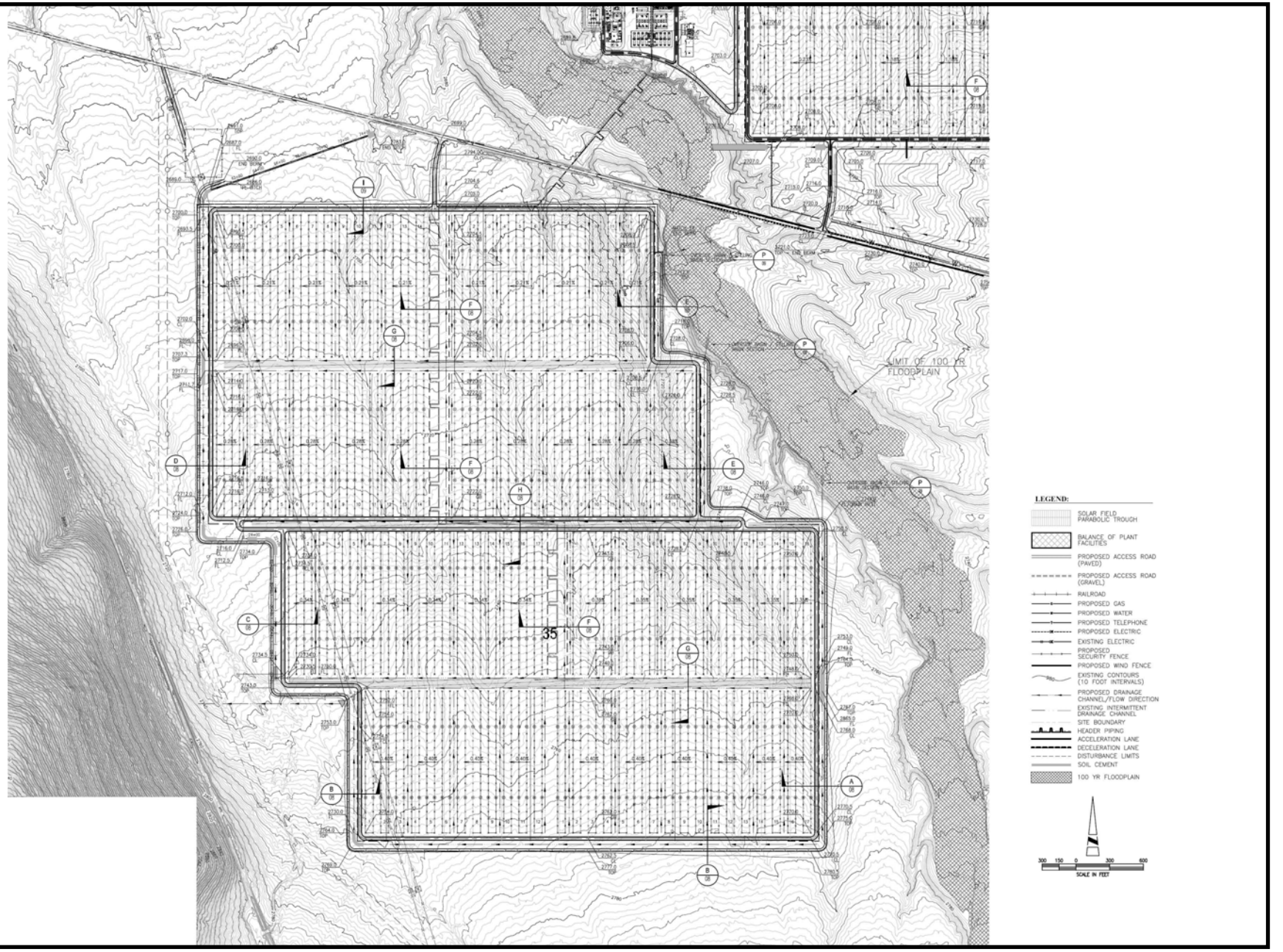


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2010

SOIL AND WATER - FIGURE 21

Ridgecrest Solar Power Project - El Paso Floodplain 3



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2010

C.10 TRAFFIC AND TRANSPORTATION

Testimony of Robert Fiore

C.10.1 SUMMARY OF CONCLUSIONS

The Ridgecrest Solar Power Project (RSPP) would conflict with an applicable laws, ordinances, regulations, and standards (LORS) pertaining to State and Kern County's level of service (LOS) standards. LOS D is the minimum acceptable LOS standard for State highways and Kern County roads. The Brown Road, US 395 and China Lake Boulevard intersection currently operates at LOS B but project related construction trips would degrade the LOS for the intersection to LOS E. California Energy Commission staff's (staff) recommended conditions of certification would ensure that the proposed RSPP does not conflict with and would be in compliance with applicable LORS. Other transportation system aspects of the RSPP would be in compliance with applicable LORS related to traffic and transportation, including the Circulation Element of the County of Kern County General Plan and Municipal Code and the Circulation-Transportation Element of the Ridgecrest General Plan Circulation Element.

RSPP would introduce an impact (significant under CEQA) related to traffic safety. The Brown Road, US 395 and China Lake Boulevard intersection experiences a collision rate almost three times the State average for similar intersections. Project related construction trips are likely to significantly increase the collision rate at the intersection. Fifteen percent more vehicle trips (approximately 583) would encounter the intersection as a means to access the proposed RSPP site.

RSPP would introduce an impact (significant under CEQA) with respect to glare. The solar mirror troughs would reflect light or create glare posing a hazard to motorists. RSPP induced impacts related to glare hazards would be mitigated (reduced to less than significant under CEQA) with the implementation of staff's recommended conditions of certification.

RSPP would introduce impacts (significant under CEQA) related to vertical velocity plumes and glare affecting pilots. Military operations occur at low altitudes over the proposed project site. R2506 is a restricted military air space for the purposes of providing the military an area for performing low altitude maneuvers. In addition, civilian aircraft may fly over the proposed project site, with permission from the military. Further, the area within 20 miles of the Inyokern airport presents ideal conditions for sailplanes and pilot instruction due to the many atmospheric and geographic conditions of the eastern side of the Sierra Nevada Mountains.

Vertical velocity plumes are unseen currents of air exhausted upward from the Air Cooled Condenser (ACC) stacks that would pose a hazard to aircraft with direct over flight of these facilities. As presented above, there is a potential that military and civilian flight paths and patterns would occur over the proposed RSPP site. RSPP induced impacts related to the vertical velocity plume hazards would be mitigated (reduced to less than significant under CEQA) with the implementation of staff's recommended conditions of certification.

Similar to the affect glare or reflection may pose on motorists, the solar mirror troughs would reflect light or create glare that pose a hazard to civilian and to military flight operations. RSPP induced impacts related to hazards affecting pilots would be mitigated (reduced to less than significant under CEQA) with the implementation of staff's recommended conditions of certification.

C.10.2 INTRODUCTION

The transportation system within the proposed RSPP's affected environment includes; existing and planned regional and local roads, routes and traffic patterns, public transportation operations, school bus routes, designated bikeways or pedestrian pathways, railways, airports, aircraft flight paths and patterns, transmission lines and pipelines and waterways. Analysis of these aspects of the traffic and transportation system is statutorily required by the Energy Commission's Siting Regulations[1].

In cooperation with Bureau of Land Management (BLM), the traffic and transportation analysis identifies existing and reasonably foreseeable transportation systems and conditions as the basis for determining potential impacts induced by the proposed project. This analysis is organized by: a) assessing existing and planned transportation systems and conditions, b) assessing the impacts induced by the proposed project on existing and planned transportation systems and conditions, c) assessing the cumulative impacts of the proposed project and reasonably foreseeable future projects on the transportation systems and conditions and, d) determining compliance with applicable traffic and transportation laws, ordinances, regulations and ordinances (LORS).

C.10.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

The National Environmental Protection Act (NEPA) and the California Environmental Quality Act (CEQA) require agencies to integrate environmental values into the decision making processes by considering the environmental impacts of projects. The purpose of NEPA is to disclose a proposed action's environmental effect and to avoid or minimize such adverse effects to the extent practicable[2]. Similar to NEPA, the purpose of CEQA is to identify a project's environmental effect and to minimize such environmental effect. The Application for Certification 09-AFC-9 and other resources were consulted to assist in determining the proposed action or project's traffic and transportation environmental effects. Neither NEPA nor CEQA provide specific methodologies or thresholds for determining a project's environmental affects or impacts to the existing or reasonably foreseeable traffic and transportation conditions. It is the responsibility of the lead agency to develop such methodologies, thresholds or policy statements.

CEQA Guidelines and Environmental Checklist[3], provide issues the lead agency can consider in determining project induced environmental effects and the significance of

[1] California Code of Regulations, Title 20, Chapter 5, § 1704, Appendix B (g)(5)

[2] Code of Federal Regulations, Title 40, § 6.100

[3] California Code of Regulations, Title 14, § 15063

the effects. It is important to understand the significance of environmental effect to determine if such effect can be mitigated and the mitigation measure if the effect can be mitigated. The methodologies and thresholds staff used to determine the significance of project induced impacts includes an integration of principles and practices, performance standards and thresholds established by interested agencies. The following are the Environmental Checklist questions staff considered and the methodology, threshold, performance standard or principle and practice staff used to determine the significance of the environmental effect induced by the proposed RSPP:

- Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?
- Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?

Level of service (LOS) is the primary measure for determining environmental effect associated with the circulation system within the proposed projects affected environment. State and County LORS establish LOS standards for roadways and intersections within the proposed project's affected environment. Since the proposed project would impact state and local roadways, the following performance standards were used to determine the proposed project's environmental effect:

- LOS D or better conditions on a State of California highways (Federal highways are operated and maintained by Caltrans[4])
- LOS D or better conditions on an Kern County roadways

Policies adopted by the Kern Council of Governments and Kern County pertaining to mass transit, congestion management, transportation demand management and pedestrian and bicycle paths, and Caltrans construction traffic control plan manual also provide the basis for mitigating circulation system impacts.

- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

There are four primary safety concerns that pose impacts to flight paths and patterns associated with power plants. The four safety concerns are obstruction, plumes, radio and telecommunications and glare.

Power plant buildings and structures can present an obstruction to flight paths and patterns. Planning policies used to assess the potential environmental effect related to obstruction include the Code of Federal Regulations, Special Federal Aviation Regulations and Federal Aviation Administration informational circulars, Military

[4] California Department of Transportation

Restricted Area R-2506, Military Restricted Area R-2508 Joint Land Use Study and the Kern County Airport Land Use Compatibility Plan.

Power plant operations could generate visible water vapor and vertical velocity plumes. What constitutes a potential visible water vapor or vertical velocity safety concern is not clearly defined and methodologies or thresholds are currently being debated. Staff has concluded that the most remote possibility of hazard is considered significant and must be mitigated.

The proposed project would present glare that may affect pilot's vision. What constitutes a potential glare related safety concern is not clearly defined and methodologies or thresholds are currently being debated. Staff has concluded that the most remote possibility of hazard is considered significant and must be mitigated.

- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Traffic generated by the proposed RSPP would exacerbate an existing traffic safety condition. The threshold is based on average collision statistics for State of California highways and existing conditions. Collision statistics vary between years but, according to Caltrans, the intersection of Brown Road, US 395 and China Lake Boulevard has a collision incident rate that is 2.8 times higher than the state average.

- Result in inadequate emergency access?

Kern County Municipal Code Title 19.80 establishes policies for emergency access and Kern County design manuals and design procedures ensure adequate and safe emergency access.

- Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

Kern Council of Governments, Kern County, and the City of Ridgecrest have developed the Regional Transportation Plan and General Plan Circulation Elements containing policies regarding public transit, bicycle, or pedestrian facilities. These planning documents do not contain methodologies or thresholds for measuring impacts but do contain statements that promote, encourage and support public transit, bicycle, or pedestrian facilities. These statements provide the basis for mitigation of other impacts.

C.10.4 PROPOSED PROJECT

C.10.4.1 SETTING AND EXISTING CONDITIONS

Ridgecrest Solar 1, LLC (RSI), the applicant, is proposing to develop, own and operate a utility-scale solar thermal electric generating facility. Application for Certification, 09-AFC-9 (SM 2009a), states that the proposed project would be located on approximately 1,940 acres of a ROW grant on lands managed by the Bureau of Land Management (BLM) in Kern County, California. Ridgecrest, California is located approximately five miles northeast of the proposed project. The China Lake Naval Air Weapons Station

and the many recreational activities offered in El Paso Management Area (BLM) are the main attractions for the area within the vicinity of the proposed project.

Construction of the RSPP project is anticipated to occur over approximately 28 months. Peak project construction workforce is anticipated to be 633 workers during the 11th month. (SM 2009a, p. 5.13-13) Other components of the proposed project with the potential to affect traffic and transportation systems include: a water mainline, telecommunication and telemetry systems, access road(s) and 230 kV transmission lines (SM 2009a, Sections 2.1, 2.5 and 2.6).

The California Desert Conservation Area (CDCA) Plan is the land (including transportation) planning document for BLM managed lands for the California desert where the RSPP would be developed. It was adopted in 1980 (BLM 1980a). CDCA includes policies and procedures for motorized vehicle access as an integral part of desert land planning. Originally adopted in 1980, the CDCA was re-published in 1999 and included several amendments. In March 2006, the BLM issued a Record of Decision amending the CDCA plan with the West Mojave Plan (BLM 2005a). Section 2.2.6 of the West Mojave Plan discusses the Public Land Motorized Vehicle Access Network. It establishes sub-regions and motorized access zones (MAZ). The project site would be located in the El Paso sub-region. The purpose of the plan is to identify and balance recreation, habitat conservation and access.

BLM designated motorized vehicle access routes currently traverse the proposed project site (BLM 1980a, pp 75-83). BLM MAZ's are multiple-use routes not necessarily for the purpose connecting origins and destinations. These routes are primarily used for recreation activities. MAZ routes are discussed further in the **LAND USE** section of this staff assessment.

Vacant land and sparse rural residential development characterize the proposed project site and surrounding uses. The nearest residence is located approximately 3,200 feet northwest of the proposed project site. Brown Road is used to access these sparsely developed home-sites. Brown Road also provides access to the community of Inyokern.

C.10.4.1.1 Regional and Local Highways and Roads

The proposed RSPP site is located near the apex of Brown Road and US 395. There are three regional highways within the proposed project's affected environment that connect the proposed project site with the employment base. These routes are US 395, SR-14 and SR-178. China Lake Boulevard and Brown Road are primary roadways also serving the proposed project site. China Lake Boulevard connects Ridgecrest with Brown Road and Brown Road connects SR-178 and US 395 to the proposed project site.

Traffic and Transportation Figure-1 illustrates regional and local roadways within the project's affected environment. Construction workforce origination centers include Ridgecrest (5 miles), Barstow (80 miles), Bakersfield (100 miles), Antelope Valley (90 miles), Victor Valley (85 miles) and other cities within the Los Angeles metropolitan area (100 miles). The proposed project site is accessible from these centers via the routes cited above.

Traffic analysis begins with identifying routes and intersections to be affected by the proposed project. It is likely that construction traffic would travel a distance of up to two hours (100 miles) from the proposed project site. Energy Commission staff requested the applicant to expand their data to include routes and intersections accordingly. The applicant assigned a distribution of construction traffic trips to routes of anticipated points of origin (SM 2010a, DR-Traffic-193). The following are routes and intersections identified that project construction and operations traffic would use to access the proposed project site:

The anticipated routes for construction traffic include:

- From Ridgecrest, traffic would travel south on US 395 or China Lake Boulevard (45%)
- From Inyokern, traffic would travel east on SR-178 and south on Brown Road or US 395. (30% includes trips originating from the Antelope Valley or 5%, respectively)
- From Inyo and Mono counties, traffic would travel south on US 395. (5%)
- From Victorville and Barstow, traffic would travel north on US 395. (20%)
- From the Antelope Valley, traffic would travel north on SR-14 and east on SR-178 and south on Brown Road or US 395. (43% includes overlap)

US 395

US 395 is operated and maintained by Caltrans. It is the primary connector route for the communities on the eastern side of the Sierra Nevada Mountains. It extends north and south between the Oregon border and the Victor Valley. US 395 is a two-lane highway with two 12-foot travel lanes from SR-14 to Victorville. The posted speed limit is 55-miles per hour (mph) within the proposed project's immediate vicinity. US 395 peak hour volumes are shown in **Traffic and Transportation Table 1**.

Access from US 395 to the proposed site, would occur via US 395 to Brown Road. Traffic traveling north bound from US 395 from south of the proposed project site would turn left on Brown Road. South bound traffic traveling US 395 from north of the proposed project site would turn right on Brown Road. **Traffic and Transportation Figure-2** is a photograph illustrating the intersection's grade separation. The alignment of the intersection is illustrated on **Traffic and Transportation Figure-3**.

US 395 intersects Brown Road and China Lake Boulevard near the proposed RSPP site. There are safety and geometric issues associated with the US 395, Brown Road and China Lake Boulevard intersection. Safety issues associated with this intersection include:

- South bound traffic on US 395 north of the intersection approaches the intersection on a downward slope, increasing speed).
- North bound traffic on US 395 encounters a sharp curve just south of the intersection as it approaches the intersection.
- Brown Road and China Lake Boulevard approaches to US 395 are not at a perpendicular angle.

- The intersection is grade separated. It was constructed above natural grade to avoid the potential for flooding.

China Lake Boulevard

China Lake Boulevard is a two-lane collector road. It connects Ridgecrest to US 395 near the proposed project site. This route is maintained by Kern County and the City of Ridgecrest, in their respective jurisdictions. The posted speed limit is 55 mph for the Kern County portion and 35 mph for the Ridgecrest portion. China Lake Boulevard average daily traffic (ADT) is shown in **Traffic and Transportation Table 1**. Vehicles traveling south on China Lake Boulevard are stopped at US 395 if proceeding forward or turning left. For vehicles turning left, the vehicle turns into the travel lane. Vehicles traveling north bound on US 395 from China Lake Boulevard are also stopped before proceeding right. This right turn also turns into the travel lane. Neither turning movement has a transitional lane. The alignment of the intersection is illustrated on Traffic and Transportation Figure-2.

SR-14, SR-178 and Brown Road

SR-14, SR-178 and Brown Road are presented together as this is the route traffic would travel if originating from the Antelope Valley and places in between. This route takes into account traffic originating from Mono and Inyo counties and Inyokern. Construction traffic would use Brown Road from SR-14 and SR-178. SR-14 and SR-178 peak hour volumes and Brown Road ADT are shown in **Traffic and Transportation Table 1.**

SR-14 is a regional serving route that connects Los Angeles to the Antelope Valley and the Antelope Valley with the eastern side of the Sierra Nevada mountains. It connects with US 395 just north of Inyokern and approximately twelve miles north of the proposed project site. It is a two lane highway with transitional lanes at SR-178 from Redrock-Inyokern Road to approximately one mile north of SR-178. SR-14 is a 4-lane divided highway from one mile north of SR-178 to US 395.

Northbound SR-14 has a travel lane and right turn lane to SR-178 east bound. South bound traffic has a travel through lane and a separate left turn lane to eastbound SR-178. The SR-14 and US 395 interchange provides a southbound traffic ramp to US 395 and a northbound US 395 ramp to northbound SR-14. There is no direct access to southbound SR-14 from US 395 at this location. The posted speed limit on SR-14 is 55-65 mph.

SR-178 is also a regional serving highway connecting Bakersfield to Ridgecrest and on to Trona. The route is combined with SR-14 for approximately nine miles between Inyokern and the point where it traverses west toward Bakersfield off SR-14. From Bakersfield to SR-14, SR-178 is primarily a two-lane highway. Between SR-14 and eastbound SR-178 intersection, SR-178 is a three lane highway with two lanes westbound (up a hill). At Avenue Del Sol it becomes a two lane highway through to US 395. In Inyokern, SR-178 has a dual-turn center lane and it is four lanes from US 395 to Ridgecrest.

Traffic turning left from SR-178 to southbound SR-14 is stop controlled. West bound traffic on SR-178 to northbound SR-14 is also stop controlled because there is a single northbound travel lane on SR-14.

Brown Road is a two-lane collector road. It connects US 395, near the proposed project site, and SR-178, in Inyokern. This route is maintained by Kern County. Kern County Municipal Code Title 10, Section 10.04.525, establishes the speed limit for Brown Road. Between two thousand three hundred (2,300) feet south of Inyokern Road (State Route 178) and two thousand one hundred (2,100) feet north of Inyokern Road, the speed limit is forty-five (45) miles per hour (mph). Brown Road is 25-35 mph through Inyokern.

The alignment for the intersection of SR-178 and Brown Road is illustrated on **Traffic and Transportation Figure-4.** The critical turning movements for this intersection are eastbound SR-178 to southbound Brown Road and northbound Brown Road to westbound SR-178. SR-178 approaches (eastbound and westbound) to Brown Road are not stop controlled. The Brown Road approaches to SR-178 are stop controlled. SR-178 eastbound traffic going south bound on Brown Road does not need to stop.

Traffic and Transportation Table 1 summarizes the most recently available data characteristics of the roadway segments studied within the vicinity of the RSPP. The data contained in the table includes segments from the likely origination points.

Based on existing traffic patterns and the highly skilled trades required for project construction, staff has some concerns with the distribution of anticipated construction vehicle trips. Data indicates that there would be more trips originating from the Victor Valley. As shown in the Table, the annual average daily traffic (AADT) on US 395, in the proximity of China Lake Boulevard, is 4,000 vehicle trips on US 395 south of Brown Road and 2,950 vehicle trips on US 395 north of Brown Road. The difference in the through trips between the two segments is the result of traffic patterns entering and exiting US 395 and traveling on China Lake Boulevard The data suggests that approximately 25% of traffic travels between Ridgecrest and points beyond the SR-58 and US 395 interchange using US 395 and China Lake Boulevard Consistent with this pattern, it is likely that more than 20% of construction traffic would use US 395 from the Victor Valley and Barstow.

Traffic and Transportation Table 1
Existing Roadway Segment Characteristics

Roadway Segment	Roadway Class/ Lanes	Capacity	2008 Caltrans AADT[1]	Peak Hour ADT Volume [1]	V/C
US 395 in Independence, CA (95 miles)	Arterial/ 2	UNK	6,150	1,100	UNK
US 395 @SR-190	Arterial/ 4 Divided	UNK	5,700	940	UNK
US 395 North of SR-14	Arterial/ 4 Divided	UNK	5,700	940	UNK
US 395 South of SR-14	Arterial/ 2	2,000[3]	3,000	440	22%
US 395 South of SR-178	Arterial/ 2	2,000[3]	2,850	420	21%
US 395 North of Brown Rd.	Arterial/ 2	2,000[3]	2,950	410	20%
US 395 South of Brown Rd.	Arterial/ 2	2,000[3]	4,000	550	28%
US 395 @ Randsburg Rd.	Arterial/ 2	2,000[3]	4,000	550	28%
US 395 North of SR-58	Arterial/ 2	2,000[3]	4,800	580	29%
US 395 South of SR-58	Arterial/ 2	2,000[3]	7,800	940	47%
US 395 @ I-15 (86 miles)	Arterial/ 4 Divided	UNK	28,000	2,900	UNK
SR-14 South of US 395	Arterial/ 3	UNK	2,900	590	UNK
SR-14 South of SR-178 E	Arterial/ 2	2,000	3,400	570	29%
SR-14 South of SR-178 W	Arterial/ 2	2,000	5,400	700	35%
SR-14 @ Randsburg Rd.	Arterial/ 2	2,000	6,600	740	37%
SR-14 @ SR-58	Arterial/ 4 Divided	UNK	17,800	1,750	UNK
SR-14 @ Avenue L (90 miles)	Arterial/ 4 Divided	UNK	92,000	7,900	UNK
SR-178 W @ SR-14	Arterial/ 2	2,000	1,500	140	11%
SR-178 E @ SR-14	Arterial/ 2-3 Undivided	UNK	7,100	750	UNK
SR-178 East of US 395	Arterial/ 2-3 Undivided	UNK	7,500	850	UNK
SR-178 @ Ridgecrest	Arterial/ 4 Divided	UNK	7,500	820	UNK
Brown Road	Collector/ 2	UNK	1,200 (ADT)	UNK	UNK
China Lake Blvd.	Collector/ 2	2,000[3]	2,350 (ADT)	212[3]	11%

AADT = Average Annual Daily Taffic

ADT = Average Daily Taffic

V/C = Volume to capacity stated in percentage

UNK = Unknown

Peak hour volumes are usually counted when a route is expected to experience the most demand.

The typical peak hour is between 7:00am and 9:00am and between 4:00pm and 6:00 pm.

Source: 1. http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/2008all.htm and

Source: 2. http://www.co.kern.ca.us/roads/pdf/Traffic_Counts.pdf

Source: 3. SM 2009a , Table 5.1-5

Traffic and Transportation Table 2 summarizes the applicant's traffic engineer HCM worksheets intersections within the vicinity of the RSPP.

Traffic and Transportation Table 2
Existing Intersection Characteristics

Intersection	AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS
US 395, Brown Road and China Lake Blvd.				
US 395 SB to Brown Road WB (1)	(1)	(1)	(1)	(1)
US 395 SB to China Lake Blvd. EB	7.4	A	7.3	A
US 395 NB to China Lake Blvd. EB (1)	(1)	(1)	(1)	(1)
US 395 NB to Brown Road WB	7.3	A	7.3	A
Brown Road EB to US 395 NB	10.2	B	9.7	A
Brown Road EB to US 395 SB	8.5	A	8.5	A
Brown Road EB to China Lake Blvd.*	10.2	B	9.7	A
China Lake Blvd. WB to US 395 NB	8.7	A	10	A
China Lake Blvd. WB to US 395 SB	10	A	8.6	A
China Lake Blvd. WB to Brown Road WB	10	A	10	A
US 395 and SR-178				
US 395 NB to SR178 EB	12.8	B	13.5	B
US 395 NB to SR178 WB	7.7	A	8	A
SR-178 EB to US 395 SB	13.1	B	14.4	B
SR-178 WB to US 395 SB	8	A	7.7	A
SR-14 and SR-178 E				
SR-14 NB to SR-178 EB*	10.5	A	9.5	A
SR-178 WB to SR-14 SB	9.5	A	10.5	A
SR-14 SB to SR178 EB	7.4	A	7.4	A
SR-178 and Brown Road				
SR-178 EB to Brown Road SB*	12.2	B	9.2	A
Brown Road NB to SR-178 WB	9.2	A	12.2	B
Brown Road SB thru SR-178	13.2	B	15.7	C

Source: SM 2009a, p. 5.13-9 and DR-TRAFFIC-196

*Assumed the reverse of route

(1) Delay and LOS not applicable. Movement is an uncontrolled right turn (no stop control) and therefore no delay LOS A

The applicant did not assess China Lake Boulevard in Ridgecrest though 45% of construction traffic is anticipated to originate from there. Since a another significant amount of construction traffic may originate from the Antelope Valley, the Victor Valley, Barstow and Inyo and Mono Counties, project related construction would likely encounter the following additional intersections as well:

- US 395 and SR-14
- US 395 and Randsburg Road
- US 395 and SR-58
- Several intersections along US 395 in the Victor Valley
- SR-14 and SR-178 W

- SR-14 and Randsburg Road
- SR-14 and SR-58
- SR-14 and SR-58 Business
- Several intersections along SR-14 in the Antelope Valley
- Multiple localized intersections along SR-178 in Weldon, Lake Isabella and Bakersfield

C.10.4.1.2 Railways

The location of the railways within the proposed project's affected environment is shown on **Traffic and Transportation Figure-1**.Trona Railway Company operates a railroad that connects Trona to Mojave. In Mojave, Trona Railway railroad junctions with the Burlington Northern – Santa Fe (BNSF) Railways and Union Pacific Railroad (UPRR) railroads. Trona Railway Company's railroad follows Randsburg Road between SR-14 and US 395 and extends easterly toward Trona and southwesterly toward Mojave. The applicant proposes to use railways for the transport of materials and equipment but did not present any specifics as to how it would occur.

Trona Railway Company railroad crosses US 395 south of Garlock Road. It is gate and signal controlled at-grade crossing. UPRR railroad crosses SR-14/ CA Business SR-58 in Mojave. It is a gate and signal controlled at-grade crossing.

C.10.4.1.3 Airports

The locations of the airports within the proposed project's affected environment are shown on **Traffic and Transportation Figure-1**. Three of the seven airports are military installations. The Mojave Desert provides diverse terrain and many open spaces suitable for military operations. Air Force Flight Test Center at Edwards Air Force Base, National Training Center at Fort Irwin and Naval Air Weapons Station at China Lake use and manage the 20,000 square miles of restricted military airspace, R-2508 Special Use Complex, above Kern and surrounding counties and above the proposed project site.

The project site is located approximately eight miles south-southwest of the China Lake Naval Air Weapons Station or Armitage Field (FAA identifier is NID, AirNav.com 2009a). RSPP would be located within the R-2506 internal restricted area, a sub area of the R-2508 Special Use Complex.

The project site is located approximately seven miles south of the Inyokern Airport (FAA identifier is IYK, AirNav.com 2009a). Energy Commission staff discussed airport operations and flight paths with the Inyokern Airport General Manager. The Inyokern Airport General Manager stated that pilots avoid flying through the R-2506 air space restricted area because of the Handbook (USAF 2010a) procedures required for entry. He further stated that some commercial flight paths transect the R-2506 airspace but occur at very high altitudes. (S. Seymour, IYK 2009a)

Indian Wells Airport District/Inyokern Airport serves the China Lake Naval Air Weapons Station, the community of Inyokern, and the City of Ridgecrest with scheduled airline service to Los Angeles International Airport. It also serves local general aviation needs for personal, business and recreational flying.

The Inyokern Airport is located northwest of the community of Inyokern. Existing facilities consist of three runways, longest of which is the 7,344-foot runway 15-33. This runway and runways 2-20 (6,275-feet length) and 10-28 (4,153-feet length) are equipped with medium intensity runway lights and precision approach path indicators on runways 20 and 33.

The area surrounding Inyokern Airport, including the project site, is an internationally known soaring site for sailplanes. The reliable thermal and mountain lift provided by the surrounding ranges, including the El Paso Mountains, make this a perfect soaring location for the beginner and expert alike. Many national and world sailplane altitude, distance, and speed records have been set in the airspace around and above the Inyokern airport. (IYK, 2010a) Non-motorized aircraft generally fly by visual flight rules[5] (see and avoid) and have less ability to react to or recover from unexpected flight conditions.

Airports and distances from the proposed project are summarized in the **Traffic and Transportation Table 3**.

Traffic and Transportation Table 3
Airports

Airport	Military/ Public	Distance from RSPP
China Lake Naval Air Weapons Station	Military	10 miles north
Inyokern Airport,	Public	10 miles northwest
Trona Airport	Public	59 miles northeast
California City Municipal Airport	Public	32 miles southwest
Mojave Air and Space Port	Public	53 miles southwest
Edwards Air Force Base	Military	50 miles south
Fort Irwin National Training Center	Military	55 miles southeast

Source: AirNav.com

[5] Visual flight rules (VFR)**.** Flight rules adopted by the FAA that govern aircraft flight using visual references. VFR operations specify the amount of ceiling and the visibility the pilot must have in order to operate according to these rules.

C.10.4.1.4 Transmission Lines and Pipelines

There are three transmission lines and pipelines proposed as part of the project that potentially affect traffic and transportation. **Traffic and Transportation Figure-5** shows the proposed transmission lines and pipelines and the locations of roadway crossings. Electricity transmission would occur via overhead power lines. Water for the proposed project and the heat transfer fluid would occur via underground pipelines. (SM 2009a, Section 2.5)

Transmission lines would connect the proposed project's power block to a proposed substation adjacent to the existing Southern California Edison transmission lines, which is west of Brown Road. The transmission lines would cross over Brown Road (SM 2010c, Attachment 1).

Heat generated by the parabolic mirrors would be transported via a underground heat transfer fluid (HTF) pipeline. The heat transfer fluid pipeline would connect the parabolic mirrors south of Brown Road with the steam turbine generator in the power block north of Brown Road (SM 2010c, Attachment 1).

The water mainline would connect the Ridgecrest Heights water storage tank to the proposed project. Water uses for the proposed project include mirror washing, dust control, potable water and other similar uses. The water storage tank is located near China Lake Boulevard on Kendall Avenue. This pipeline would extend approximately 4.5 miles from the storage tank along China Lake Boulevard and cross US 395 to the proposed project site (SM 2010c, Attachment 1).

There are no navigable waterways or water transport systems within the proposed RSPP's vicinity.

C.10.4.1.5 Public Transportation and School Bus Service

The Kern Regional Transit operates an intercity public transit service that connects Ridgecrest with Mojave and California City (KRT 2009a). It originates from Ridgecrest City Hall to SR-178, stops in Inyokern and then goes south to California City and Mojave, then returns the same route. The Eastern Sierra Transit Authority provides bus service that extends from Lancaster to Reno. On a very limited basis, it connects Ridgecrest with Lone Pine and other cities north. Ridgecrest does not offer fixed route services within the community but the City contracts for dial-a-ride services (COR 2009a).

Sierra Sands Unified School District provides school bus service for the communities of Ridgecrest, Inyokern and other communities near the proposed project site. A school bus route exists along China Lake Boulevard Other school bus routes exist along local streets but not along the other roads and highways the construction workforce is likely to use. (SSUSD 2009a)

Traffic and Transportation Figure-5 shows the public transit and school bus routes.

C.10.4.1.6 Bicycle and Pedestrian Facilities

Kern County Council of Governments designates China Lake Boulevard from the Ridgecrest city limits to the proposed project site as a planned bike route. Funding for this route has not been established (KCOG 2009a). Likewise, the City of Ridgecrest designates China Lake Boulevard within the city as a planned bicycle route (COR 2009b, p.6-3). **Traffic and Transportation Figure-5** shows the planned bicycle route. In addition, Brown Road is regularly used by recreation bicyclists and is a published bike route by the High Sierra Cyclists biking club (HSC 2010a).

Sidewalks and pedestrian pathways are limited to the urban areas of the proposed project's vicinity. US 395, China Lake Boulevard and Brown Road do not include sidewalks within the respective road rights-of-way. There are pedestrian and bike trails traversing BLM managed lands. These routes are primarily used for recreation activities. Trails and off-highway vehicles (OHV) routes are discussed further in the **LAND USE** section of this staff assessment.

C.10.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section evaluates the potential for the proposed project, during construction and operation, to impact the anticipated future traffic and transportation conditions. It is anticipated that the RSPP would be constructed between 2011 and 2013 and operations to commence in 2014.

The project is evaluated for its impacts on existing and planned regional and local roads, routes and traffic patterns, public transportation operations, school bus routes, designated bikeways or pedestrian pathways, railways, airports, aircraft flight paths and patterns, transmission lines and pipelines and waterways. For example, if an ACC stack is at a height that intrudes into the paths of aircraft, staff uses known resources to evaluate the project's stack height impact to airport operations. In addition, the proposed projects impacts are measured in terms of significance. The project may impact the traffic and transportation system but it may not be significant. RSPP traffic or facilities are measured against or added to current and projected conditions to determine the potential for environmental impact. Mitigation is recommended for potential significant impacts induced by the proposed project.

C.10.4.2.1 Direct/Indirect Impacts and Mitigation

The direct and indirect impacts of the RSPP are addressed for modes of travel and significance criteria previously addressed. Impacts were evaluated for two separate time periods. Project construction is anticipated to occur between late 2010 to mid-year 2013, with the peak construction occurring in month 11 (late 2011) and RSPP operation startup in 2014. Year 2011 base conditions include present day traffic volumes plus anticipated future growth unrelated to the RSPP. Other planned projects in the vicinity of the proposed RSPP site were determined to contribute to both year 2011 and year 2014 traffic levels; therefore, trips from the planned projects were added into the future traffic volumes, which include planned projects unrelated to RSPP. Future conditions are discussed further in the **CUMULATIVE IMPACTS** discussion contained herein.

The Kern Council of Governments prepared the Regional Transportation Plan (RTP) for Kern County (KCOG 2009b). It is the transportation planning guide for the next 24 years beginning May 2007. It provides transportation and air quality goals, policies and actions for now and into the future, and includes programs and projects for congestion management, transit, airports, bicycles and pedestrians, roadways, and freight. It also provides a discussion of all mechanisms used to finance transportation and air quality program implementation. The RTP does not contain policies directed toward specific land development projects. Its purpose is to identify existing conditions and project future scenarios that are intended to improve multi-modal interaction and function. The RTP Congestion Management Program Element presents the interrelationship between roadway congestion and alternative transportation. Congestion Management is an important component of the RTP that encourages alternative transportation. Alternative transportation is discussed under **BICYCLE, PEDESTRIAN, PUBLIC AND ALTERNATIVE TRANSPORTATION AND SCHOOL BUS ROUTE** discussion contained herein.

The Kern County General Plan, Circulation Element, establishes goals, objectives and policies for roadways and roadway function, safety hazards, scenic routes, trucks routes and hazardous materials transport, airport compatibility and railroad crossings (KERN 2007a). Similarly, the Ridgecrest General Plan establishes goals, objectives and policies for the city's transportation system.

C.10.4.2.1.1 Regional and Local Highways and Roads

Figure 7 of the Kern County Circulation Element identifies major roads, including China Lake Boulevard and Brown Road. Circulation Element Policy 2.3.4, Policy 2, states that the County should monitor development and in relation to traffic estimates developed for this plan. It further states that if development causes affected roadways to fall below Level of Service (LOS) D, mitigation could involve exactions to build off-site transportation facilities.

The Ridgecrest General Plan Circulation Element Policy C-2.4 states that the City shall strive to maintain Level of Service C or better for both daily and peak hour conditions.

The Traffic Study (SM 2010a, DR-Traffic-205) presents existing traffic data and conditions within the project's affected environment. It also presents traffic data, conditions and potential impacts, which may be caused by the project, to regional and local highways and roads. Energy Commission staff consulted with the California Department of Transportation (Caltrans) District 9 Permits and Traffic Operations office to review and comment on the AFC data pertaining to State highways and Kern County for AFC data pertaining to local roads.

As presented above, primary regional and local roadway segments and intersections, routes and traffic patterns for the proposed RSPP were identified. For these roadways, intersections, routes and patterns, LOS is the policy that establishes the baseline for measuring effectiveness roadways and intersections. Other modes and elements of the transportation system are considered to off-set impacts to roadway, intersections, routes and patterns. Project generated traffic is also evaluated so as not to conflict with congestion management program policies for the purposes of reducing traffic and demand. Another important component of evaluating project generated traffic is to

ensure that hazards are not created or substantially increased due to an existing or proposed design feature (e.g., sharp curves or dangerous intersections) or incompatible uses.

Level of Service

The Highway Capacity Manual (TRB 2000a) is widely accepted for principles and practices pertaining to traffic data and assessment. According to the HCM, LOS is quality measure describing roadway and intersection operational conditions, such as speed and travel time, maneuverability, traffic interruption and comfort and convenience, within a traffic stream and are assigned a letter grade A through F. LOS A is assigned to operational conditions with free flowing traffic that encounters minimal design issues and minimal distraction. LOS F is assigned to operational conditions with significant traffic congestion and delay due to capacity constraints, traffic controls, design issues or distractions. Measures of Effectiveness (MOEs) are performance measures commonly expressed in terms of travel speed, vehicle-to-capacity ratios, delays or both. These qualitative measurements establish the fundamental basis for determining the significance of traffic impacts and corresponding LOS grade.

Existing roadway and intersection traffic conditions are based on data obtained from Caltrans and through field surveys (SM2009a, Tables 5.13-5 and 5.13-6). Existing conditions establish the basis for determining potential project (construction an operation) induced traffic impacts to roadways and intersections. The applicant used HCM methodology to establish existing LOS on roadways and at intersections and then applied RSPP project induced traffic to establish LOS on roadways and at intersections as anticipated during construction and once the project becomes operational (SM2009a, Tables 5.13-7, 5.13-8, 5.13-9 and 5.13-10).

State and County LORS establish the LOS (roadways and intersections) standards for the proposed RSPP, as follows:

- LOS D or better conditions on a State of California highways (Federal highways are operated and maintained by Caltrans)
- LOS D or better conditions on an Kern County roadways

Traffic and Transportation Table 4 presents HCM standards for intersection LOS. It is based on the average vehicle delay per second at a particular intersection. LOS A indicates little or no delay or little or no stacking. LOS F indicates excessive vehicle delay per second.

Traffic and Transportation Table 4
Level of Service Criteria for Intersections

Level of Service	Un-signalized Intersection Delay Per Vehicle (in Seconds)	Signalized Intersection Delay Per Vehicle (in Seconds)
A	Less than 10	Less than 10
B	10 to 15	10 to 20
C	15 to 25	20 to 35
D	25 to 35	35 to 55
E	35 to 50	55 to 80
F	50 or more	80 or more

Source: HCM

A significant impact would occur if the project generates vehicle trips that reduce roadway and intersection operations below the accepted LOS standards on a Federal, State or County roadways and intersections

Construction Traffic Impacts and Mitigation

Potential traffic impacts associated with construction of the RSPP were evaluated for both construction workforce traffic and construction truck traffic. To determine the amount of construction workforce vehicle trips to the RSPP site during peak construction, the applicant assumed that workers would commute alone during the morning and afternoon peak hours (7 to 9 AM and 4 to 6 PM). It is anticipated that the average number of construction workers would be approximately 405. During the peak month, the number of workers increases to 633 (SM 2009a, p. 5.13-13).

The applicant states that according to the Electric Power Research Institute, construction workforce would commute as much as two hours from the workplace (SM 2009a, p. 5.11-18). Regional demographics and availability of skilled laborers establish the basis for distributing construction workforce vehicle trips. The applicant's distribution of vehicle trips indicates that approximately 50% of the construction employees will reside in the project's immediate vicinity (10 miles) and approximately 50% of the construction employees will commute from Victor Valley, Antelope Valley, Barstow, Bakersfield, Inyo and Mono counties and possibly from Los Angeles and San Bernardino areas. Due to the diversity of people behaviors and the broad employment base, it is difficult to project more accurately a distribution of workforce construction trips. The applicant's population and employment tables (SM 2009a, Section 5.11.3.2) show that Kern County, Los Angeles County and San Bernardino County have sufficient workforce. A large segment of workforce would likely originate from Victor Valley, Antelope Valley and Barstow. Ridgecrest would also be a considerable workforce source. Bakersfield, Inyo and Mono counties and possibly Los Angeles and San Bernardino areas provide additional workforce.

During construction, it is anticipated that construction workers and technical workers will reside in temporary housing or apartments during the week. There is sufficient temporary housing in Ridgecrest and Inyokern.

Under a worst-case scenario, all construction workers would travel alone. If this occurred, there would be a 910 one-way passenger car trips on the average day and 1,266 passenger car trips during peak month. This would be 405 and 633 vehicle trips entering and exiting the site, respectively but not including truck trips.

Construction of the RSPP would require the use and installation of heavy equipment and associated systems and structures. The heavy equipment would be used throughout the construction period, including trenching and earthmoving equipment, forklifts, cranes, cement mixers and drilling equipment. This heavy equipment would likely be delivered by contractors to RSPP and has been added to the RSPP trip generation. (SM 2009a, p. 5.13-15)

The applicant anticipates that RSPP construction would require an average 100 truck trips. During foundation construction, approximately month 8, there would be 140 truck trips per day. It is standard practice for a truck to equal three passenger cars. The passenger car equivalent (PCE) for 100 trucks is 300 vehicle trips and for 140 trucks the PCE is 420 vehicle trips. (SM 2009a, p. 5.13-13)

Total peak construction traffic (passenger car and trucks) would be 1,686 vehicle trips (1,266 workers plus 420 PCE for trucks and deliveries). Similarly, an average day could result in 1,210 vehicle trips. If all workers and trucks entered and exited the proposed project site in the AM and PM peak hour during the peak construction month, there would be 843 vehicle trips in the AM and PM peak hour. Similarly, the average day peak hour vehicle trips would be 605.

Traffic and Transportation Table 5 shows the change in traffic volumes, including 2008 Peak Hour, estimated 2011 No Project Peak hour and estimated 2011 Project Construction Peak Month Peak Hour. As shown in the Table, it is not likely any roadway segment would exceed its design capacity.

The third column of **Table 5** assumed a 6% per year increase in traffic for all road segments except where provided by the applicant. The third column includes construction workforce trips and truck trips. As shown in the table, except where capacity is not known, 2011 conditions road plus construction workforce trips and truck trips road segment volumes, even with the exceptional rate of increase, would be far below capacity. It is not likely any of the road segments where capacity was not provided would exceed design capacity, based on the data and number of lanes for those routes.

The traffic data contradicts the RTP. As reflected in RTP Figures 4-3 and 4-5, SR-178, between US 395 and SR-14, is operating at LOS D in 1998 and in 2030 respectively. RTP Figure 4-8, shows near term projects, which includes improving US 395 to four lanes between SR-178 and China Lake Boulevard with construction to occur between 2011 and 2030.

Traffic and Transportation Table 5
Comparison of Construction Year (2011) Traffic on Roadway Segments

US 395 in Independence, CA (95 miles)	1,100	1,310	1,319	UNK
US 395 @SR-190	940	1,120	1,136	UNK
US 395 North of SR-14	940	1,120	1,162	UNK
US 395 South of SR-14	440	524	566	28%
US 395 South of SR-178	420	500	711	36%
US 395 North of Brown Rd.	410	508[3]	540[3]	27%
US 395 South of Brown Rd.	550	818[3]	945[3]	28%
US 395 @ Randsburg Rd.	550	655	866	43%
US 395 North of SR-58	580	691	902	45%
US 395 South of SR-58	940	1,120	1,246	62%
US 395 @ I-15 (86 miles)	2,900	3,454	3,580	UNK
SR-14 South of US 395	590	703	745	UNK
SR-14 South of SR-178 E	570	620[3]	746	37%
SR-14 South of SR-178 W	700	834	960	48%
SR-14 @ Randsburg Rd.	740	765[3]	891	45%
SR-14 @ SR-58	1,750	2,084	2,152	UNK
SR-14 @ Avenue L (90 miles)	7,900	9,409	9,476	UNK
SR-178 W @ SR-14	140	167	293	UNK
SR-178 E @ SR-14	750	893	1,020	51%
SR-178 West of US 395	750	774[3]	940[3]	UNK
SR-178 @ Ridgecrest	820	846[3]	910[3]	46%
Brown Road	14	15[3]	458[3]	23%
China Lake Blvd.	212[3]	219[3]	503[3]	25%

1. Applicant projects up to 6% increase per year based on historical records

2. Distribution workforce percentage plus 2011 No project conditions

3. AFC Table 5.13-7 and DR-Traffic-194

V/C = Volume to capacity stated in percentage

UNK = Unknown

Traffic and Transportation Table 6 shows intersection LOS projected for 2011 under the No Project scenario and the projected LOS for intersections under the 2011 conditions plus construction traffic scenario. Intersection LOS is substantially influenced by traffic volumes. Other important factors that contribute to intersection delay include, traffic control, turning radius, number of trucks, number of lanes including turn lanes, grade, and visual distraction or roadway conditions.

As reflected in the AFC, the traffic counts and projections were used to determine the LOS for intersections which takes into account the factors stated above and other factors. Based on these highly specialized calculations, the applicant anticipates that four intersections would experience delay equal to LOS D or less. These intersections include eastbound SR-178 eastbound to southbound Brown Road, the reverse route (Brown Rd. to SR-178), Brown Road south bound through SR-178 and China Lake

Boulevard through US 395 to Brown Road. To mitigate the potential intersection impacts, the applicant proposes to stagger the work schedule of construction workers.

Data was not provided for intersections in the city limits of Ridgecrest. If 45% of construction traffic would use China Lake Boulevard, it is likely that Ridgecrest intersections would be impacted. Also, construction traffic would impact SR-178 intersections through Inyokern, other than the SR-178 and Brown Road intersections.

Certain Ridgecrest intersections would encounter up to 379 one-way construction related vehicle trips. It is a policy of the Ridgecrest General Plan 1991-2010, Circulation-Transportation Element (Policy 2.1.11) to relieve traffic congestion at major intersections and along arterial roads. Policy 2.1.24 states, work with major employers to establish car and van pooling. Further, the City of Ridgecrest's Draft General Plan 2010, Policy C-2.4 states that the City shall strive to maintain LOS C or better for peak hour conditions. Policy C-2.6 states critical intersections within the City require monitoring.

Safety and hazards to roadways, intersections, routes and patterns, associated with the proposed RSPP also must be considered. Caltrans cited collision rates 2.8 times the State average occurring at the US 395 and Brown Road (DOT 2010a) intersection. This intersection is above the statewide average for injury and total accidents for a similar facility. It is below the statewide average for fatal accidents. There have been nine accidents at this intersection in the five year period between January 1, 2004 and December 31, 2008. Of the nine collisions/ accidents four involved injury to13 people. The other five accidents involved property damage only. All nine of these accidents were turn related from Brown Road or China Lake Blvd onto US 395. Two accidents occurred while it was dark and seven occurred during daylight hours.

Chapter 2 of the RTP policy states, "provide heavy truck access planning guidance including a review of the current Surface Transportation Assistance Act route system, review of geometric issues and signaling for all routes identified as major local access routes, and the develop standards for truck access." This policy requires coordination with COG regarding heavy truck access.

Traffic and Transportation Table 6
2011 No Project and 2011 Conditions Plus Workforce Traffic Comparison

Intersection	AM Peak Hour 2011 No Project		PM Peak Hour 2011 No Project		AM Peak Hour 2011 With Construction Traffic		PM Peak Hour 2011 With Construction Traffic	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
US 395, Brown Road and China Lake Blvd.								
US 395 SB to Brown Road WB (1)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
US 395 SB to China Lake Blvd. EB	7.4	A	7.4	A	7.4	A	7.4	NP
US 395 NB to China Lake Blvd. EB (1)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
US 395 NB to Brown Road WB	7.3	A	7.3	A	7.6	A	9.3	NP
Brown Road EB to US 395 NB	9.9	A	9.9	A	12.5	B	13.4	NP
Brown Road EB to US 395 SB	8.6	A	8.6	A	8.6	A	9.1	NP
Brown Road EB to China Lake Blvd.*	9.9	A	9.9	A	12.5	B	12.2	B
China Lake Blvd. WB to US 395 NB	8.7	A	10.3	B	40.6	E (2)	19.2	NP
China Lake Blvd. WB to US 395 SB	10.2	B	8.7	A	8.7	A	8.7	NP
China Lake Blvd. WB to Brown Road WB	10.2	B	10.3	B	40.4	E (2)	18.9	C
US 395 and SR-178								
US 395 NB to SR178 EB	12.9	B	13.8	B	13.1	B	14	B
US 395 NB to SR178 WB	7.7	A	8.1	A	7.8	A	8.1	A
SR-178 EB to US 395 SB	13.3	B	14.3	B	13.6	B	15.1	B
SR-178 WB to US 395 SB	8	A	7.7	A	8.1	A	7.7	A
SR-14 and SR-178 E								
SR-14 NB to SR-178 EB*	10.5	A	9.5	A	11.5	B	9.5	A
SR-178 WB to SR-14 SB	9.5	A	10.6	B	9.5	A	11.5	B
SR-14 SB to SR178 EB	7.4	A	7.4	A	7.4	A	7.4	A
SR-178 and Brown Road								
SR-178 EB to Brown Road SB*	12.2	B	9.2	A	25.2	D	9.7	A
Brown Road NB to SR-178 WB	9.2	A	12.3	B	9.7	A	25.2	D
Brown Road SB thru SR-178	13.5	B	16.2	C	27.6	D	19.7	C

Source: RSPP 2009, p. 5.13-9 and DR-TRAFFIC-196

*Assumed the reverse of route

(1) Delay and LOS not applicable. Movement is an uncontrolled right turn (no stop control) and therefore no delay LOS A

(2) With mitigation of adding exclusive thru lane on China Lake Approach WB China Lake to 395 NB delay improves to 23.7 (LOS C) and WB China Lake to Brown delay improves to 10.0 (LOS A/B)

N/A = Not available

The applicant projects that 20% of project related construction traffic would use US 395 from the south of the proposed project and 5% would use US 395 from north of the proposed project. In addition, the applicant projects that 45% of construction traffic trips would travel on China Lake Boulevard between Ridgecrest and the proposed project site. Based on the applicant's projected construction related trips, there would be approximately 379 Ridgecrest area originating construction trips and approximately 211 Victor Valley originating construction related trips. That means 590 RSPP construction related vehicle trips would use the Brown Road, US 395 and China Lake Boulevard intersection. This represents an additional 15% traffic trips through the intersection, substantially increasing the possibility for collision at the intersection.

Access via Brown Road was proposed by the applicant. Caltrans and Kern County suggested two alternative access routes to the proposed RSPP site to avoid the Brown Road, US 395 and China Lake Boulevard intersection. One alternative would be to provide a temporary access directly from US 395 approximately one mile north of the existing Brown Road, US 395 and China Lake Boulevard intersection. The other would be to route traffic to avoid the Brown Road, US 395 and China Lake Boulevard intersection.

An evaluation of the applicant's proposed access and the two suggested alternatives are as follows:

Traffic and Transportation Figure 1 illustrates the location for the proposed Ridgecrest Solar Power Plant project. RSPP would be located northwest of Brown Road and US 395. Traffic generated by the project would reduce the Brown Road, US 395 and China Lake Boulevard intersection of to LOS E. Brown Road and SR-178 intersection would be also operate at LOS D. The applicant proposes to split work shifts to reduce impacts to the intersections. Though a rotational or staggered work shift would bring the project in compliance with the local LOS LORS policy but the Brown Road, US 395 and China Lake Boulevard intersection safety issues would be exacerbated. Energy Commission staff evaluated the constraints of the proposed and alternative access routes.

Basis:

- Peak construction related trips is 843
- 25% of the trips (211) would originate from the Victor Valley (US 395 south of Brown Road)
- The applicant projects that 40% of the trips (337) would originate from Ridgecrest and use China Lake Blvd.
- 30% of the trips (252) would use SR-178 and Brown Road

Applicant's Proposed Brown Road Access

The applicant's proposed Brown Road access is problematic because of the alignment at the Brown Road, US 395 and China Lake Boulevard intersection. Project generated traffic originating from the Victorville and San Bernardino areas south of the project site would travel north on US 395 to the Brown Road, US 395 and China Lake Boulevard intersection and turn left on Brown Road.

The US 395 north and south bound legs of the intersection are not controlled and traffic flows freely through the intersection, unless a vehicle is making a left turn on to Brown Road (Brown) or China Lake Blvd (CLB). A vehicle heading north on US 395 must wait for oncoming traffic before proceeding left on to Brown Road, causing delay to US 395 northbound vehicles. The turning movement on to Brown from US 395 is more acute than standard, causing an extreme turn radius and increase in hazard. A separate right turn lane on the US 395 northbound approach to CLB provides through traffic on US 395 to flow freely and an exit for traffic heading northbound on CLB. Transitional lanes are non-existent or extremely limited for traffic entering US 395 from Brown Road or China Lake Boulevard. The majority of the collisions are a result traffic entering US 395 from Brown or CLB and traffic going through to Brown and CLB.

The most ideal scenario would be to fully improve the Brown Road, US 395 and China Lake Boulevard intersection to minimize the potential for hazard. Existing conditions contribute to high collision rates without the proposed project and intersection realignment and improvements would be warranted anyway and not attributable to the applicant. In addition, Caltrans acknowledged that it is not likely this intersection would be realigned and improved within the next ten years. There is little nexus to require the applicant to realign and improve the intersection and traffic impact fees would not resolve the collision rate hazard.

Caltrans states further that it is highly unlikely that signalization would be a solution. Signalization often creates more but perhaps less severe collision.

Constraints:

- Since the intersection is above natural grade, improvements to the intersection and measures could require additional environmental review, multiple agency involvement and extensive financial consideration. Factors such as these could affect the viability of Brown Road as the proposed projects primary access.
- Southbound US 395 declines in grade and speeds increase as vehicles approach Brown Road from the north. Likewise, northbound US 395 traffic encounters a curve that limits sight distance just before the Brown Road intersection.
- Bicyclists that use Brown Road are in opposition to construction traffic using Brown Road.

Potential mitigation:

- Install a left turn lane from north bound US 395 to Brown Road, a deceleration lanes from south bound US 395 to Brown Road, a separate left turn lane from China Lake

Boulevard to US 395 south bound, acceleration and deceleration lanes on US 395 from China Lake Boulevard and Brown Road and acceleration and deceleration lanes on Brown Road to US 395.

- Develop a Traffic Control Plan (TCP) to include:
  - Staggering work shifts.
  - Monitoring construction related traffic to ensure it is not contributing to additional roadway safety problems and collisions. The monitoring would include monthly reporting of construction related traffic patterns and collision incidents.
  - Employee training and driver education.
  - Incentives for ride sharing, off-site parking and the provision of vans for van pools consistent with the RTP, Transportation Control Measures Action Element, pages 4-57 through 4-60.
  - Post law enforcement, flag men, informational and warning signage and reduce speeds during high traffic times.

It is difficult to quantify reducing the possibility of increasing the collision rates associated with these measures. However, these measures are consistent with standard protocol for reducing collisions in construction zones as contained in California's Manual on Uniform Traffic Control Devices (Caltrans, January, 2010) and Caltrans Construction Manual, Chapter 2, Safety and Traffic.

Direct US 395 Access

Access would be constructed specifically for the project and be located in a tangent section one to 1.5 miles north of the existing Brown Road, US 395 and China Lake Boulevard intersection. Caltrans suggested this scenario because direct access would be at-grade and would not require substantial re-grading or design and construction. (DOT 2010a)

The alignment of the new access would include acceleration, deceleration and turn lanes. A left turn lane for north bound construction related traffic and a right turn deceleration lane for south bound construction related traffic would be provided from US 395 to the new project access. From the new project access, there would be a separate left turn lane and right turn lane to US 395. The left turn from the alternative would transition via an acceleration lane on to US 395 and then merge into the northbound travel lane. The right turn from the alternative would transition via an acceleration lane on to US 395 and then merge into the southbound travel lane. Right and left turns from the alternative access would be stop controlled.

Similar to the Brown Road access, vehicles heading north on US 395 must wait for oncoming traffic before proceeding left on to the alternative access. However, there would be no delay to US 395 northbound vehicles because of the separate left turn lane and the turning movement would be designed in a more standard perpendicular manner. Also, south bound traffic would not be delayed or slowed because of the deceleration lane.

Constraints:

- State highway rights-of-way request - BLM is the land owner of the RSPP site, therefore they would authorize BLM as an agent to the applicant to request access to State highway right-of-way. A primary factor in the evaluation of a State highway right-of-way access request in rural areas is that it be at least one mile from the next nearest intersection. It is not known whether the request for access to State highway rights-of-way can be temporary.
- Caltrans has not officially recommended this alternative as preferable. This scenario involves obtaining State highway right-of-way access. Obtaining the right to access a State highway requires Caltrans and California Transportation Commission approval and the preparation of a Transportation Impact Study.
- The alternate access would not resolve the collision issue at the Brown Road, US 395 and China Lake Boulevard intersection. It is anticipated that up to 75% of construction traffic would travel through the intersection. However, it would avoid the awkward turning movements from US 395 to Brown Road.

Potential mitigation if State right-of-way access can be obtained:

- Route China Lake Boulevard construction related traffic to SR-178 and then to US 395, the amount of traffic traveling through the intersection is reduced substantially. The increase in traffic through the intersection that would be generated by the project would be 5% versus 15% without the routing scenario. Notwithstanding, the 5% or 211 traffic trips pose the likelihood for collision rates to increase.
- Install improvements and prepare a TCP as discussed above.

Route traffic to avoid the Brown Road, US395 and China Lake Boulevard intersection

Another scenario would be to route construction traffic to avoid the Brown Road, US 395 and China Lake Boulevard intersection. US 395 north bound construction related traffic would travel west on SR-58 (Kramer Junction) then proceed north bound on SR-14. Construction traffic would then travel east bound on SR-178, then south bound on Brown Road to the proposed RSPP site. Also, construction traffic from Ridgecrest would travel west bound on SR-178 and south bound on Brown Road.

The most likely intersection that would experience significant delay as a result of routing traffic around Brown Road, US 395 and China Lake Boulevard intersection would be the SR-178 and Brown Road intersection. Without the routing of construction related traffic, the intersection would operate at LOS D for the proposed project. The additional construction trips could degrade the intersection to LOS E.

Constraints:

- It is not likely this routing of vehicles would capture all of the construction related traffic because approximately 45% of construction related traffic would use China Lake Boulevard and up to 25% would use US 395 to Brown Road. Besides, construction related traffic originating from the Victor valley is not likely to travel an

additional 49 miles to work at the proposed project. In addition, Energy Commission staff has not evaluated the environmental effects associated with routing traffic the additional 45 miles.

- Traffic collision data has not been provided for the proposed routing of traffic to SR-58, SR-14, SR-178 and Brown Road for the purposes of evaluating associated impacts. In addition, the data provided by the applicant in the AFC and subsequent data request responses does not account for other potentially impacted intersections as a result of the routing of construction related traffic to avoid the Brown Road, US 395 and China Lake Boulevard intersection.

Based on the three scenarios, the best option would be the Brown Road access. Constraints associated with the suggested alternatives involve further study and are not likely to reduce the potential increase to the existing hazardous conditions of the Brown Road, US 395 and China Lake Boulevard intersection. Staff is also concerned with providing multiple accesses from US 395 and the timing of obtaining access to a State highway. Though the direct access from US 395 would be equally sufficient in limiting the potential for an increase in collision rates at Brown Road, US 395, China Lake Boulevard intersection, similar mitigation would be required. Further, staff is concerned with the routing of traffic to avoid the Brown Road, US 395 and China Lake Boulevard intersection because of the potential environmental and unknown impacts to traffic volumes and safety.

Summary

Construction related traffic for the proposed RSPP is not anticipated to impact roadway segments. However, SR-14 becomes extremely congested on weekends and holidays, usually during Friday evenings and Sunday nights. Though data and statistics are not readily available, the influx of recreational travelers would likely contribute to degrade LOS on SR-14 during Friday PM peak hour conditions.

Construction related traffic would degrade four intersections to LOS D but only one intersection would be reduced to LOS E. The proposed RSPP would conflict with applicable RTP and Kern County General Plan Circulation Element LOS LORS. As stated above, other modes and elements of the transportation system are considered as means to off-set significant impacts to roadway, intersections, routes and patterns and to reduce traffic and demand.

Ridgecrest intersections would be impacted by construction related vehicle trips. The proposed RSPP would conflict with applicable Ridgecrest General Plan Circulation Element LOS LORS.

Brown Road, US 395 and China Lake Boulevard intersection has safety issues and the proposed RSPP would likely contribute to the increase in collision rates at the intersection.

Truck traffic would be a generated by the proposed RSPP. RTP requires coordination with COG regarding heavy truck access.

With the effective implementation of intersection improvements together with the preparation of a TCP would minimize the potential for collision rates to be significantly increased at the Brown Road, US 395 and China Lake Boulevard intersection. Staff recommends Condition of Certification **TRANS-1,** which would require the project owner to install recommended Brown Road, US 395 and China Lake Boulevard intersection improvements and to prepare a Traffic Control Plan that effectively employs traffic reduction and calming measures and a plan for heavy truck access.
In addition, **TRANS-1** would require the project owner: to stagger work shifts to avoid weekend recreational traffic using US 395 and SR-178 on Friday evenings, contribute fair share traffic impact fees toward the future planned interchange at Brown Road, US 395 and China Lake Boulevard.

Operation Traffic Impacts and Mitigation

The AFC projects that during operation of the RSPP there would be an 84 person workforce. Since the RSPP would be a 24-hour facility, not all workers would arrive and depart during AM and PM peak hours, therefore, the proposed RSPP would generate 60 peak hour vehicle trips. The AFC also projects that the RSPP would generate three one-way truck trips per day. This would equate to nine PCE trips arriving and nine PCE trips departing the RSPP per day. These trips may not necessarily arrive or depart during peak hours. The applicant did not project the number of deliveries and visitor trips per day. (SM 2009a, pp. 5.13-15 and 5.13-16)

Traffic and Transportation Table 7 provides a comparison of roadway segment volumes between 2008 and 2014 and 2014 volume conditions with project operations generated traffic. As shown in the Table, operational phase trips would not impact roadway design capacities.

Project operations vehicle trips and intersection LOS impacts would be far less than during the project's construction phase. However, similar to RSPP construction related traffic, the three alternatives apply. Left turns from north bound US 395 to Brown Road would be hazardous due to roadway geometrics. In addition, other turning movements at this intersection and roadway design contribute to the hazardous conditions.

Traffic and Transportation Table 7
Comparison of Operations Year (2014) Traffic on Roadway Segments

Roadway Segment	2008 Peak Hour Volume	Est. 2014 No Project Peak Hour[1]	Est 2014 Project Construction Peak Month & Peak Hour[2]	2011 Project Construction Est. V/C
US 395 in Independence, CA (95 miles)	1,100	1,472	1,541	UNK
US 395 @SR-190	940	1,258	1,259	UNK
US 395 North of SR-14	940	1,258	1,261	UNK
US 395 South of SR-14	440	589	592	30%
US 395 South of SR-178	420	562	579	29%
US 395 North of Brown Rd.	410	571	588	29%
US 395 South of Brown Rd.	550	919	936	47%
US 395 @ Randsburg Rd.	550	736	753	38%
US 395 North of SR-58	580	776	793	40%
US 395 South of SR-58	940	1,258	1,268	63%
US 395 @ I-15 (86 miles)	2,900	3,881	3,891	UNK
SR-14 South of US 395	590	790	793	UNK
SR-14 South of SR-178 E	570	697	707	35%
SR-14 South of SR-178 W	700	937	947	47%
SR-14 @ Randsburg Rd.	740	860	870	43%
SR-14 @ SR-58	1,750	2,342	2,347	UNK
SR-14 @ Avenue L (90 miles)	7,900	10,572	10,578	UNK
SR-178 W @ SR-14	140	187	193	UNK
SR-178 E @ SR-14	750	1,004	1,014	51%
SR-178 West of US 395	750	870	880	UNK
SR-178 @ Ridgecrest	820	951	961	UNK
Brown Road	14	17	27	1%
China Lake Blvd.	212[3]	246	256	13%

1. Applicant projects up to 6% increase per year based on historical records

2. Distribution workforce percentage plus 2011 No project conditions

V/C = Volume to capacity stated in percentage

UNK = Unknown

Traffic and Transportation Table 8 provides a comparison of intersection delay and LOS between 2008 and 2014 and 2014 conditions with project operations generated traffic. As shown in the Table, operational delay and LOS would not significantly impact intersections.

Traffic and Transportation Table 8
2014 No Project and 2014 Conditions Plus Operations Traffic Comparison

Intersection	AM Peak Hour 2014 No Project		PM Peak Hour 2014 No Project		AM Peak Hour 2014 With Operations Traffic		PM Peak Hour 2014 With Operations Traffic	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
US 395, Brown Road and China Lake Blvd.								
US 395 SB to Brown Road WB (1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
US 395 SB to China Lake Blvd. EB	7.4	A	7.4	A	7.4	A	7.4	A
US 395 NB to China Lake Blvd. EB (1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
US 395 NB to Brown Road WB	7.3	A	7.3	A	7.3	A	7.3	A
Brown Road EB to US 395 NB (L)	10.1	B	10	A	10.2	B	10.2	B
Brown Road EB to US 395 SB ®	8.6	A	8.6	A	8.6	A	8.6	A
Brown Road EB to China Lake Blvd. (T)	10.1	B	10	A	10.2	B	10	B
China Lake Blvd. WB to US 395 NB ®	8.8	A	8.7	A	11.1	B	11	B
China Lake Blvd. WB to US 395 SB (L)	10.5	B	10.4	B	8.8	A	8.7	A
China Lake Blvd. WB to Brown Road WB (T)	10.4	B	10.4	B	11.1	B	11	B
US 395 and SR-178 Ramp Junctures								
SR 178 WB LEFT to US 395 SB On (L)	8	A	7.7	A	8	A	7.8	A
SB US 395 Off-Ramp to SR178	13.6	B	15.1	B	13.7	B	15.2	B
SR-178 EB LEFT to US 395 NB On	7.7	A	8.1	A	7.7	A	8.1	A
US 395 NB Off-Ramp LEFT to SR-178 WB	13.1	B	14	B	13.2	B	14.1	B
SR-14 and SR-178 E								
SR-14 SB to SR-178 EB (L)	7.4	A	7.4	A	7.4	A	7.4	A
SR-178 WB to SR-14 SB (L)	9.6	A	10.7	B	9.6	A	10.7	B
SR-178 SB to SR14 NB ®	N/A	A	8.9	A	N/A	A	8.9	A
SR-178 and Brown Road								
NB Brown Road	9.3	A	12.5	B	9.3	A	12.6	B
SB Brown Road	13.8	B	16.5	C	13.9	B	16.6	C

Source: RSPP 2009, p. 5.13-9 and DR-TRAFFIC-196

(1) Delay and LOS not applicable. Movement is an uncontrolled right turn (no stop control) and therefore no delay LOS A

(2) With mitigation of adding exclusive thru lane on China Lake Approach WB China Lake to 395 NB delay improves to 23.7 (LOS C) and WB China Lake to Brown delay improves to 10.0 (LOS A/B)

Operations workforce is not likely to travel up to two hours from the proposed RSPP site. Ridgecrest skilled labor force is accentuated by China Lake Naval Air Warfare Station. It is likely that a significant operations workforce would relocate to Ridgecrest because of the services offered associated with the naval base. It is not anticipated that primary regional and local roadway segments and intersections, routes and traffic patterns LOS would be diminished.

As discussed herein, China Lake Boulevard experiences 25% of the traffic volumes from US 395 during the peak hour. There is a good possibility that RSPP operations would mimic this pattern. Project operations generated traffic plus projected truck trips equal 69 PCE trips. Approximately 25% of the 69 one-way vehicle trips or approximately 17 trips would travel through the Brown Road, US 395 and China Lake Boulevard intersection. This represents a negligible increase in traffic through the intersection and a negligible potential for collision rates to increase.

Glare Effect to Roadways Impacts and Mitigation

The **VISUAL RESOURCES** section of this document addresses the general topic of glare impacts. As it relates to transportation, glare has the potential to be a distraction to motorists and corresponding degradation in traffic safety. The greatest chance for solar reflection to occur is when the solar troughs reflect the sun at sunrise and sunset (MIL 2009a). US 395 is a regional serving route with national significance for interstate commerce. The slightest chance that glare may affect motorists may result in a substantial safety risk and impede interstate commerce.

Staff recommends Condition of Certification **VIS-4**, which requires the project owner to provide opaque or nearly opaque screening (berms, fencing, landscaping, or similar means) along the project boundaries facing Brown Road and US 395 at a height to effectively intercede any light reflection from the mirror troughs. It would be necessary to perform a line-of-sight study for Brown Road and US 395 to determine the appropriate height for the screening. Design of the screening would be included on the final construction drawings and notated showing lines-of-sight. Staff recommends Condition of Certification **TRANS-2**, which would require the project owner to perform a line-of-sight study for Brown Road and US 395 to determine the appropriate height of the screening. Such a study would provide data to allow Commission staff to customize the mitigation recommended in **VIS-4.**

Access and Internal Roadway Impacts and Mitigation

Two access driveways are proposed for the RSPP (SM 2009a, Section 2.5.6.5, p. 21). One access would serve the northern portion of the project site and one would serve the southern portion. The driveway serving the northern portion of the site is a 550-foot access drive from Brown Road to the power block. It would be located approximately 1.75 miles west of the Brown Road and US 395 intersection and is proposed to be 24 feet wide, consistent with common emergency access standards. The driveway for the southern portion would provide access to the solar field for maintenance and similar duties. It would be 650 feet in length, 24 feet wide and be located 0.6 miles west of the access road to the northern portion.

RSPP egress and ingress would be accompanied by acceleration and deceleration lanes within the Brown Road right-of-way. Ingress, right-in from west bound traffic traveling on Brown Road entering the site, to the proposed northern project site would be served by a deceleration lane 1,500 feet in length. Egress, right-out to west bound traffic departing the site, would be served by an acceleration lane 1,000 feet in length. Similarly, ingress, right-in from east bound traffic traveling on Brown Road, to the proposed southern project site would be served by a deceleration lane 1,500 feet in length. Egress, right-out to Brown Road eastbound, would be served by an acceleration lane 1,000 feet in length. The applicant is not proposing left turns for the site access driveways.

Kern County Municipal Code, Section 12.16 (KERN 2009a), requires encroachment permits for access and construction in public rights-of-way. Encroachment permits would be required for the proposed acceleration and deceleration lanes on Brown Road. Kern County states that any improvements or alterations to Brown Road shall be determined by the Roads Department, including length and design of acceleration and deceleration lanes (SM 2009a, DR-Traffic-197). Encroachment permits are ministerial permits that ensure the design of the lanes and ingress and egress meet county standards. These ministerial permits are better suited for local implementation.

During construction of the power plant, construction related traffic would account for 843 PCE trips. Left turn lanes are not proposed by the applicant as part of the ingress and egress. Left turning movements would encounter opposing oncoming traffic on Brown Road. Some construction traffic is anticipated to travel south bound on Brown Road to the proposed northern project site. This would require a left turn into this portion of the project site. Additionally, some construction traffic would travel north bound on Brown Road and turn left to the southern portion of the proposed project site. Left turns present a hazard when left turning lanes are not provided, especially considering the amount of opposing traffic and trucks during construction. There would be 590 construction trips using Brown Road between US 395 and the proposed project site and 253 construction trips using Brown Road between the proposed project site and SR-178. Though small amounts of non-project related traffic would pass through the proposed ingress and egress areas, traffic travels at 45 mph and it would be important to move construction related traffic and trucks out of the travel lanes. Further, as construction approaches the left turns it may stack, causing shorter stopping distances. It would be important to move construction traffic to left turn lanes as well.

To accommodate left turns and acceleration and deceleration lanes as discussed above and meet the standards of Kern County encroachment permits, staff recommends Condition of Certification **TRANS-3**. **TRANS-3** would require the project owner to temporarily widen Brown Road to accommodate 500 foot left turn lanes from Brown Road to the northern and southern portions of the proposed project site. **TRANS-3** would also require the project owner to submit plans, meeting the Kern County encroachment permit standards, for the left turn lanes and acceleration and deceleration lanes to the Kern County Roads Department for review and comment to the CBO and CPM for review and approval.

Solar field access driveways would be unpaved. The applicant does not discuss how these driveways would be improved to accommodate the weight of construction equipment and maintenance vehicles. The power block would be 18 acres with six acres of paved area for circulation.

Internal roadway standards are reviewed with final construction drawings. **TRANS-3** requires the project owner to design and provide cross sections demonstrating that the internal driveways would accommodate construction, operations and maintenance vehicles, per Kern County standards, and submit the plans to the CBO and CPM for review and approval.

Project Closure and Decommissioning Impacts and Mitigation

Traffic and transportation facilities constructed with the project include, construction laydown and parking area, paved surface of the power block, internal circulation driveways, temporary left turn lanes, acceleration and deceleration lanes on Brown Road and intersection improvements to the Brown Road, US 395 and China Lake Boulevard intersection. The Decommissioning Plan may allow alternatives to full site restoration (SM 2009a, sec. 3.2, p. 3-2).

At project closure, the construction laydown and parking area and power block paved area can serve as a BLM parking facility and recreation vehicle staging area and rest stop, if BLM is willing to accept these areas at the time of closure. If BLM is not willing to accept these areas for such purposes due to cost, etc., the project owner will be required to fence this area to protect BLM from liability.

The recommended external improvements to Brown Road would be temporary. Mitigation for the temporary improvements are discussed under the heading Potential for Roadway Damage Impacts and Mitigation. The recommended external improvements to the Brown Road, US 395 and China Lake Boulevard intersection would serve as an interim design until the State can provide the realignment and improvements according to preliminary designs when funding may be available.

At plant closure, if the project owner sells the site to a BLM approved replacement user the purchaser would be required to meet any conditions BLM imposes. If the project owner cannot sell to a BLM approved replacement user, staff recommends Condition of Certification **TRANS-4**, requiring the project owner, at plant closure, to offer the internal traffic and transportation components, as stated above, to BLM. If BLM accepts these areas, then the project owner will be required to improve these areas for recreational parking and recreational vehicle staging and ensure the driveways are converted to acceptable off-road vehicle trails or pedestrian paths. If BLM does not accept these areas, the project owner shall fence off such areas so as to protect BLM from liability.

Scenic Route Corridors Impacts and Mitigation

Kern County Circulation Element Policy 2.3.9 states, “the California Scenic Highways Master Plan designates three State highways in Kern County "Eligible State Scenic Highway."Route 1 consists of State Route 14 and State Highway 395. It begins north of Mojave and continues to the Inyo County line. Route 1 traverses high desert land, hilly areas, and is next to the Sierra Nevada Mountains. Plants indigenous to the area along

the route have good scenic qualities when wildflowers are in bloom. Points of interest include 20-Mule Team Terminus (State Registered Landmark 652) in Mojave, Desert Springs (State Registered Landmark 14), and Robbers Roost. Other interesting points are Red Rock Canyon State Park, Salt beds (near Koehn Lake), and Freeman Junction (State Registered Landmark 766)."

Kern County does not have project specific policies regarding scenic corridors and Caltrans has not made any recommendations pertaining to scenic corridors. Please refer to the **VISUAL RESOURCES** section of the Staff Assessment for discussion pertaining to potential scenic resource impacts.

Potential for Oversize and Heavy Load Vehicle Hazard Impacts and Mitigation

Project construction and operation would involve the transport of equipment and materials that exceed roadway load or size limits that would require special permits to be obtained through state and local regulatory agencies. It is a goal of Kern County to reduce overweight vehicles (Circulation Element, Section 2.5.1) on county roadways. According to the AFC, the maximum weight for heavy load vehicles in Kern County is 80,000 pounds (SM 2009a, Section 5.13.3.2, p. 5.13-15).

The transport of equipment and materials may require the use of truck and trailer with multiple axles on public roadways. The multi-axles trucks transporting oversize and heavy loads would create potential hazard because of such factors as being able to see around or overtake this type of vehicle, the ability for these vehicles to speed, slow or stop and the amount of turning radius needed for the vehicles to maneuver.

The California Vehicle Code (See LORS Compliance **Traffic and Transportation Table 8**) includes regulations pertaining to licensing, size, weight and load of vehicles operated on highways, safe operation of vehicles, and the transportation of hazardous materials. In addition, the Kern County Circulation Element provides goals, objectives and policies for the purposes of reducing to oversize and heavy load vehicles on public roadways.

It is a requirement of the California Vehicle Code and California Streets and Highway Code, that if State highways are used by oversized truck and trailer with multiple axles, the mover is required to obtain a permit from Caltrans, and use trailing warning vehicles or police control. These are ministerial permits that are more appropriately obtained when the specific circumstances are presented.

For the proposed project to be in compliance with LORS pertaining to overweight and oversized vehicles, staff recommends Condition of Certification TRANS-5. TRANS-5 requires that all project-related overweight and oversize vehicles used on public roadways during construction and operations comply with Caltrans and Kern County regulations pertaining to overweight and oversize vehicles. The project owner must also obtain necessary state and Kern County permits for all project-related overweight and oversize vehicles and use trailing warning and police control, if necessary.

Hazardous Material Transport Impacts and Mitigation

Circulation Element, Figure 11, identifies adopted hazardous materials shipping routes, which include US 395 and SR-14. The RTP (Freight Movement Action Element, page 4-

52) states, “Kings County, northwest of Kern County, is the site of a Class 1 hazardous waste facility. The facility, located at Kettleman Hills, draws trucks carrying hazardous materials from all western states. The presence of these trucks on regionally significant routes increases the probability of dangerous spills (RTP, page 4-52).

RSPP would require the delivery of hazardous materials and off-site shipment of wastes (SM 2009a, Section 5.13.3.3, Page 5.13-15). The California Vehicle Code and California Streets and Highway Code require permits for hazardous materials shipment and handling including quantities, routes and operator training and qualifications. Again, these are ministerial permits for the purpose of preventing hazard when the hazard can be better understood. Because the project would require the delivery of hazardous materials, staff recommends Condition of Certification TRANS-6. TRANS-6 requires the project owner to obtain the necessary permits from the appropriate federal, state and local agencies for the delivery of hazardous materials on public roadways and to only use SR-14 and US 395 (and Brown Road from the project site to US 395), according to the County’s Circulation Element adopted hazardous materials shipping routes. Permits obtained pursuant to the Code of Federal Regulations and the California Vehicle Code and Streets and Highways Code would include a description of quantities and routes and ensure operator training and qualifications.

For a discussion of the potential impacts related to hazardous materials please see the **HAZARDOUS MATERIALS MANAGEMENT** section in this Staff Assessment (SA).

Potential for Roadway Damage Impacts and Mitigation

California Streets and Highway Code: Division 1 and 2, Chapter 3 and Chapter 5.5, includes regulations for the care and protection of State and County highways, and provisions for the issuance of written permits.

Chapter 2 of the RTP (KCOG 2009a) contains policies that promote opportunities for truck-to-rail and truck-to-intermodal mode shifts and encourages the use of rail and air to reduce impacts to state and inter-county routes. The policies also encourage coordination between the public and private sectors to explore innovative strategies for the efficient movement of goods. The policies specifically state, “oppose higher axle load limits for the trucking industry on general purpose roadways”.

The applicant proposes to use railways to the extent possible (SM 2010a, Section 5.13.2.5, Page 5.13-10). **TRANS-1** requires the project owner to coordinate with Kern COG to include railway transport of equipment, materials and supplies as part of the traffic control plan, to minimize the potential of roadways being damaged.

Heavy equipment transport and repetitive public right-of-way use is likely to occur on Brown Road. Project related transport of heavy equipment and repetitive use from construction activities on public rights-of-way would likely damage public rights-of-way. Kern County states that the applicant shall be required to restore and reconstruct Brown Road to pre-construction conditions, including complete structural sections resulting from heavy equipment and vehicles.

Kern County Roads Department (KCPD 2010a) requires roadways damage by vehicles and equipment be restored to existing conditions. Caltrans also requested that State

highways be repaired to pre-construction condition (DOT 2010a). Staff's recommended Condition of Certification TRANS-7, would require the project owner to repair any road damaged by the transport of heavy equipment and repetitive use of roadways associated with construction activities to its pre-construction condition. **TRANS-7** also requires the project owner to document before/after conditions of the roadways. This would ensure that any damage to local roadways would not be a safety hazard to motorists.

C.10.4.2.1.2 Parking, Internal Circulation and Emergency Access Impacts and Mitigation

Kern County General Plan Circulation Element Policy, 2.3.7, requires setback deviation studies. It pertains to any County collector road that may need additional right-of-way as new developments are proposed. The RSPP is not likely to spur growth along Brown Road or US 395 as infrastructure and environmental constraints significantly reduce the possibility. It is Energy Commission staff's position that a setback deviation is not warranted.

Kern County's Zoning Ordinance, Chapter 19.82, provides requirements for off-street parking and parking design standards. The most closely related use to a power plant (Chapter 19.82.020 (L)) is industrial uses, manufacturing or assembly (Chapter 19.82.020 (F) (2)). The off-street parking requirement for this type of use is: One (1) space per five hundred (500) square feet of floor area plus one (1) per two hundred and fifty (250) square feet of office area. The minimum parking space dimension is 9 x 20 feet (Chapter 19.82.030). The applicant's traffic engineer anticipates that construction laydown and parking would require 5.5 acres. A standard parking space is 9 x 20 feet or 180 square feet. During the peak months of construction and if the construction workforce commutes alone in a passenger sized vehicle or pickup truck the acreage required for parking would be 2.5 acres. Under the same conditions, trucks would require an additional 1.75 acres plus area for turning and backing. This would result in just over one acre for equipment, materials and supply storage and maneuverability. The applicant submitted 30 % preliminary site drawings (SM 2010c, Attachment 1) indicating that the construction laydown area exceeds the 5.5 acres needed for parking and laydown area, as cited in the AFC.

Chapter 19.82.050 establishes parking standards for persons with disabilities and must be in compliance with Title 24 of the California Administrative Code and all applicable federal requirements and be surfaced and designed to facilitate wheelchair use.

Chapter 19.82.060 requires three loading spaces for up to 100,000 square feet of floor area plus one loading space for each additional 80,000 square feet.

Chapter 19.82.090 establishes parking area design standards. Chapter 19.82.090 (B) states that parking aisles shall comply with the following minimum standards arrangement minimum/ aisle width:

- 30 degree, single row 11 feet
- 45 degree, single or multiple row 14 feet
- 60 degree, single or multiple row 18 feet

- 90 degree, single or multiple row 25 feet

Chapter 19.82.090 (C) states that all parking spaces shall be clearly marked with white painted stripes and concrete wheel blocks or a six- (6-) inch raised A.C. curb shall be installed at each parking space that abuts a structure or property line. Chapter 19.82.090 (E) states that driveways for industrial developments shall be a minimum of eighteen (18) feet in width with fifteen (15) feet of unobstructed vertical clearance.

In compliance with Kern County LORS, the proposed RSPP would be subject to Kern County Zoning Ordinance Chapter 19.80. The purpose of this chapter is to establish parking and internal circulation development standards for industrial uses. 19.80.030 (D) states that all access drives, parking areas, and vehicle maneuvering areas shall be surfaced with a minimum of two (2) inches of asphaltic concrete paving constructed over a minimum of three (3) inches of compacted base material or material of higher quality. The paved access drive shall be continuously maintained in good condition. 19.80.030 (D) states that fire protection facilities and access ways and safety setbacks shall be as required and approved by the Kern County Fire Department. 19.80.030 (K) states that all industrial uses with five (5) or more employees provide adequate space for the collection and loading of recyclable materials.

The proposed RSPP site is of adequate size to accommodate parking, loading, and the design and access requirements. Accordingly, the final construction plan sets must demonstrate compliance with the parking LORS. Staff recommends Condition of Certification TRANS-8, which requires the project owner to provide adequate parking to accommodate the proposed number of construction employees, parking for persons with disabilities, per Title 24, loading lanes, and design parking and access according to the parking development standards.

The applicant submitted 30% preliminary site drawings (SM 2010c, Attachment 1) and states that internal turning radius for all the internal roadways will be a minimum of 35 feet to comply with Kern County requirements. Internal circulation turning radius and sight distances cannot be determined at this time. The proposed RSPP site is of adequate size to accommodate minor adjustments to internal circulation, if necessary, so traffic movements can function safely within the site. The final construction plan sets must clearly demonstrate that traffic can move safely within the site and adequate areas are set aside for backing and maneuvering of large trucks. TRANS-8 requires that the project owner provide adequate internal circulation within the project site, including sight distances, turning radii and line of sight for internal circulation and show these design criteria on the final construction drawings. The final construction drawings shall be provided to the Kern County for review and comment and to the CBO and CPM for review and approval.

Inadequate emergency access would be a significant impact under CEQA. In the event of an emergency at the RSPP site, emergency vehicles would likely use Brown Road to access the project site. Kern County Fire Department determines the requirements for emergency access.

The applicant states that the proposed emergency access driveway would be paved with a width of 24 feet, if required by Kern County, a secondary point of access from

Brown Road to the area of the power block would be provided and that all driveways for access to the occupied areas have grades less than 5%. In addition, the applicant states that all roads to occupied areas will be a minimum of 20 feet in width, paved, and provided with a structural section capable of H-20 loading, which will meet or exceed the Kern County requirements for their emergency fire vehicles. The applicant further states that scaled plans showing emergency access including design radii, grades lane widths, etc., will be developed during the design process as the project moves forward. And, all emergency access work will be designed and completed in conformance with the Kern County Fire Marshall's standards and requirements. (SM 2010a, DR-Traffic-203)

The proposed RSPP site is of adequate size to accommodate minor adjustments to emergency access, if necessary. Accordingly, the final construction plan sets must demonstrate compliance with emergency access LORS and strive to address Kern County's Fire Marshall standards and requirements. Staff recommends Condition of Certification TRANS-9, which requires the project owner to ensure adequate emergency access within the project site by showing emergency access including design radii, grades lane widths, etc. on the final construction plan sets. The final construction drawings shall be provided to the Kern County for review and comment and to the CBO and CPM for review and approval.

For additional discussion of emergency services serving the facility, refer to the WORKER SAFETY and FIRE PROTECTION section in this Staff Assessment.

C.10.4.2.1.3 Bicycle, Pedestrian, Public and Alternative Transportation, School Bus Route Impacts and Mitigation

A significant impact would be present if an impact conflicts with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities. The proposed RSPP would result in a change to a regularly traveled bicycle route. Numerous bicyclists use Brown Road as a recreational bicycle route. Refer to the **LAND USE** section of this Staff Assessment for discussion and analysis pertaining to motorized and non-motorized vehicle access. Conditions of Certification **LAND-5** and **LAND-6** provide mitigation for bicyclists using Brown Road. **Traffic and Transportation Figure-5** depicts bicycle, public transportation and school bus routes.

Kern County uses the RTP for bicycle and pedestrian facility planning. The RTP Bicycle and Pedestrian Action Element (KCOG 2009a, pp. 4-54 to 4-56) promote bicycle and pedestrian facility development and use. Its purpose is to asses and plan for the development and financing of such facilities but does not contain project specific project policies. Kern County utilizes fees, grants and bonds to finance facilities not specifically required of projects to implement bike and pedestrian facilities.

Kern COG adopted the *Kern County Bicycle Facilities Plan* (KCOG 2009a), which provides a compendium of bicycle transportation facilities, constructed and planned for Kern County. As stated in the setting section, China Lake Boulevard from the Ridgecrest city limits to the US 395 is a planned bike route. Funding for the China Lake Boulevard bicycle route has not been established.

The distance from downtown Ridgecrest to the proposed project site is within bicycle commuting distance. Bicycling can be an alternative transportation mode to reduce construction trips.

Kern County alternative transportation goals, objectives and policies are contained in the RTP. RTP Transportation Control Measure Action Element (KCOG 2009a, pp. 4-33 to 4-40) and Congestion Management Action Element (KCOG 2009a, pp. 4-68 to 4-85) promotes the implementation of alternative transportation and transportation control. Transportation control is commonly referred to as Transportation Demand Management programs (TDM). Kern County does not require specific projects to participation in a TDM.

As noted above China Lake Boulevard is a school bus route. Approximately 379 construction related PCE trips would use China Lake Boulevard in the morning and evening peak hours. The number of trips poses an impact to the school bus route. Staff has been advised by Sierra Sands Unified School District School (SSUSD 2009b) that buses operate along China Lake Boulevard from 7:00 to 9:15 am and again between 2:15 to 4:00pm. Additionally, kindergartens operate to noon so school buses use China Lake Boulevard from 11:30 am to 12:30 pm.

As discussed herein, the Brown Road, US 395 and China Lake Boulevard intersection experiences a collision rate almost three times the State average. Construction and traffic is likely to increase the collision rate significantly. **TRANS-1** requires improvements to the intersection the preparation of a traffic control plan. As a means to further reduce project related construction traffic through the intersection, the Traffic Control Plan would require the project owner to implement a TDM program. The Traffic Control Plan would also restrict heavy equipment and building materials deliveries from using China Lake Blvd. between 7:00am and 9:15am and from 2:30pm to 400pm. In addition, construction workers shall be trained on precautionary measures for avoiding collisions with school busses and instructed to take extra precautions to avoid collisions with school busses, especially during midday hours.

Sidewalks and pedestrian pathways are limited to the urban areas of the proposed project's vicinity. There are no sidewalks along US 395, China Lake Boulevard and Brown Road rights-of-way. The nearest residence with pedestrian dedicated access to the proposed project site is several miles away. It is unlikely that pedestrians would walk more than two miles to access the project site so sidewalks would not be required.

Kern County public transportation goals, objectives and policies are contained in the RTP. The RTP Public Transportation Action Element (KCOG 2009a, pp. 4-33 to 4-40) plans for public transportation needs. A goal of this element is to improve services to rural parts of the County. Kern Regional Transit would be a service provider that provides services to rural parts of the County. However, Kern County does not have LORS implementing the rural network needs. Since the proposed project's construction is temporary in nature, requiring public transportation fees or services is not warranted.

C.10.4.2.1.4 Linear Facilities Impacts and Mitigation

As stated in the setting, RSPP would include a HTF pipeline, transmission lines and water pipeline. These facilities would cross public right-of-way.

Kern County Municipal Code, Title 12, Section 12.16.110 states that any trench and excavation or piling any material in the traveled part of any public highway require the placement and maintenance of warning lights at each end of such pile or excavation, at distances of not more than one hundred (100) feet apart along such pile or excavation, from sunset of each day to sunrise of the next day, until such excavation is entirely refilled, or such pile of material is removed. Section 12.16.120, states that the laying of gas or water pipes or conduits requires a permit to tunnel under improved portion of highways. The surface shall be blocked up to ensure the safe use of the highway pending the work and the work shall be conducted as expeditiously as possible, and upon completion the tunnel shall be filled and closed so that the surface of the street will be supported to pre-existing conditions. Section 12.20.010 states that electric power corporations, granted the right to construct electric power wires along, upon and across any public road or highway may erect poles for supporting the wires and other necessary fixtures of such lines, so as to not incommode the public in the ordinary use of such roads or highways. Section 12.20.020, states that such wires along such roads and highways shall be suspended not less than twenty-five (25) feet in height on posts or poles, and such wires across roads or highways shall be suspended at least eighteen (18) feet above the road or highway, or higher if required by public utilities commission regulations.

The HTF is proposed to cross Brown Road approximately halfway between the access driveways for the northern and southern portions of the proposed project. An encroachment permit and franchise agreement (PUC 2010a) would be required to trench through or bore under Brown Road. Similarly, the proposed transmission line would crossover Brown Road. The transmission lines must be constructed according to Section 12.20.020 and an encroachment permit and franchise agreement would be required.

The proposed water pipeline would be installed by Indian Wells Valley Water District (IWVWD). Right-of-way for the Installation of the water pipeline is 30 feet wide but the trench will be three feet wide. The waterline will be constructed 15 to 20 feet from existing pavement on the west side of China Lake Boulevard and along the north side of Brown Road to the proposed project site. It will run 4.5 miles from IWVWD's Ridgecrest Heights storage tank to the proposed project site. (SM 2010a, DR-Traffic-212) According to Kern County Assessor parcel maps, there is adequate public right-of-way to accommodate the waterline along the proposed corridor.

IWVWD would be required to obtain the encroachment permit and franchise agreement. Since the existing Brown Road shoulder is not very wide, construction of the water pipeline may require the water pipeline placement under Brown Road. To do this work, parts of Brown Road would be temporarily impacted. The water pipeline would also require an encroachment permit from Caltrans to permit work within a State highway (DOT 2010a). There are nine private and public driveways the waterline would affect

during its installation. Consistent with Kern County encroachment permit requirements, conditions for the installation of the waterline include temporary driveway diversions and phasing the installation.

Staff recommends Condition of Certification **TRANS-10** for project related HTF pipelines, transmission lines and water pipeline activities affecting public roads. **TRANS-10** would require the project owner to comply with the LORS listed above and install crossing structures and netting, if required by Kern County, across Brown Road as a safety precaution and to reduce the potential for damage from falling construction materials or equipment during cable-stringing activities, prior to transmission line cable stringing. In addition, **TRANS-10** would also require the project owner to submit plans, meeting the Kern County encroachment permit standards for project related HTF pipelines, transmission lines and water pipeline activities to the Kern County Roads Department for review and comment to the CBO and CPM for review and approval.

The project owner would be required to provide 15 foot temporary driveway diversions within 10 feet immediately adjacent to the existing driveway location and phase the installation when necessary (SM 2010a, DR-Traffic-213). Staff recommends Condition of Certification **TRANS-11,** which would require the project owner to provide driveway diversions during construction of the water pipeline.

C.10.4.2.1.5 Air Traffic, Water and Rail Impacts and Mitigation

Air Traffic

Impacts would occur if the project causes a change in air traffic patterns, including either, an increase in traffic levels or a change in location that results in substantial safety risks. There are four potential primary causes for project to affect a change in air traffic patterns or increase safety risks. The four causes include height of structures near airports, vertical velocity and visible water vapor plumes generated from industrial exhaust, radio or telecommunication interference and glare.

Operations conducted in the R-2506 internal restricted area include low altitude high speed maneuvers and radar intercept areas. The vertical dimension for the restricted area extends from surface to 6,000 feet mean sea level (MSL) or approximately 2,000 feet above ground level at the project site. Entry into the restricted areas requires prior approval from the designated using agency. The designated using agency is determined by the R-2508 Joint Policy and Planning Board, which is comprised of the three military facilities commanding officers (USAF 2010a) within the Isabella Military Operating Area (MOA). The MOA is used for military flight activities, including acrobatic or abrupt flight maneuvers, intercepts, air combat maneuvering, aerial refueling, and training areas for student pilots. It has a minimum altitude of 200 feet above ground level (AGL), but the project site's proximity to the Ridgecrest and Inyokern communities and El Paso Wilderness generally precludes extremely low altitude flights in the project area.

Obstruction

United States Department of Transportation, Federal Aviation Administration Title 14, Chapter 1, Part 77 establishes procedures for evaluating project construction within

10,000 feet from runways of 3,200 feet in length or greater. If the proposed project would introduce any construction or alteration that is greater in height than an imaginary surface extending outward and upward at the following applicable slope 100 to 1 for the horizontal distance of 20,000 feet from project to the nearest 3,200 foot (FAA 2009a), the developer is required to notify the FAA.

Furthermore, FAA Advisory Circular 70/7460-1, Obstruction Lighting/Marking Requirements, requires that any temporary or permanent structure, including all appurtenances, that exceeds an overall height of 200-feet above ground level (AGL) or exceeds any obstruction standard contained in FAA Form 7460, should normally be marked and/or lighted (FAA 2009b).

The proposed RSPP is not located within 20,000 feet of the nearest airport runway. None of the project's physical structures would exceed 120 feet in height and are, therefore, well below the 200-foot maximums for structures within the affected operational airspace of either airport.

Plumes

Vertical velocity plumes are currents of air emitted upward from the ACC stacks. At 4.3 meters per second and up to 1,500 feet above ACC stacks, vertical velocity plumes can be emitted at a velocity as to affect anything that travels over or through its current. The ACC stacks for the Blythe Solar Project are similar to the ACC stacks for RSPP and would emit vertical velocity plumes at a similar rate (BSPP 2010a).

Aircraft operating in the traffic pattern or within sight of a tower, or aircraft known to be departing or arriving from flight in local practice areas (within a 20-mile radius of the airport), or aircraft executing practice instrument approaches at the airport. (FAA 2009a). As stated herein, the area within the vicinity of the proposed RSPP provides ideal conditions for sail planes. Vertical velocity thermal plumes are generally invisible and may present a hazard to gliders, as well as an attractive nuisance to sailplane enthusiasts, intent on improving their soaring records. Staff recommends Condition of Certification **TRANS-12** would require the applicant to notify the FAA regarding vertical velocity thermal plumes that may be generated by the project and may pose a hazard to flights occurring at low altitudes above the proposed power block. Although the potential hazard would still remain, pilots would receive adequate warning to avoid or compensate.

Visible water vapor plumes are similar to fog in the fact that the air mass contains high moisture levels that may reduce visibility. These plumes occur as a result of ACC stacks exhaust combined with the presence of low temperature and high humidity weather. **TRANS-12** would require the applicant to notify the FAA regarding visible water vapor plumes that may be generated by the project and may pose a hazard to flights occurring at low altitudes above the proposed power block. Although the potential hazard would still remain, pilots would receive adequate warning to avoid or compensate.

Radio and Telecommunications

The applicant acknowledges the affect of the electronic spectrum of the proposed project has not yet been fully developed. At the present time, staff cannot evaluate the

potential effects of the proposed project's electronic spectrum on military air operations. It is not likely to affect flights paths and patterns of public airports because of the distance between the public airports and the proposed project.

However, radio transmissions that may be required for the proposed RSPP could produce interference that would disrupt military testing and training operations conducted in the project vicinity and on the military ranges (SM 2009a, Appendix K). However, full implementation of condition of certification **LAND-7** would eliminate potential mission impacts. (See **TRAFFIC & TRANSPORTATION** section for further discussion.)

Glare

Sunlight can reflect off the mirror troughs at extremely limited interval, normally at sunrise and sunset. The proposed RSPP mirror troughs may generate glare that would distract pilots.

Staff has contacted Anthony Parisi, PE, Head, Sustainability Office, NAVAIR Ranges requesting a review of the RSPP proposal, specifically for stack heights, vertical velocity plumes and visible water vapor plumes and glare. Mr. Parisi states that the U. S. Department of Defense Renewable Energy Workshop has reviewed the proposed RSPP would not impact military missions, with respect to low flying aircraft over stack heights and glare (DOD 2009a). The response did not include discussion of vertical velocity plumes and visible water vapor plumes.

Staff also consulted with CDR Dan Harmon, Operations Officer / N3, NAWS China Lake requesting a review of the RSPP proposal, specifically for stack heights, vertical velocity plumes and visible water vapor plumes and glare. The response did not address stack heights, vertical velocity plumes and visible water vapor plumes (Harmon, email 2/18/2010). CDR Harmon expressed concerns regarding "the potential for reflectivity from the mirrors may affect aircraft departing China Lake NAWS, which are usually on a southwesterly course heading to cross Inyokern Rd at Jack's Ranch Rd. and then proceed climbing to the south.

Commission staff states, in the mornings the directional array will be pointed east and the reflective energy will be right in the eyes of the pilots during what is termed as a "critical phase of flight". Upwards of 80% of mishaps occur during critical phases of flight (takeoffs and landings), due to high task loading, proximity to ground and changes in aircraft configuration. Additional distractions only increase the probability of mishap. The proposed RSPP plant uses reflective troughs. In the morning the troughs turn from stow position to tracking position and in the evening move in the reverse. It is in that transition before the sun is properly focused that the mirrors send out a linear solar reflection which can produce thermal damage to humans within 60 feet of the plant boundary. This line of light is not cumulative; that is, it represents only one sun at any given point on the mirror and would likely last six seconds. Once the sun and the mirror are aligned 95% of the direct sunlight falls on the heat collecting element and an observer then sees the bright blue sky or clouds reflected from the mirror and not total solar energy. The mirrors can produce "bright spots" at their top and bottom but is not likely to affect departures. (MIL 2009a)

There is no question that the mirrors have the possibility to be bright, intrusive objects in the field of view. However, they will not produce retinal damage but may be distracting. There is general agreement in the field of specialists dealing with these mirror fields that they have the appearance of lakes. The visible spectrum from total solar energy 60 feet from the plant boundary and would be at moderate levels. (MIL 2009a)

Staff recommends Condition of Certification **VIS-4**, which requires the project owner to provide opaque or nearly opaque screening (berms, fencing, landscaping, or similar means) along the project boundaries facing Brown Road and US 395 at a height to effective intercede any light reflection from the mirror.

Navigable waterways

The proposed RSPP is not located adjacent to a navigable waterway; therefore, the RSPP is not expected to affect water-related transportation.

Railways

Rail line LA 028634 is a former Southern Pacific Railroad 100 foot right-of-way that exists to the west of the proposed project site. The Phase I Environmental Site Assessment did not locate railroad ties, tracks or roadway crossings, but did locate infrastructure associated with the railroad corridor, like bridges and storm water conveyances. The rail road corridor currently serves as a hiking trail. Project facilities are located at least 230 feet from the rail road corridor. The boundary of the proposed project would be fenced and it is unlikely persons working at the plant site would encounter the rail road corridor (SM 2010a, DR-Traffic-208).

As stated herein, the project related construction and operations traffic would likely cross railways. These crossing are gated and signalized. Project construction and operations traffic is not likely to affect railway operations.

C.11.4.3 CEQA LEVEL OF SIGNIFICANCE

With implementation of conditions of certification as defined above, the proposed RSPP would not conflict and be in compliance with applicable LORS. Further, RSPP project traffic and transportation impacts would be reduced to less than significant.

C.10.5 NORTHERN UNIT ALTERNATIVE

The northern unit alternative would be the proposed project minus all facilities south of Brown Road (see Alternatives Figure 1). Regional access to the site would occur via United States Route 395 (US 395), State Road-14 (SR-14), SR-178 and China Lake Boulevard Local access is provided via Brown Road. **Traffic and Transportation Figure-1** illustrates regional and local roadways within the project's affected environment.

Traffic generated from construction operations would impact local and regional serving roadways. Construction of the RSPP project is anticipated to occur over approximately 28 months. Peak project construction workforce is anticipated to be 633 workers during the 11th month. Other components of the proposed project with the potential to affect

traffic and transportation systems include: a water mainline, telecommunication and telemetry systems, access road(s) and 230 kV transmission lines.

C.10.5.1 SETTING AND EXISTING CONDITIONS

The transportation system within the northern unit alternative's affected environment includes; existing and planned regional and local roads, routes and traffic patterns, public transportation operations, school bus routes, designated bikeways or pedestrian pathways, railways, airports, aircraft flight paths and patterns, transmission lines and pipelines and waterways.

The anticipated routes and distribution for construction traffic is the same as the proposed project. Traffic volumes and delay at intersections would be similar to the proposed project because facility construction would involve the same number of construction workers during the peak month. Other existing traffic and transportation aspects of the proposed northern unit alternative are not different from the proposed project, except that the HTF line would not cross Brown Road.

C.10.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Northern Unit alternative would present similar traffic and transportation impacts as the proposed project. Traffic and transportation aspects considered with this alternative are listed below. If the proposed project's LORS, significant impacts or mitigation are modified or changed then it is discussed below:

Construction and operation roadway and intersection impacts would not significantly change. Traffic generated by the proposed alternative would not impact roadway segments but would impact the Brown Road, US 395 and China Lake Boulevard intersection. Construction traffic would degrade the intersection to LOS E (LORS), similar to the proposed project. In addition, the construction and operations traffic generated by the alternative would pose a potential significant increase in collision rates. Condition of Certification **TRAN-1** would minimize the potential increase to collision rates and with the implementation of **TRAN-1** the proposed alternative would be in compliance with LORS.

The mirror troughs may generate glare and pose a hazard on motorists. Condition of Certification **TRAN-2** would require a line-of-sight study along the alternative's boundary facing Brown Road and US 395 to determine the height needed to prevent glare effecting motorists.

The alternative project's access and internal driveways must comply with LORS for encroachment permits and construction design standards. Condition of Certification **TRAN-3** requires compliance with these LORS and the project owner to construct temporary left turn lanes and acceleration and deceleration lanes on Brown Road. This condition of certification would be modified to eliminate the requirement for a left turn from Brown Road and acceleration lanes to and from Brown Road to the proposed project's southern portion since it is not a part of the alternative.

If the alternative project was decommission or closed, project facilities would be located on BLM managed lands. Condition of Certification **TRANS-4** requires security fencing or conversion of the project facilities.

The alternative project would involve the use of oversize and overweight vehicles, the transport of hazardous materials and present the potential to damage public roadways. Conditions of Certification, **TRAN-5, TRANS-6 and TRANS-7,** require compliance with LORS pertaining to oversize and overweight vehicles and the transport of hazardous materials. In addition, the public roadways will be restored to original pre-construction conditions.

The alternative project's parking, internal circulation and emergency access must comply with LORS. In addition, the parking, internal circulation and emergency access must meet development standards and commonly accepted engineering principles and practices for turning radius, sight distance and line-of-sight. Conditions of Certification **TRAN-8** and **TRANS-9** requires compliance with these LORS and proper development of parking, internal circulation and emergency access.

Refer to the **LAND USE** section of this Staff Assessment for discussion and analysis pertaining to motorized and non-motorized vehicle access. Conditions of Certification **LAND-5** and **LAND-6** provide mitigation for bicyclists using Brown Road. In addition, **TRANS-1** would require van pools and other TDM measures to mitigate the impacts to the intersection.

The alternative project would involve project related HTF pipelines, transmission lines and water pipeline activities affecting public roads. **TRANS-10** would require the project owner to comply with the LORS listed above and install crossing structures and netting, if required by Kern County, across Brown Road as a safety precaution and to reduce the potential for damage from falling construction materials or equipment during cable-stringing activities, prior to transmission line cable stringing. In addition, **TRANS-10** would also require the project owner to submit plans, meeting the Kern County encroachment permit standards for project related transmission lines and water pipeline activities.

The alternative project would involve water pipeline construction,requiring 15 foot temporary driveway diversions within 10 feet immediately adjacent to the existing driveway location and phase the installation when necessary. **TRANS-11,** requires the project owner to provide driveway diversions during construction of the water pipeline.

The alternative project would generate glare associated with the mirrors that may impact military flight operations. Condition of Certification **VIS-4**, requires the provision of opaque or nearly opaque screening (berms, fencing, landscaping, or similar means) along the project boundaries.

C.10.5.3 CEQA LEVEL OF SIGNIFICANCE

Impacts associated with this alternative would be the same as the proposed project, except that the ingress and egress improvements, permitting and LORS compliance necessary for the southern access driveway would not be required. In addition, the

permitting and LORS compliance associated with the HTF pipeline would not be required. With the implementation of the same or slightly modified conditions of certification, the alternative project's impacts would be less than significant.

C.10.6 SOUTHERN UNIT ALTERNATIVE

The southern unit alternative would be the proposed project minus all facilities north of Brown Road(see Alternatives Figure 1). Regional access to the site would occur via United States Route 395 (US 395), State Road-14 (SR-14), SR-178 and China Lake Boulevard Local access is provided via Brown Road. **Traffic and Transportation Figure-1** illustrates regional and local roadways within the project's affected environment.

Traffic generated from construction operations would impact local and regional serving roadways. Construction of the RSPP project is anticipated to occur over approximately 28 months. Peak project construction workforce is anticipated to be 633 workers during the 11th month. Other components of the proposed project with the potential to affect traffic and transportation systems include: a water mainline, telecommunication and telemetry systems, access road(s) and 230 kV transmission lines.

C.10.6.1 SETTING AND EXISTING CONDITIONS

The transportation system within the southern unit alternative's affected environment includes; existing and planned regional and local roads, routes and traffic patterns, public transportation operations, school bus routes, designated bikeways or pedestrian pathways, railways, airports, aircraft flight paths and patterns, transmission lines and pipelines and waterways.

The anticipated routes and distribution for construction traffic is the same as the proposed project. Traffic volumes and delay at intersections would be similar to the proposed project because facility construction would involve the same number of construction workers during the peak month. Other existing traffic and transportation aspects of the proposed northern unit alternative are not different from the proposed project, except that the HTF pipeline and transmission lines would not cross Brown Road.

C.10.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Southern Unit alternative would present similar traffic and transportation impacts as the proposed project. Traffic and transportation aspects considered with this alternative that are different from the Northern Unit Alternative are listed below:

The alternative project's access and internal driveways must comply with LORS for encroachment permits and construction design standards. Condition of Certification **TRAN-3** requires compliance with these LORS and the project owner to construct temporary left turn lanes and acceleration and deceleration lanes on Brown Road. This condition of certification would be modified to eliminate the requirement for a left turn from Brown Road and acceleration lanes to and from Brown Road to the proposed project's northern portion since it is not a part of the alternative.

The alternative would not require the transmission lines to cross Brown Road. Condition of Certification **TRAN-10** would not apply to the transmission lines.

C.10.6.3 CEQA LEVEL OF SIGNIFICANCE

Impacts associated with this alternative would be the same as the proposed project, except that the ingress and egress improvements, permitting and LORS compliance necessary for the northern access driveway would not be required. In addition, the permitting and LORS compliance associated with the HTF pipeline and transmission lines would not be required. With the implementation of the same or slightly modified conditions of certification, the alternative project's impacts would be less than significant.

C.10.7 ORIGINAL PROPOSED PROJECT ALTERNATIVE

The original proposed project alternative is a slightly modified version of the proposed project but it was partially located in a flood area. Regional access to the site would occur via United States Route 395 (US 395), State Road-14 (SR-14), SR-178 and China Lake Boulevard Local access is provided via Brown Road. **Traffic and Transportation Figure-1** illustrates regional and local roadways within the project's affected environment.

Traffic generated from construction operations would impact local and regional serving roadways. Construction of the RSPP project is anticipated to occur over approximately 28 months. Peak project construction workforce is anticipated to be 633 workers during the 11th month. Other components of the proposed project with the potential to affect traffic and transportation systems include: a water mainline, telecommunication and telemetry systems, access road(s) and 230 kV transmission lines.

C.10.7.1 SETTING AND EXISTING CONDITIONS

The transportation system within the original proposed project alternative's affected environment includes; existing and planned regional and local roads, routes and traffic patterns, public transportation operations, school bus routes, designated bikeways or pedestrian pathways, railways, airports, aircraft flight paths and patterns, transmission lines and pipelines and waterways.

The anticipated routes and distribution for construction traffic is the same as the proposed project. Traffic volumes and delay at intersections would be similar to the proposed project because facility construction would involve the same number of construction workers during the peak month. Other existing traffic and transportation aspects of the proposed northern unit alternative are not different from the proposed project.

C.10.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The original proposed project alternative would present the same traffic and transportation impacts as the proposed project. Conditions of certification **TRANS-1**

through **TRANS-12** mitigates traffic and transportation impacts or ensures compliance with traffic and transportation LORS for this alternative.

C.10.7.3 CEQA LEVEL OF SIGNIFICANCE

Impacts associated with this alternative would be the same as the proposed project. With the implementation of the same conditions of certification, this alternative project's impacts would be less than significant.

C.10.8 NO PROJECT/NO ACTION ALTERNATIVE

The No Project/No Action alternative would result in the proposed project site(s) not being developed by the applicant. RSPP related construction and operations impacts would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's CDCA, potentially including other renewable energy projects, recreational activities, etc.

C.10.8.1 SETTING AND EXISTING CONDITIONS

The transportation system within the No Project/No Action alternative's affected environment includes; existing and planned regional and local roads, routes and traffic patterns, public transportation operations, school bus routes, designated bikeways or pedestrian pathways, railways, airports, aircraft flight paths and patterns, transmission lines and pipelines and waterways.

C.10.8.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The No Project/ No Action alternative would not present traffic and transportation impacts:

- Without the proposed project the Brown Road, US 395 and China Lake Boulevard intersection would not be improved until Caltrans has the funding but other intersections would not be impacted by the projected traffic generation associated with the proposed project.
- Glare reflected from the mirror troughs would not pose a hazard on motorists
- Access and internal driveways would not be constructed.
- Security fencing or conversion of the project facilities would not be required.
- There would be no use of oversize and overweight vehicles and the transport of hazardous materials and damage public roadways would not occur.
- There would be no parking, internal circulation and emergency access requirements.
- A bicycle path would not be constructed.
- The preparation of a TDM program would not be required.
- There would be no HTF lines, transmission lines and water pipeline effects to public roadways.
- There would be no plumes to affect flight paths and pattens.

C.10.8.3 CEQA LEVEL OF SIGNIFICANCE

There would be no impacts and, therefore no significant impacts.

C.10.9 COMPARISON OF ALTERNATIVES AND PROPOSED PROJECT

Traffic and Transportation Table 9 provides a comparison of alternatives as it pertains to this technical area.

Traffic and Transportation Table 9
Comparison of Proposed Project and Alternatives

EFFECTS	Proposed Project (250 MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250 MW)	No Project/No Action*
Brown Rd., US 395 and China Lake Blvd. LOS Degradation and Collision Rates	LOS would be degraded at the intersection and there is adequate basis for collision rates to increase. COC **TRANS-1** provides mitigation.	Same as Proposed Project.	Same as Proposed Project.	Same as Proposed Project.	No Impact
Glare on Motorists	Glare from the mirror troughs may affect motorists. COC **TRANS-2** and **VIS -4** provides mitigation.	Same as Proposed Project.	Same as Proposed Project.	Same as Proposed Project.	No impact.
Ingress and Egress Construction and Encroachment Permits	Ingress and egress left turn lanes and acceleration and deceleration lanes must be constructed and encroachment permits obtained. COC **TRANS-3** provides mitigation.	Same as Proposed Project, except to southern portion of the proposed project.	Same as Proposed Project, except to northern portion of the proposed project.	Same as Proposed Project.	No impact
Project Decom. and Closure	If the project is closed, transportation facilities would remain. COC **TRANS-4** provides mitigation.	Same as Proposed Project.	Same as Proposed Project.	Same as Proposed Project.	No impact
Oversize and Overweight Vehicles	The project would require oversize and overweight vehicles. COC **TRANS-5** provides mitigation.	Same as Proposed Project.	Same as Proposed Project.	Same as Proposed Project.	
Hazardous Material Truck Trips	The project would require hazardous material truck trips. COC **TRANS-6** provides mitigation.	Same as Proposed Project.	Same as Proposed Project.	Same as Proposed Project.	No impact
Roadway Damage	The project would involve heavy truck and repetitive trips. COC **TRANS-7** provides mitigation.	Same as Proposed Project.	Same as Proposed Project.	Same as Proposed Project.	No impact

EFFECTS	Proposed Project (250 MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250 MW)	No Project/No Action*
Parking and Internal Circulation	The project would be required to provide parking and adequate internal circulation. COC **TRANS-8** provides mitigation.	Same as Proposed Project.	Same as Proposed Project.	Same as Proposed Project.	No impact
Emergency Access	The project would be required to provide adequate emergency vehicle access and provide proper turning radii, sight distances and lines-of-sight for internal movement. COC **TRANS-9** provides mitigation.	Same as Proposed Project.	Same as Proposed Project.	Same as Proposed Project.	No impact
Franchise Agreement and Encroachment Permits for Trenching	The project would be required to obtain franchise agreements and encroachment permits for the HTF pipeline, transmission lines and water pipeline. COC **TRANS-10** provides mitigation.	Same as Proposed Project. Franchise agreements and encroachment permits are not required for the HTF pipeline.	Same as Proposed Project. Franchise agreements and encroachment permits are not required for the HTF pipeline and transmission lines.	Same as Proposed Project.	No impact
Driveway Diversions	The project would be required to provide driveway diversions along the waterline pipeline during pipeline construction. COC **TRANS-11** provides mitigation.	Same as Proposed Project.	Same as Proposed Project.	Same as Proposed Project.	No impact
FAA Notification	The project owner would be required to notify the FAA regarding vertical velocity plumes and visible water vapor plumes. COC **TRANS-12** provides mitigation.	Same as Proposed Project.	Same as Proposed Project.	Same as Proposed Project.	No impact

*All No Project/No Action alternatives assume that the RSPP project would not be built on the proposed site

C.10.9 CUMULATIVE IMPACTS AND MITIGATION

The RSPP **CUMULATIVE IMPACTS** section of this staff assessment presents project effects in combination with foreseeable future projects. The affected environment includes the proposed project's construction and operation traffic and transportation impacts plus reasonably foreseeable future projects traffic and transportation impacts. Construction related traffic and transportation cumulative impacts occur when the proposed project construction overlaps reasonably foreseeable future projects' construction.

Cumulative Impacts Table 3 lists reasonably foreseeable future projects within the affected environment of the RSPP. Project generated traffic, the number of heavy haul trucks, the amount of hazardous materials delivery and the potential for highway and roadway damage of these projects together with the proposed project pose would result in cumulative impacts to the traffic routes and patterns. Traffic generated may also affect railways because it is likely that traffic would encounter railways within the project's affected environment.

A list of projects and anticipated construction schedule are as follows:

- City of Ridgecrest New Waste Water Treatment Plant – A request for qualifications was issued in October 2009. Staff attempted to contact Ridgecrest Public Works Department to inquire as to the timing of this project. If the environmental analysis has occurred, it is likely that a contractor would be selected and construction could begin in 2010. If the environmental analysis has not occurred, construction is not likely to occur for several years.
- China Lake Naval Air Weapons Station Base Realignment and Closure (BRAC)– A Final EIR was published in 2004. Several facilities are proposed or under construction. Traffic data generated by the construction of these facilities are unknown.
- Walmart – A final EIR was published in September 2009. It is likely that construction of the Walmart would coincide with the proposed project. The final EIR does not estimate construction trip generation.
- Freeman Gulch Four-Lane Project – Construction to start between 2012 – 2015, dependent on funding and will likely occur later than 2012.
- Inyokern Four-Lane Project - There is no funding available for this project and construction is unlikely to coincide with the proposed project.
- Solar Project - CACA 49511 – BLM issued a decision, status unknown
- Wind Project – CACA 050020 – test site, minimal impact
- Wind Project – CACA 048948 - test site, minimal impact
- Wind Project – CACA 050319 - test site, minimal impact

China Lake NAWS BRAC related projects would potentially contribute to the proposed RSPP traffic impacts. Similarly, the construction of the Walmart would potentially contribute to the proposed RSPP traffic impacts.

The construction traffic of these proposed projects, together with the construction traffic of the proposed project, are not likely to exceed highway and roadway design capacities. There is sufficient capacity on highways and roadways as discussed herein under **CONSTRUCTION TRAFFIC IMPACTS AND MITIGATION**. However, it is likely the intersection of Brown Road and SR-178 could operate below LOS D. **Traffic and Transportation Table 6** shows this intersection operating at LOS D with the proposed RSPP. **TRANS-1** would require the project owner to stagger work shifts.

C.10.10 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS COMPLIANCE

As stated the proposed project would be located on BLM managed lands. BLM land use practices give deference to the local governments when making land use decisions. The BLM managed lands are located in Kern County. Kern County would be the local government with responsibility for enforcing compliance with LORS if BLM wasn't managing the lands.

Energy Commission staff consulted Kern County traffic and transportation LORS to ensure the proposed development project is developed consistent with similar uses in the community.

Traffic and Transportation Table 8 provides a general description of applicable statutes, regulations, and standards (LORS) pertaining to traffic and transportation adopted by the federal government, the State of California, Kern County and Ridgecrest. Compliance with LORS is assesses within the appropriate areas discussed. For example: compliance with Federal Aviation Administration (FAA) LORS is assessed in the discussion pertaining to direct and indirect impacts related to airport operations and mitigation. Conditions of certifications have been proposed to ensure project compliance with LORS.

Traffic and Transportation Table 8
Traffic and Transportation LORS Compliance

Applicable LORS	Description	Determination of Compliance				
Federal		**Proposed Project**	**Northern Unit Alternative**	**Southern Unit Alternative**	**Original Proposed Project Alternative**	**No Project Alternative**
Code of Federal Regulations Title 49, Sections 171-177	Governs the transportation of hazardous materials and related guidelines.	Yes. COC **TRANS-6** provides mitigation	Yes. COC **TRANS-6** provides mitigation	Yes. COC **TRANS-6** provides mitigation	Yes. COC **TRANS-6** provides mitigation	NA
Code of Federal Regulations Part 77, Federal Aviation Administration Regulations	Implements standards for determining obstructions in navigable airspace. Sets forth requirements for notice to the FAA of certain proposed construction or alteration. Also, provides for aeronautical studies of obstructions to air navigation to determine their effect on the safe and efficient use of airspace.	Yes.	Yes.	Yes.	Yes.	NA
Code of Federal Regulations Title 49, Sections 350-399 and Appendices A-G	Includes procedures and regulations pertaining to interstate and intrastate transport (includes hazardous materials program procedures) and provides safety measures for motor carriers and motor vehicles who operate on public highways.	Yes. **TRANS-5** and **TRANS-6** provides mitigation	Yes. **TRANS-5** and **TRANS-6** provides mitigation	Yes. **TRANS-5** and **TRANS-6** provides mitigation	Yes. **TRANS-5** and **TRANS-6** provides mitigation	NA

Applicable LORS	Description	Determination of Compliance				
Federal Land Policy and Management Act, 1976-43 CFR 1600, Sec. 501 [43 U.S.C. 1761] California Desert Conservation Area Plan and West Mojave Plan	The California Desert Conservation Area (CDCA) Plan is the land planning document for BLM managed lands for the California desert where the RSPP would be developed. CDCA includes policies and procedures for motorized vehicle access as an integral part of desert land planning. Originally adopted in 1980, the CDCA was re-published in 1999 and included several amendments. In March 2006, the BLM issued a Record of Decision amending the CDCA plan with the West Mojave Plan. Section 2.2.6 of the West Mojave Plan discusses the Public Land Motorized Vehicle Access Network.	Yes. See the **LAND USE** section of the Staff Assessment	Yes. See the **LAND USE** section of the Staff Assessment	Yes. See the **LAND USE** section of the Staff Assessment	Yes. See the **LAND USE** section of the Staff Assessment	NA
State						
California Vehicle Code Division 2, Chapter 2.5, Division 6, Chapter 7, Division 13, Chapter 5, Division 14.1, Chapter 1 and 2, Division 14.8, Division 15	Includes regulations pertaining to licensing, size, weight and load of vehicles operated on highways, safe operation of vehicles, and the transportation of hazardous materials.	Yes. COC **TRANS-5** and **TRANS-6** provides mitigation	Yes. COC **TRANS-5** and **TRANS-6** provides mitigation	Yes. COC **TRANS-5** and **TRANS-6** provides mitigation	Yes. COC **TRANS-5** and **TRANS-6** provides mitigation	NA
California Streets and Highway Code Division 1 and 2, Chapter 3 and Chapter 5.5	Includes regulations for the care and protection of State and County highways, and provisions for the issuance of written permits.	Yes. COC **TRANS-7** provides mitigation	Yes. COC **TRANS-7** provides mitigation	Yes. COC **TRANS-7** provides mitigation	Yes. COC **TRANS-7** provides mitigation	NA

Applicable LORS	Description	Determination of Compliance				
California's Manual on Uniform Traffic Control Devices (Caltrans, 1/2010) and Caltrans Construction Manual, Chapter 2, Safety and Traffic.	Provides criteria, standards and measures for signage, traffic control and construction zone safety.	Yes. COC **TRANS-1** provides mitigation	Yes. COC **TRANS-1** provides mitigation	Yes. COC **TRANS-1** provides mitigation	Yes. COC **TRANS-1** provides mitigation	NA
Manual for Encroachment Permits on California State Highways	Encroachment permits would be required by Caltrans.	Yes. COC **TRANS-3** provides mitigation	Yes. COC **TRANS-3** provides mitigation	Yes. COC **TRANS-3** provides mitigation	Yes. COC **TRANS-3** provides mitigation	NA
Local						
The Kern Council of Governments Destination 2030, Kern County's Regional Transportation Plan (RTP) The Kern Council of Governments Bicycle Facilities Plan	It is a planning guide for the next 24 years beginning May 2007. It provides transportation and air quality goals, policies and actions for now and into the future, and includes programs and projects for congestion management, transit, airports, bicycles and pedestrians, roadways, and freight. It also provides a discussion of all mechanisms used to finance transportation and air quality program implementation.	Yes. Specific Elements of the RTP are discussed, evaluated and mitigation was recommended where appropriate. Compliance with Bicycle Facilities Plan. COC **VIS-4** provides mitigation	Yes. Specific Elements of the RTP are discussed, evaluated and mitigation was recommended where appropriate. Compliance with Bicycle Facilities Plan. COC **VIS-4** provides mitigation	Yes. Specific Elements of the RTP are discussed, evaluated and mitigation was recommended where appropriate. Compliance with Bicycle Facilities Plan. COC **VIS-4** provides mitigation	Yes. Specific Elements of the RTP are discussed, evaluated and mitigation was recommended where appropriate. Compliance with Bicycle Facilities Plan. COC **VIS-4** provides mitigation	NA

Applicable LORS	Description	Determination of Compliance				
County of Kern General Plan Circulation Element	Establishes goals, objectives and policies for roadways and roadway function, safety hazards, scenic routes, trucks routes and hazardous materials transport, airport compatibility and railroad crossings.	Yes. Specific Elements of the Circulation Element are discussed, evaluated and mitigation was recommended where appropriate.	Yes. Specific Elements of the Circulation Element are discussed, evaluated and mitigation was recommended where appropriate.	Yes. Specific Elements of the Circulation Element are discussed, evaluated and mitigation was recommended where appropriate.	Yes. Specific Elements of the Circulation Element are discussed, evaluated and mitigation was recommended where appropriate.	NA
County of Kern Municipal Code Chapter 10 Chapter 10, Section 10.04.525 Chapter 10, Section 10.08.020	Chapter 10 establishes processes and procedures for vehicles and traffic. Section 10.04.525 establishes speed limits for Kern County roads. Section 10.08.020 provides for maximum vehicle weights on Kern County roads.	Yes Section 10.04.525 was provided as background. Section 10.08.020 COC **TRANS-5** provides mitigation	Yes Section 10.04.525 was provided as background. Section 10.08.020 COC **TRANS-5** provides mitigation	Yes Section 10.04.525 was provided as background. Section 10.08.020 COC **TRANS-5** provides mitigation	Yes Section 10.04.525 was provided as background. Section 10.08.020 COC **TRANS-5** provides mitigation	NA
County of Kern Municipal Code Chapter 12 Chapter 12, Section 12.16 Chapter 12, Section 12.16.110	Chapter 12 establishes processes and procedures for Kern County roads, highways and bridges. Section 12.16 encroachment permits would be required by Kern County. Section 12.16.110, establishes trenching, stockpiling and crossing public roads procedures and standards.	Yes. Section 12.16 COC **TRANS-3** provides mitigation Section 12.16.110 COC **TRANS-11** provides mitigation	Yes. Section 12.16 COC **TRANS-3** provides mitigation Section 12.16.110 COC **TRANS-11** provides mitigation	Yes. Section 12.16 COC **TRANS-3** provides mitigation Section 12.16.110 COC **TRANS-11** provides mitigation	Yes. Section 12.16 COC **TRANS-3** provides mitigation Section 12.16.110 COC **TRANS-11** provides mitigation	NA

Applicable LORS	Description	Determination of Compliance				
County of Kern Municipal Code Title 19 Section 19.80 and Section 19.82	Title 19 was adopted to promote and protect the public health, safety and welfare through the orderly regulation of land uses throughout the unincorporated area of the county. Section 19.80 establishes access drive composite standards, fire protection access safety and collection areas for recyclable materials. Section 19.82 establishes off-street parking and development standards.	Yes. COC **TRANS-8** provides mitigation	Yes. COC **TRANS-8** provides mitigation	Yes. COC **TRANS-8** provides mitigation	Yes. COC **TRANS-8** provides mitigation	
City of Ridgecrest General Plan Circulation-Transportation Element	Establishes goals, objectives and policies for roadways and roadway function, safety hazards, scenic routes, trucks routes and hazardous materials transport, airport compatibility and railroad crossings.	Undetermined. The applicant has not provided data on Ridgecrest intersections and Ridgecrest intersections were not evaluated.	Undetermined. The applicant has not provided data on Ridgecrest intersections and Ridgecrest intersections were not evaluated.	Undetermined. The applicant has not provided data on Ridgecrest intersections and Ridgecrest intersections were not evaluated.	Undetermined. The applicant has not provided data on Ridgecrest intersections and Ridgecrest intersections were not evaluated.	

C.10.11 NOTEWORTHY PUBLIC BENEFITS

The proposed project would result in improvements to the Brown Road, US 395 and China Lake Boulevard intersection. These improvements would provide interim relief until the intersection could be fully realigned and improved.

C.10.12 PROPOSED CONDITIONS OF CERTIFICATION

TRANS-1 The project owner shall Install a left turn lane from north bound US 395 to Brown Road, a deceleration lanes from south bound US 395 to Brown Road, a separate left turn lane from China Lake Boulevard to US 395 south bound, acceleration and deceleration lanes on US 395 from China Lake Boulevard and Brown Road and acceleration and deceleration lanes on Brown Road to US 395.

The project owner shall submit to Kern County and Kern Council of Governments (COG) a construction Traffic Control Plan and implementation program. The TCP must include but not be limited to the following measures:

- Prepare and distribute a map of the route for construction workers to use to access the proposed project site. The map shall denote critical intersections and advise drivers to take extra caution through intersections;
- Establish a TDM program in conjunction with Kern COG, including the project owner supplying vans for van pools, identifying off-site parking, and provide incentives for car pooling;
- Restrict heavy equipment and building materials deliveries from using China Lake Blvd. between 7:00 am and 9:15 am and from 2:30 pm to 400 pm;
- Construction workers shall be trained on precautionary measures for avoiding collisions with school busses and instructed to take extra precautions to avoid collisions with school busses, especially during midday hours.;
- Provide signing, lighting, and traffic control device placement during construction impacting regional and local roadways in accordance with Caltrans Manual on Uniform Traffic Control Devices, Caltrans Construction Manual, Chapter 2, Safety and Traffic;
- Use flagging, flag men, signage and cover open trenches.
- Contract with Caltrans to provide reduce speed warning signs, spread at intervals to adequately advise drivers well enough in advance of the Brown Road, US 395 and China Lake Boulevard intersection;
- Stagger construction work hours and arrival/departure times outside peak traffic periods, including Fridays between 4:00 pm and 7:00 pm;
- Prepare traffic diversion plans in coordination with the Kern County to ensure access during temporary lane/road closures;

- Ensure of access for emergency vehicles to the project site;
- Monitor construction related traffic to ensure it is not contributing to additional roadway safety problems and collisions. The monitoring would include monthly reporting of construction related traffic patterns and collision incidents;
- Provide employee training and driver education;
- Post law enforcement, flag men, informational and warning signage and reduce speeds during high traffic times;
- Coordinate with Kern COG to include railway transport of equipment, materials and supplies;
- Coordinate with Kern COG to manage and reduce truck traffic;
- Require hazardous materials delivery to only use SR-14 and US 395 (and Brown Road from the project site to US 395);

The project owner shall contribute fair share traffic impact fees toward the future planned interchange at Brown Road, US 395 and China Lake Boulevard. (DOT 2010a)

Verification: At least 30 days prior to the start of site mobilization, the project owner shall complete said improvements to the Brown Road, US 395 and China Lake Boulevard intersection.

At least 90 days prior to the start of site mobilization, the project owner shall submit a traffic control plan that outlines each component above to the Kern County and Kern County COG for review and comment and submit the construction traffic control plan to the Compliance Project Manager (CPM) and Chief Building Official (CBO) for review and approval. The CPM and CBO will consider comments received by the agencies and include such comments where appropriate.

At least 30 days prior to the start of site mobilization, the project owner shall submit evidence of traffic impact fee payments to the CPM.

TRANS-2 The project owner shall perform a line-of-sight study for Brown Road and US 395 to ensure the screening for glare impacts does not impact motorists**.**

Verification: At least 90 days prior to the start of site mobilization, the project owner shall perform the line-of-sight study and design the screening to ensure glare does not impact motorists on US 395 and Brown Road and submit the study and construction drawings illustrating lines-of-sight to the CBO and CPM for review and approval.

TRANS-3 The project owner shall to submit plans, meeting the Kern County encroachment permit standards, and construct temporary left turn lanes and acceleration and deceleration lanes on Brown Road.

The project owner shall provide cross-sections or designs demonstrating that the on-site internal driveways, paved and unpaved, can accommodate heavy trucks and maintenance vehicles.

Verification: At least 90 days prior to the start of site mobilization, the project owner shall submit construction drawings, meeting the Kern County encroachment permit standards, and construct temporary left turn lanes and acceleration and deceleration lanes to the Kern County Roads Department for review and comment to the CBO and CPM for review and approval.

At least 90 days prior to the start of site mobilization, the project owner shall submit construction drawings, meeting the Kern County design standards, illustrating that the on-site internal driveways, paved and unpaved, can accommodate heavy trucks and maintenance vehicles and construct temporary to the Kern County Roads Department for review and comment to the CBO and CPM for review and approval.

TRANS-4 At project closure, the project owner shall to offer the internal traffic and transportation facilities to BLM. If BLM accepts these areas, then the project owner shall improve these areas for recreational parking and recreational vehicle staging and ensure the driveways are converted to acceptable off-road vehicle trails or pedestrian paths. If BLM does not accept these areas, the project owner shall fence off such areas so as to protect BLM from liability

Verification: Not Applicable

TRANS-5 The project owner shall comply with US DOT, Caltrans, Kern County and Ridgecrest limitations on vehicle sizes, weights, and travel routes and ensure that drivers and handlers are trained and certified in the delivery of hazardous materials. In addition, the project owner shall obtain overweight and oversize vehicle and routing permits from theses agencies and use trailing warning vehicles or police control where necessary.

Verification: The project owner shall retain copies of any permits and supporting documentation in their compliance file for a period of six months.

TRANS-6 The project owner shall comply with US DOT, Caltrans, Kern County and Ridgecrest LORS regarding the delivery of hazardous materials and obtain the necessary permits from the appropriate federal, state and local agencies for the delivery of hazardous materials on public roadways.

Verification: The project owner shall retain copies of any permits and supporting documentation in their compliance file for a period of six months.

TRANS-7 The project owner shall repair any damage to roadways affected by construction activity, along US 395, China Lake Boulevard and Brown Road, to the pre-project construction condition.

Verification: At least 90 days prior to the start of site mobilization, the project owner shall photograph, videotape, or digitally record images of the Brown Road, US 395 and China Lake Boulevard at least one mile in each direction for each road segment from the Brown Road, US 395 and China Lake Boulevard intersection that will be affected by any underground utility connection construction and heavy construction traffic. For China Lake Boulevard such recording is required for the entire length of the water pipeline. The project owner shall provide the CPM, CBO and Caltrans, Kern County and Ridgecrest with a copy of the images for the roadway segments under its jurisdiction.

Also prior to start of construction, the project owner shall notify the agencies about the schedule for project construction. The purpose of this notification is to postpone any planned roadway resurfacing and/or improvement projects until after the project construction has taken place and to coordinate construction-related activities associated with other projects.

Within 30 days before the commencement of project operations, the project owner shall meet with the CBO and Caltrans, Kern County and Ridgecrest to determine the actions necessary and schedule the repair of identified sections of public roadways and restore ROW to original or as near-original condition as possible. Following completion of any road improvements, the project owner shall provide to the CPM and CBO comments received from the agencies regarding work completed within public right-of-way and, with consideration given to the comments received by the agencies, ensure roads are restored satisfactorily.

TRANS-8 The project owner shall submit a site plan to Kern County Public Works Department, Engineering and Surveying Department, the CPM, and the CBO ensuring the provision of adequate parking, parking for persons with disabilities, per Title 24, loading lanes, and the design of parking and access according to the parking development standards and ensure adequate internal circulation within the project site.

Verification: At least 60 days prior to the start of site mobilization, the project owner shall submit the site plan illustrating the provision of adequate parking, parking for persons with disabilities, per Title 24, loading lanes, and the design of parking and access according to the parking development standards and ensuring adequate internal circulation within the project site for review and comment to Kern County Public Works Department and Engineering and Surveying Department for review and comment and to the CPM and CBO for review and approval.

TRANS-9 The project owner shall submit construction plans ensuring adequate emergency access per Kern County Fire Department officials and showing adequate emergency access turning radius, sight distances, lines-of-sight, grades, lane widths, etc.

Verification: At least 90 days prior to the start of site mobilization, the project owner shall submit construction drawings, meeting the Kern County emergency access standards and ensuring adequate emergency access within the project site by showing adequate emergency access turning radius, sight distances, lines-of-sight, grades, lane widths, etc to the Kern County Roads Department for review and comment to the CBO and CPM for review and approval.

TRANS-10 The project owner shall provide construction drawings meeting Kern County standards pertaining to encroachment permits, franchise agreements, and trenching for the HTF pipelines, transmission lines and water pipeline. In addition, the project owner shall install crossing structures and netting, if required by Kern County, across Brown Road as a safety precaution and to reduce the potential for damage from falling construction materials or equipment during cable-stringing activities.

Verification: At least 60 days prior to the start of site mobilization, the project owner shall submit construction drawings, meeting the Kern County encroachment permit and trenching standards for project related HTF pipelines, transmission lines and water pipeline activities to the Kern County Roads Department for review and comment to the CBO and CPM for review and approval.

At least 60 days prior to the start of site mobilization, the project owner shall provide franchise agreements to the CBO and CPM for review and approval.

The project owner shall install crossing structures and netting, if required by Kern County, across Brown Road as a safety precaution and to reduce the potential for damage from falling construction materials or equipment during cable-stringing activities during transmission line installation crossing Brown Road.

TRANS-11 The project owner shall provide 15 foot temporary driveway diversions within 10 feet immediately adjacent to the existing driveway location and phase the installation when necessary during water pipeline construction.

Verification: During water pipeline construction, the project owner shall notify the CPM of each driveway to be affected by the construction and provide evidence that the driveway diversion adequately provides access to public and private roads and driveways.

C.10.13 CONCLUSIONS

The Ridgecrest Solar Power Project (RSPP) would conflict with an applicable laws, ordinances, regulations, and standards (LORS) pertaining to State and Kern County's level of service (LOS) standards. LOS D is the minimum acceptable LOS standard for State highways and Kern County roads. The Brown Road, US 395 and China Lake Boulevard intersection currently operates at LOS B but project related construction trips would degrade the LOS for the intersection to LOS E. California Energy Commission staff's (staff) recommended conditions of certification would ensure that the proposed RSPP does not conflict with and would be in compliance with applicable LORS. Other transportation system aspects of the RSPP would be in compliance with applicable LORS related to traffic and transportation, including the Circulation Element of the County of Kern County General Plan and Municipal Code and the Circulation-Transportation Element of the Ridgecrest General Plan Circulation Element.

RSPP would introduce an impact (significant under CEQA) related to traffic safety. The Brown Road, US 395 and China Lake Boulevard intersection experiences a collision rate almost three times the State average for similar intersections. Project related construction trips are likely to significantly increase the collision rate at the intersection. Fifteen percent more vehicle trips (approximately 583) would encounter the intersection as a means to access the proposed RSPP site.

RSPP would introduce an impact (significant under CEQA) with respect to glare. The solar mirror troughs would reflect light or create glare posing a hazard to motorists.

RSPP induced impacts related to glare hazards would be mitigated (reduced to less than significant under CEQA) with the implementation of staff's recommended conditions of certification.

RSPP would introduce impacts (significant under CEQA) related to vertical velocity plumes and glare affecting pilots. Military operations occur at low altitudes over the proposed project site. R2506 is a restricted military air space for the purposes of providing the military an area for performing low altitude maneuvers. In addition, civilian aircraft may fly over the proposed project site, with permission from the military. Further, the area within 20 miles of the Inyokern airport presents ideal conditions for sailplanes and pilot instruction due to the many atmospheric and geographic conditions of the eastern side of the Sierra Nevada Mountains.

Vertical velocity plumes are unseen currents of air exhausted upward from the Air Cooled Condenser (ACC) stacks that would pose a hazard to aircraft with direct over flight of these facilities. As presented above, there is a potential that military and civilian flight paths and patterns would occur over the proposed RSPP site. RSPP induced impacts related to the vertical velocity plume hazards would be mitigated (reduced to less than significant under CEQA) with the implementation of staff's recommended conditions of certification.

Similar to the affect glare or reflection may pose on motorists, the solar mirror troughs would reflect light or create glare that pose a hazard to civilian and to military flight operations. RSPP induced impacts related to hazards affecting pilots would be mitigated (reduced to less than significant under CEQA) with the implementation of staff's recommended conditions of certification.

C.10.14 REFERENCES

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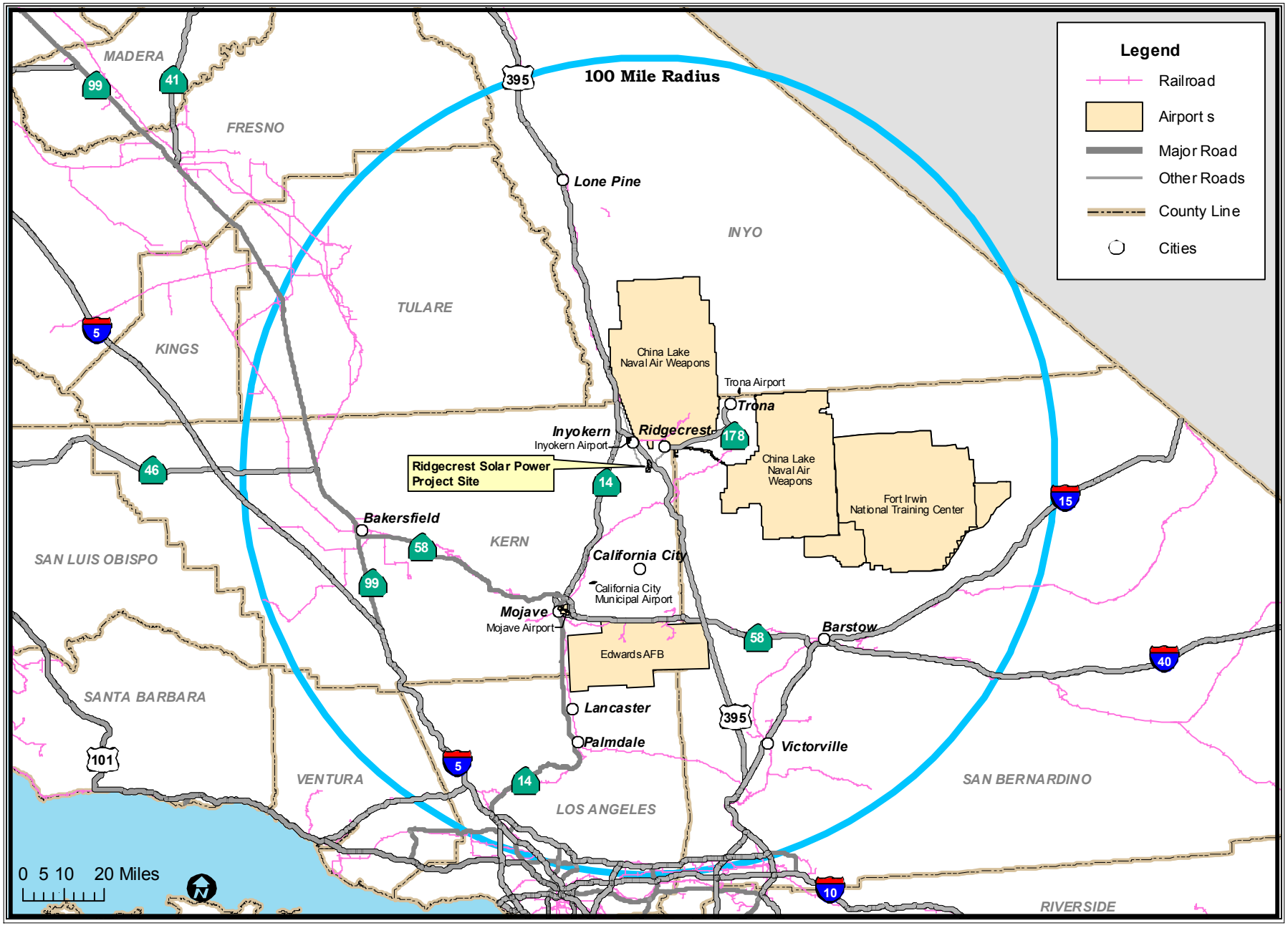
TRAFFIC AND TRANSPORTATION - FIGURE 1

Ridgecrest Solar Power Project - Regional Traffic and Transportation Related Facilities



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Solar Millennium LLC and Multinet 09

TRAFFIC AND TRANSPORTATION - FIGURE 2

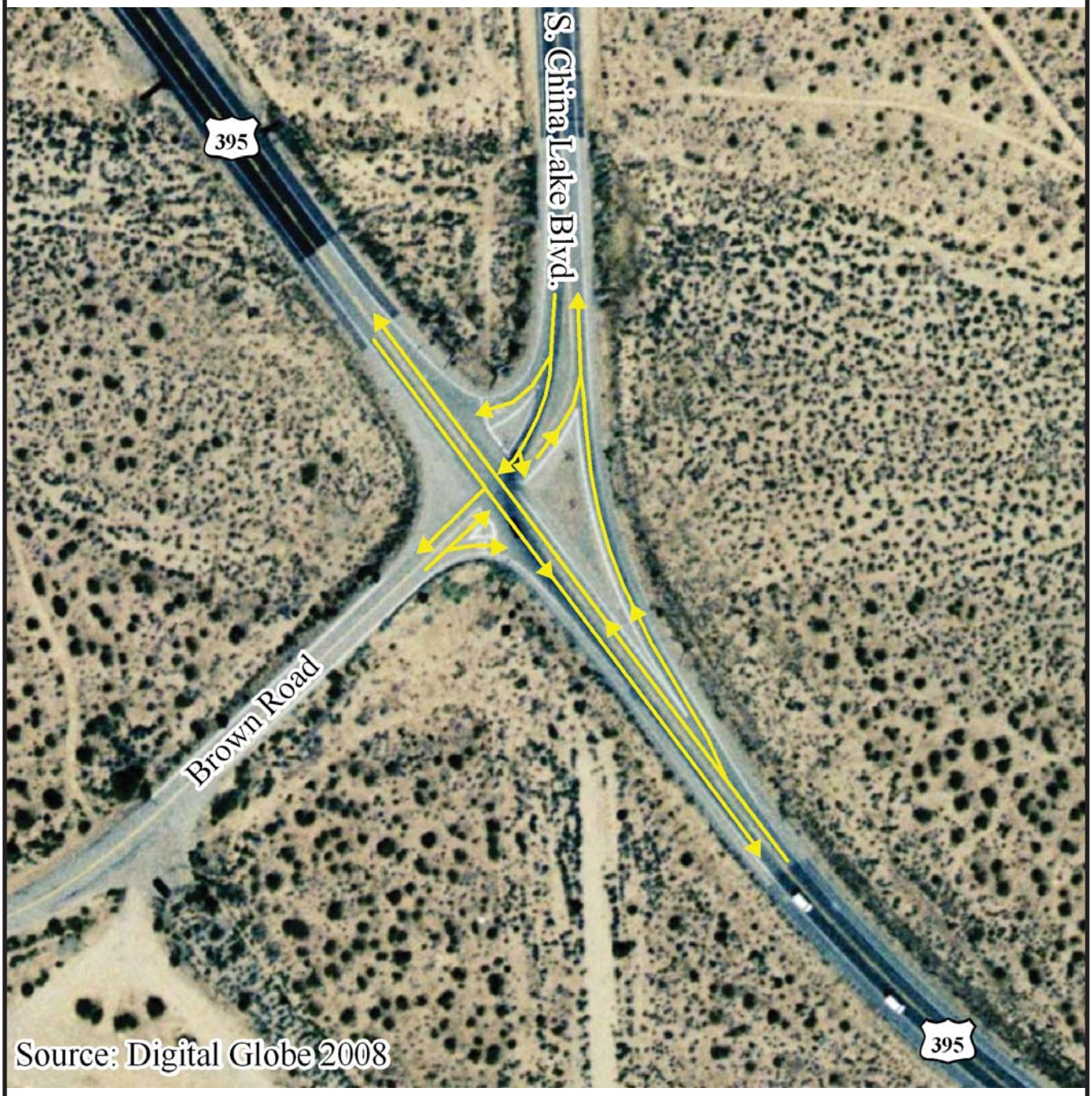
Ridgecrest Solar Power Project - Brown Road, US 395 and China Lake Blvd. Intersection Grade Separation

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: California Energy Commission

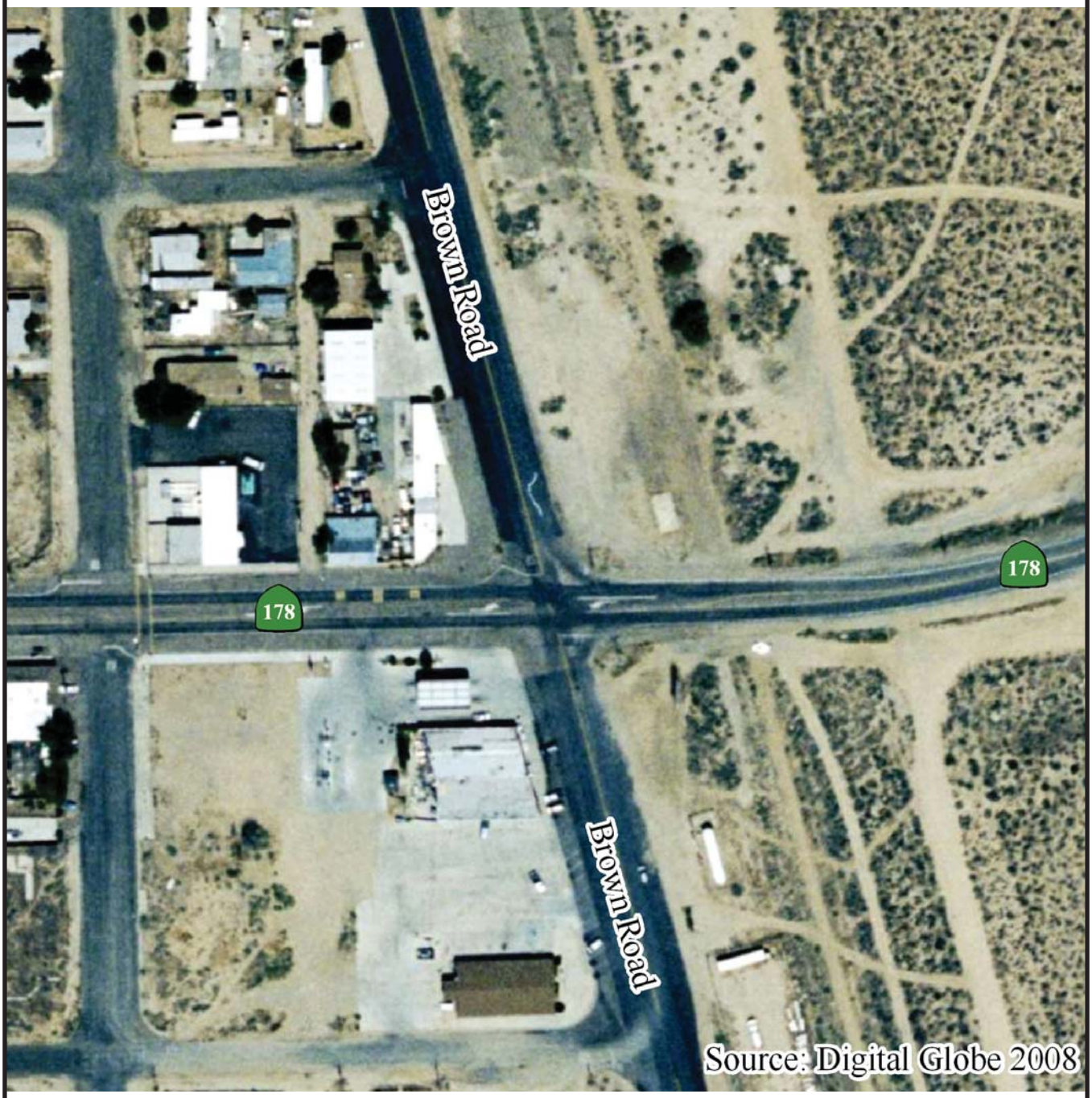
TRAFFIC AND TRANSPORTATION - FIGURE 3

Ridgecrest Solar Power Project - US395, Brown Road, and S. China Lake Blvd



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

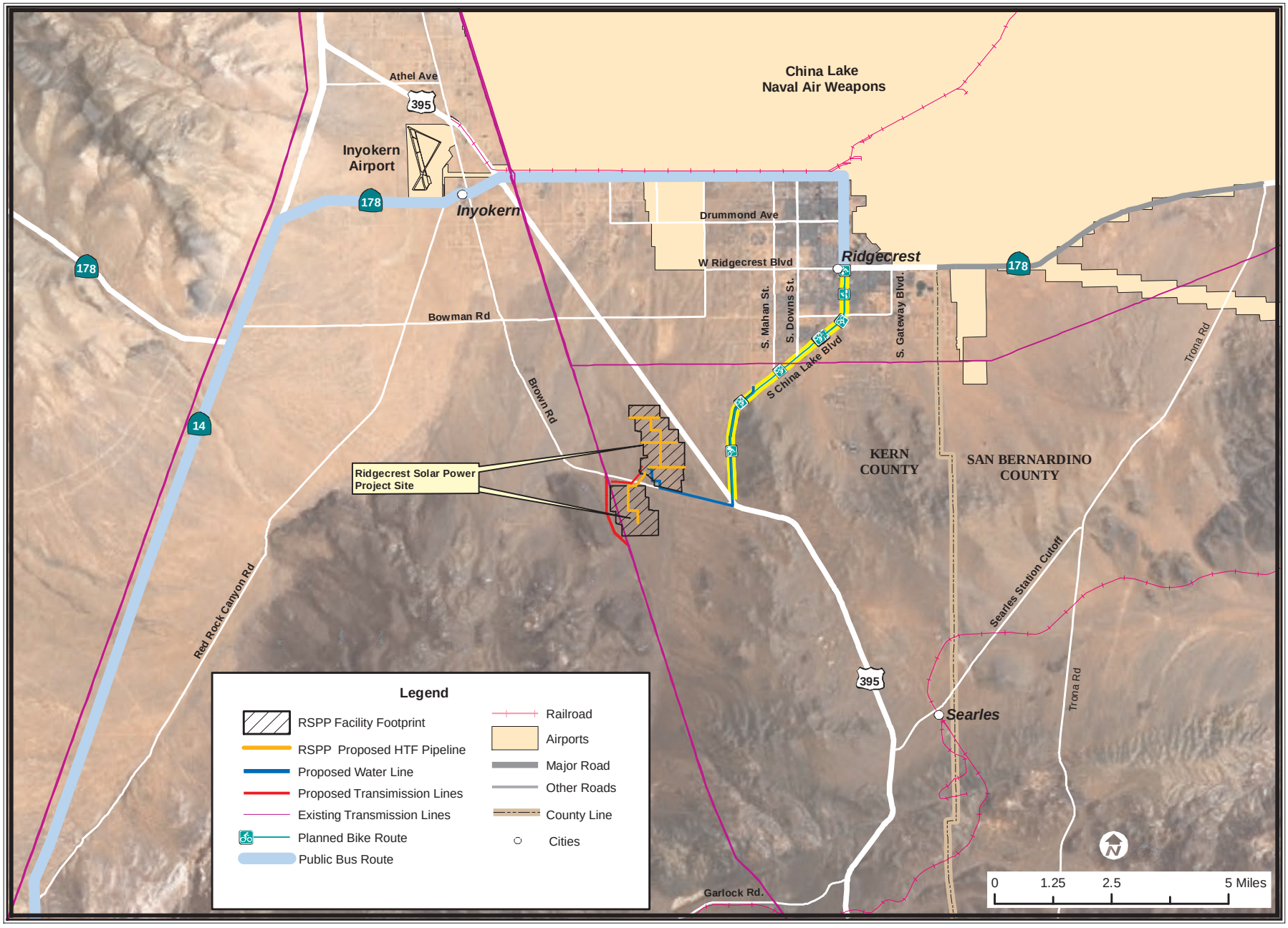
TRAFFIC AND TRANSPORTATION - FIGURE 4
Ridgecrest Solar Power Project - SR 178 and Brown Road



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

TRAFFIC AND TRANSPORTATION - FIGURE 5

Ridgecrest Solar Power Project - Localized Traffic and Transportation Related Facilities



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Solar Millennium LLC and Multinet 09

C.11 TRANSMISSION LINE SAFETY AND NUISANCE

Testimony of Obed Odoemelam, Ph.D.

C.11.1 SUMMARY OF CONCLUSIONS

The applicant, Solar Millennium LLC, (Solar Millennium) proposes to transmit the power from the proposed Ridgecrest Solar Power Project (RSPP) to the Southern California Edison's (SCE's) transmission grid through the existing SCE 230-killovolt (kV) Inyokern/Kramer Junction transmission line passing west of the project site 300 feet from the project boundaries. The on-site tie-in line to be used for the project would be a 0.5-mile overhead 230-kV line connecting the project's proposed switchyard to a planned SCE Millennium 230-kV substation to the west, adjacent to the plant facility. It is from this new SCE substation that the connection would be made with the Inyokern/Kramer Junction line. Building RSPP would require relocation of two existing SCE transmission lines along the southwestern corner of the southern solar field. This line relocation would be under the jurisdiction of the California Public Utilities Commission (PUC) and the Bureau of Land management (BLM).Therefore, this staff analysis is for the tie-in project line as it stretches from the proposed on-site substation to the new SCE Millennium substation near the Inyokern/Kramer Junction line. Since the proposed tie-in line would be located in the SCE service area, it would be constructed, operated, and maintained according to SCE's guidelines for line safety and field management which conform to applicable laws, ordinances, regulations and standards (LORS). The area around the proposed route is undisturbed desert land with the nearest residence located approximately 3,200 feet from the northwestern site boundary thereby eliminating the potential for residential electric and magnetic field exposures when the line is operating. With the four proposed conditions of certification, any safety and nuisance impacts from operating proposed tie-in line would be less than significant.

C.11.2 INTRODUCTION

The purpose of this Staff Assessment/Draft Plan Amendment/Draft Environmental Impact Statement (SA/DPA/DEIS) is to assess the proposed Ridgecrest Solar Power Project's (RSPP's) transmission line's design and operational plan to determine whether its related field and nonfield impacts would constitute a significant environmental hazard in the areas around the proposed route. Power from RSPP would be generated from two solar fields and transmitted to the Southern California Edison's (SCE's) power grid using an overhead single-circuit 230-kilovolt (kV) line that stretches across the 0.5- mile distance between the proposed RSPP switchyard and the connection point on a planned SCE substation adjacent to the Inyokern/Kramer Junction line to the west. This staff analysis is for the proposed RSPP tie-in line and the related on-site switchyard to be built and operated by the applicant. The potential impacts of concern are those to be encountered along the proposed 0.5-mile route. All related health and safety laws, ordinances, regulations, and standards (LORS) are currently aimed at minimizing such impacts along any given line corridor. Staff's

analysis focuses on the following issues taking into account both the physical presence of the line and the physical interactions of its electric and magnetic fields:

- Aviation safety;
- Interference with radio-frequency communication;
- Audible noise;
- Fire hazards;
- Hazardous shocks;
- Nuisance shocks; and
- Electric and magnetic field (EMF) exposure.

Section C.11.3 shows the federal, state, and local laws and policies that apply to the control of the field and nonfield impacts of electric power lines. Staff's analysis examines the project's compliance with these requirements.

C.11.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

The potential magnitude of the line impacts of concern in this staff analysis depends on compliance with the listed design-related LORS and industry practices. These LORS and practices have been established to maintain impacts below levels of potential significance. Thus, if staff determines that the project would comply with applicable LORS, we would conclude that any transmission line-related safety and nuisance impacts would be less than significant. The nature of these individual impacts is discussed below together with the potential for compliance with the LORS that apply.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Transmission Line Safety and Nuisance (TLSN) Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
Aviation Safety	
Federal	
Title 14, Part 77 of the Code of Federal Regulations (CFR),"Objects Affecting the Navigable Air Space"	Describes the criteria used to determine the need for a Federal Aviation Administration (FAA) "Notice of Proposed Construction or Alteration" in cases of potential obstruction hazards.
FAA Advisory Circular No. 70/7460-1G, "Proposed Construction and/or Alteration of Objects that May Affect the Navigation Space"	Addresses the need to file the "Notice of Proposed Construction or Alteration" form (Form 7640) with the FAA in cases of potential for an obstruction hazard.
FAA Advisory Circular 70/460-1G, "Obstruction Marking and Lighting"	Describes the FAA standards for marking and lighting objects that may pose a navigation hazard as established using the criteria in Title 14, Part 77 of the CFR.
Interference with Radio Frequency Communication	
Federal	
Title 47, CFR, section 15.2524, Federal Communications Commission (FCC)	Prohibits operation of devices that can interfere with radio-frequency communication.
State	
California Public Utilities Commission (CPUC) General Order 52 (GO-52)	Governs the construction and operation of power and communications lines to prevent or mitigate interference.
Audible Noise	
Local	
Kern County General Plan, Noise Element	Establishes policies and programs to ensure that noise levels are appropriate to land uses.
Kern County Noise Ordinance	Establishes performance standards for planned residential or other noise-sensitive land uses.
Hazardous and Nuisance Shocks	
State	
CPUC GO-95, "Rules for Overhead Electric Line Construction"	Governs clearance requirements to prevent hazardous shocks, grounding techniques to minimize nuisance shocks, and maintenance and inspection requirements.

Applicable LORS	Description
Title 8, California Code of Regulations (CCR) section 2700 et seq. “High Voltage Safety Orders”	Specifies requirements and minimum standards for safely installing, operating, working around, and maintaining electrical installations and equipment.
National Electrical Safety Code	Specifies grounding procedures to limit nuisance shocks. Also specifies minimum conductor ground clearances.
Industry Standards	
Institute of Electrical and Electronics Engineers (IEEE) 1119, “IEEE Guide for Fence Safety Clearances in Electric-Supply Stations”	Specifies the guidelines for grounding-related practices within the right-of-way and substations.
Electric and Magnetic Fields	
State	
GO-131-D, CPUC ”Rules for Planning and Construction of Electric Generation Line and Substation Facilities in California”	Specifies application and noticing requirements for new line construction including EMF reduction.
CPUC Decision 93-11-013	Specifies CPUC requirements for reducing power frequency electric and magnetic fields.
Industry Standards	
American National Standards Institute (ANSI/IEEE) 644-1944 Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Power Lines	Specifies standard procedures for measuring electric and magnetic fields from an operating electric line.
Fire Hazards	
State	
14 CCR sections 1250-1258, “Fire Prevention Standards for Electric Utilities”	Provides specific exemptions from electric pole and tower firebreak and conductor clearance standards and specifies when and where standards apply.

C.11.4 PROPOSED PROJECT

C.11.4.1 SETTING AND EXISTING CONDITIONS

As discussed by the applicant, Solar Millennium LLC, the two solar fields of the proposed Ridgecrest Solar Power would produce 250 megawatts (MW) of electric power and occupy a total of 1,760 acres of federal land currently managed by the Bureau of Land Management (BLM). The site is vacant undeveloped desert located southwest of U. S. Highway 395 and approximately 4.5 miles southwest of the City of Ridgecrest, California in northeastern Kern County (Solar Millennium 2009a, p 2-3). As more fully discussed by the applicant, the proposed RSPP would consist of two solar fields: Solar Field # 1 to the north of Brown Road and Solar field # 2 to the south of brown Road. The generated power would be transmitted to the SCE power grid from a common switchyard using the single-circuit overhead, 230-kV line that would connect to a new SCE Millennium substation adjacent to the plant. Connection to this existing SCE grid line (the Kramer/Inyokern line) would be made by routing the line around the project site and looping it into the new SCE 230-kV substation.

There are two SCE lines (one of 115 kV and another of 230 kV) that presently traverse the southern portion of the site. Building RSPP would require relocation of both lines by SCE. The applicant has identified a specific land corridor to be used for such relocation under the jurisdiction of the California Public Utilities Commission (CPUC) and the Bureau of Land Management, BLM (Solar Millennium 2009a, p. 2-3). Since this planned line relocation would be under CPUC jurisdiction, the design and construction of the line and the new related SCE Millennium substation would be implemented according to SCE guidelines in keeping with existing LORS.

The proposed project site is in an uninhabited open desert land with no existing structures other than the noted SCE lines to be relocated. The route of the proposed project tie-in line is largely uninhabited desert land with the nearest residence being more than one mile away (Solar Millennium 2009, p. 5.7-16). This general absence of residences in the immediate vicinity of the line right-of-way means that there would not be the type of residential field exposure that has been of health concern in recent years over power line operation.

PROJECT DESCRIPTION

The proposed RSPP 230-kV tie-in line would consist of the following individual segments:

- A new, single-circuit 230-kV overhead transmission line extending 0.5 miles west from the on-site project switchyard to the planned 230-kV SCE substation from which the power would be transmitted to the existing 230-kV Inyokern/Kramer Junction grid line; and
- The project's on-site 230-kV switchyard from which the conductors would extend to the planned SCE connection substation for the Inyokern/Kramer Junction line.

The conductors for the proposed PSPP line would be aluminum steel-reinforced cables supported on steel pole structures with a maximum height of 120 feet as typical of

similar SCE lines. The applicant (Solar Millennium 2009a, Figure 5.14-1) provided the details of the proposed support structures as related to line safety, maintainability, and field reduction efficiency.

C.11.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Direct IMPACTS and MITIGATION METHODS

Aviation Safety

Any potential hazard to area aircraft would relate to the potential for collision in the navigable airspace. The requirements listed on **TLSN Table 1** establish the standards for assessing the potential for obstruction hazards within the navigable space and establish the criteria for determining when to notify the FAA about such hazards. As noted by the applicant (Solar Millennium 2009a, p, p. 5.14-6), these regulations require FAA notification in cases of structures over 200 feet from the ground. Notification is also required if the structure is to be below 200 feet in height but would be located within the restricted airspace in the approaches to public or military airports. For airports with runways longer than 3,200 feet, the restricted space is defined by the FAA as an area extending 20,000 feet from the runway. For airports with runways of 3,200 feet or less, the restricted airspace would be an area that extends 10,000 feet from this runway. For heliports, the restricted space is an area that extends 5,000 feet.

The closest operational airports are the Inyokern Airport and the China Lake Naval Air Weapons Station approximately seven miles from the site respectively. As noted by the applicant, these airports would, at a seven-mile distance be too far away for the proposed line and the existing on-site SCE lines to pose an aviation hazard to utilizing aircraft. Also, the maximum height of 120 feet for the proposed line support structures (Solar Millennium 2009a p.2-27, and Figure 5.14-1) would be much less than the 200 feet height that triggers the concern over aviation hazard according to FAA requirements. Therefore, staff does not recommend any related condition of certification.

Interference with Radio-Frequency Communication

Transmission line-related radio-frequency interference is one of the indirect effects of line operation and is produced by the physical interactions of line electric fields. Such interference is due to the radio noise produced by the action of the electric fields on the surface of the energized conductor. The process involved is known as *corona discharge*, but is referred to as *spark gap electric discharge* when it occurs within gaps between the conductor and insulators or metal fittings. When generated, such noise manifests itself as perceivable interference with radio or television signal reception or interference with other forms of radio communication. Since the level of interference depends on factors such as line voltage, distance from the line to the receiving device, orientation of the antenna, signal level, line configuration and weather conditions, maximum interference levels are not specified as design criteria for modern transmission lines. The level of any such interference usually depends on the

magnitude of the electric fields involved and the distance from the line. The potential for such impacts is therefore minimized by reducing the line electric fields and locating the line away from inhabited areas.

The proposed project line would be built and maintained in keeping with standard SCE practices that minimize surface irregularities and discontinuities. Moreover, the potential for such corona-related interference is usually of concern for lines of 345 kV and above, and not for 230-kV lines such as the proposed line. The line's proposed low-corona designs are used for all SCE lines of similar voltage rating to reduce surface-field strengths and the related potential for corona effects. Since the proposed line would traverse an uninhabited open space, staff does not expect any corona-related radio-frequency interference or related complaints and does not recommend any related condition of certification.

Audible Noise

The noise-reducing designs related to electric field intensity are not specifically mandated by federal or state regulations in terms of specific noise limits. As with radio noise, such noise is limited instead through design, construction, or maintenance practices established from industry research and experience as effective without significant impacts on line safety, efficiency, maintainability, and reliability. Audible noise usually results from the action of the electric field at the surface of the line conductor and could be perceived as a characteristic crackling, frying, or hissing sound or hum, especially in wet weather. Since the noise level depends on the strength of the line electric field, the potential for perception can be assessed from estimates of the field strengths expected during operation. Such noise is usually generated during rainfall, but mainly from overhead lines of 345 kV or higher. It is, therefore, not generally expected at significant levels from lines of less than 345 kV as proposed for RSPP. Research by the Electric Power Research Institute (EPRI 1982) has validated this by showing the fair-weather audible noise from modern transmission lines to be generally indistinguishable from background noise at the edge of a right-of-way of 100 feet or more. Since the low-corona designs are also aimed at minimizing field strengths, staff does not expect the proposed line operation to add significantly to current background noise levels in the project area. For an assessment of the noise from the proposed line and related facilities, please refer to staff's analysis in the **NOISE AND VIBRATION** section.

Fire Hazards

The fire hazards addressed through the related LORS in **TLSN Table 1** are those that could be caused by sparks from conductors of overhead lines, or that could result from direct contact between the line and nearby trees and other combustible objects.

Standard fire prevention and suppression measures for similar SCE lines would be implemented for the proposed project line (Solar Millennium 2009a, p. 5.14-10). The applicant's intention to ensure compliance with the clearance-related aspects of GO-95 would be an important part of this mitigation approach. Condition of Certification **TLSN-3** is recommended to ensure compliance with important aspects of the fire prevention measures.

Hazardous Shocks

Hazardous shocks are those that could result from direct or indirect contact between an individual and the energized line, whether overhead or underground. Such shocks are capable of serious physiological harm or death and remain a driving force in the design and operation of transmission and other high-voltage lines.

No design-specific federal regulations have been established to prevent hazardous shocks from overhead power lines. Safety is assured within the industry from compliance with the requirements specifying the minimum national safe operating clearances applicable in areas where the line might be accessible to the public.

The applicant's stated intention to implement the GO-95-related measures against direct contact with the energized line (Solar Millennium 2009a, p. 5.14-10) would serve to minimize the risk of hazardous shocks. Staff's recommended Condition of Certification **TLSN-1** would be adequate to ensure implementation of the necessary mitigation measures.

Nuisance Shocks

Nuisance shocks are caused by current flow at levels generally incapable of causing significant physiological harm. They result mostly from direct contact with metal objects electrically charged by fields from the energized line. Such electric charges are induced in different ways by the line's electric and magnetic fields.

There are no design-specific federal or state regulations to limit nuisance shocks in the transmission line environment. For modern overhead high-voltage lines, such shocks are effectively minimized through grounding procedures specified in the National Electrical Safety Code (NESC) and the joint guidelines of the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE). For the proposed project line, the project owner will be responsible in all cases for ensuring compliance with these grounding-related practices within the right-of-way.

The potential for nuisance shocks around the proposed line would be minimized through standard industry grounding practices (Solar Millennium 2009a, p.5, 14-7). Staff recommends Condition of Certification **TLSN-4** to ensure such grounding for RSPP.

Electric and Magnetic Field Exposure

The possibility of deleterious health effects from EMF exposure has increased public concern in recent years about living near high-voltage lines. Both electric and magnetic fields occur together whenever electricity flows, and exposure to them together is generally referred to as *EMF exposure*. The available evidence as evaluated by the CPUC, other regulatory agencies, and staff has not established that such fields pose a significant health hazard to exposed humans. There are no health-based federal regulations or industry codes specifying environmental limits on the strengths of fields from power lines. Most regulatory agencies believe, as staff does, that health-based limits are inappropriate at this time. They also believe that the present knowledge of the issue does not justify any retrofit of existing lines.

Staff considers it important, as does the CPUC, to note that while such a hazard has not been established from the available evidence, the same evidence does not serve as proof of a definite lack of a hazard. Staff therefore considers it appropriate, in light of present uncertainty, to recommend feasible reduction of such fields without affecting safety, efficiency, reliability, and maintainability.

While there is considerable uncertainty about EMF health effects, the following facts have been established from the available information and have been used to establish existing policies:

- Any exposure-related health risk to the exposed individual will likely be small.
- The most biologically significant types of exposures have not been established.
- Most health concerns are about the magnetic field.
- There are measures that can be employed for field reduction, but they can affect line safety, reliability, efficiency, and maintainability, depending on the type and extent of such measures.

State's Approach to Regulating Field Exposures

In California, the CPUC (which regulates the installation and operation of many high-voltage lines owned and operated by investor-owned utilities) has determined that only no-cost or low-cost measures are presently justified in any effort to reduce power line fields beyond levels existing before the present health concern arose. The CPUC has further determined that such reduction should be made only in connection with new or modified lines. It requires each utility within its jurisdiction to establish EMF-reducing measures and incorporate such measures into the designs for all new or upgraded power lines and related facilities within their respective service areas. The CPUC further established specific limits on the resources to be used in each case for field reduction. Such limitations were intended by the CPUC to apply to the cost of any redesign to reduce field strength or relocation to reduce exposure. Publicly owned utilities, which are not within the jurisdiction of the CPUC, voluntarily comply with these CPUC requirements. This CPUC policy resulted from assessments made to implement CPUC Decision 93-11-013.

In keeping with this CPUC policy, staff requires a showing that each proposed overhead line would be designed according to the EMF-reducing design guidelines applicable to the utility service area involved. These field-reducing measures can impact line operation if applied without appropriate regard for environmental and other local factors bearing on safety, reliability, efficiency, and maintainability. Therefore, it is up to each applicant to ensure that such measures are applied in ways that prevent significant impacts on line operation and safety. The extent of such applications would be reflected by ground-level field strengths as measured during operation. When estimated or measured for lines of similar voltage and current-carrying capacity, such field strength values can be used by staff and other regulatory agencies to assess the effectiveness of the applied reduction measures. These field strengths can be estimated for any given design using established procedures. Estimates are specified for a height of one meter above the ground, in units of kilovolts per meter (kV/m), for the electric field, and milligauss (mG) for the companion magnetic field. Their magnitude depends on line

voltage (in the case of electric fields), the geometry of the support structures, degree of cancellation from nearby conductors, distance between conductors, and, in the case of magnetic fields, amount of current in the line.

Since the CPUC currently requires that most new lines in California be designed according to the EMF-reducing guidelines of the electric utility in the service area involved, their fields are required under this CPUC policy to be similar to fields from similar lines in that service area. Designing the proposed project line according to existing SCE field strength-reducing guidelines would constitute compliance with the CPUC requirements for line field management.

The CPUC has recently revisited the EMF management issue to assess the need for policy changes to reflect the available information on possible health impacts. The findings specified in Decision D.06-1-42 of January 2006, did not point to a need for significant changes to existing field management policies. Since there are no residences in the immediate vicinity of the proposed project line, there would not be the long-term residential EMF exposures mostly responsible for the health concern of recent years. The only project-related EMF exposures of potential significance would be the short-term exposures of plant workers, regulatory inspectors, maintenance personnel, visitors, or individuals in the vicinity of the line. These types of exposures are short term and well understood as not significantly related to the health concern.

Industry's and Applicant's Approach to Reducing Field Exposures

The present focus is on the magnetic field because unlike electric fields, it can penetrate the soil, buildings, and other materials to produce the types of human exposures at the root of the health concern of recent years. The industry seeks to reduce exposure, not by setting specific exposure limits, but through design guidelines that minimize exposure in each given case. As one focuses on the strong magnetic fields from the more visible high-voltage power lines, staff considers it important, for perspective, to note that an individual in a home could be exposed to much stronger fields while using some common household appliances than from high-voltage lines (National Institute of Environmental Health Services and the U.S. Department of Energy, 1998). The difference between these types of field exposures is that the higher-level, appliance-related exposures are short term, while the exposures from power lines are lower level, but long term. Scientists have not established which of these types of exposures would be more biologically meaningful in the individual. Staff notes such exposure differences only to show that high-level magnetic field exposures regularly occur in areas other than around high-voltage power lines.

As with similar SCE lines, specific field strength-reducing measures would be incorporated into the proposed line's design to ensure the field strength minimization currently required by the CPUC in light of the concern over EMF exposure and health.

The field reduction measures to be applied include the following:

1. Increasing the distance between the conductors and the ground to an optimal level;

2. Reducing the spacing between the conductors to an optimal level;

3. Minimizing the current in the line; and

4. Arranging current flow to maximize the cancellation effects from interacting of conductor fields.

Since the proposed project line would have no residences in the immediate vicinity of its right-of-way, the long-term residential field exposures at the root of the health concern of recent years would not be a significant concern during operations. The field strengths of most significance in this regard would be as encountered at the edge of the line's 150-foot right-of-way. These field intensities would depend on the effectiveness of the applied field-reducing measures. The applicant (Solar Millennium 2009a, p. 5.14-9 and Figures 5.14-2 and 5.14-3) calculated the maximum electric and magnetic field intensities expected along the proposed route of the project line. Staff has verified the accuracy of the modeling approach used in the applicant's calculations with regard to parameters bearing on field strength dissipation and exposure assessment. The maximum electric field strength was calculated as 0.053 kV/m at the edge of the 150-foot right-of-way and is thus similar to those of SCE lines of the same voltage rating. The maximum magnetic field intensity of approximately 18.2 mG at the edge of this right-of-way is similar to that of SCE lines of the same current-carrying capacity (as required under current CPUC regulations) but is much less than the 200 mG currently specified by the few states with regulatory limits. The requirements in Condition of Certification **TLSN-2** for field strength measurements are intended to validate the applicant's assumed reduction efficiency.

CLOSURE AND DECOMMISSIONING IMPACTS AND MITIGATION

If the proposed RSPP were to be closed, decommissioned and all related structures are removed as described in the **PROJECT DESCRIPTION** section, the minimal area aviation risk and electric shocks and fire hazards from the physical presence of this tie-in line would be eliminated. Decommissioning and removal would also eliminate the line's field impacts assessed in this analysis in terms of nuisance shocks, radio-frequency impacts, audible noise, and electric and magnetic field exposure. Since the line would be designed and operated according existing SCE guidelines, these impacts would be as expected for SCE lines of the same voltage and current-carrying capacity and therefore, at levels reflecting compliance with existing health and safety LORS.

C.11.5 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because its use would eliminate 42% of the proposed project area so all possible impacts are reduced proportionately, especially those related to desert washes, biological and cultural resources, and recreational land uses. Its use would also prevent building a solar facility in the Mojave Ground Squirrel Conservation Area (MGSCA). The boundaries of this alternative are as shown in **Alternatives Figure 1**.

C.11.5.1 SETTING AND EXISTING CONDITIONS

The Northern Unit Alternative would consist of 176 solar collectors with a net generating capacity of 146 MW occupying 1,135 acres of land. This alternative would retain 58% of

the proposed solar array loops and would affect 58% of the land of the proposed 250 MW project. Please see the discussion of existing conditions within affected BLM lands under Section C.11.4.1

C.11.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff's analysis focuses on the transmission line required to serve the generation facility, and addresses the following issues taking into account both the physical presence of the line and the physical interactions of its electric and magnetic fields:

- Aviation safety;
- Interference with radio-frequency communication;
- Audible noise;
- Fire hazards;
- Hazardous shocks;
- Nuisance shocks; and
- Electric and magnetic field (EMF) exposure.

As with the proposed project, the power from the proposed Northern Unit Alternative would be transmitted to the SCE power grid through the planned SCE 230-kV Millennium Substation adjacent to the project site. The same 230-kV line would be used but the two existing on-line SCE lines would not need relocation. The field impacts on the line would be proportionately smaller. Since the line would be designed and operated according to the applicable SCE guidelines, the magnitude of the field and nonfield impacts of concern in this analysis would be as expected for SCE lines of the same voltage and current-carrying capacity. These impacts would manifest themselves as the noted effects on radio frequency communication, audible noise, hazardous and nuisance shocks, electric and magnetic field levels, fire hazards and aviation safety.

C. 12.5.3 CEQA LEVEL SIGNIFICANCE

Since staff finds the potential impacts of line operations to be at less than significant levels for the proposed SCE design, staff would expect implementation of this design (as required by the four recommended conditions for certification) to also result in impacts at less than-significant levels for both the proposed and reduced-acreage Northern Unit Alternative.

C.11.6 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would be a 104 MW solar project located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because its use would eliminate 58% of the proposed area so that all impacts are reduced proportionately, especially impacts on desert washes, biological and cultural resources. The boundaries are as shown in **Alternatives Figure 2**.

C.11.6.1 SETTING AND EXISTING CONDITIONS

The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of 104 MW and occupying approximately 826 acres of land. This alternative would retain 42% of the proposed solar array loops and would affect 42% of the land of the proposed project. Building this alternative would prevent use of a large portion of the El Paso Wash and sensitive biological resources including areas mapped as occupied by the desert tortoise and the Mojave ground squirrel. The setting is generally the same as that described in Section C.11.4.1.

C.11.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff's analysis focuses on the transmission line required to serve the generation facility, and addresses the following issues taking into account both the physical presence of the line and the physical interactions of its electric and magnetic fields:

- Aviation safety;
- Interference with radio-frequency communication;
- Audible noise;
- Fire hazards;
- Hazardous shocks;
- Nuisance shocks; and
- Electric and magnetic field (EMF) exposure.

As with the proposed project, the power from the Southern Unit Alternative would be transmitted to the SCE power grid through the planned SCE Millennium substation adjacent to the project. The proposed project line would still be used to connect the project's on-site switchyard to the existing SCE 230-kV transmission line to the west. As with the proposed project, use of the Southern Alternative would require relocation of the two on-site SCE lines which would require 58.2 acres. Building and operating the smaller 104 MW project would lead to proportionately smaller impacts. Since the line would (a) be constructed, operated, and maintained according to SCE's guidelines for line safety and field management which conform to applicable laws, ordinances, regulations and standards and (b) would traverse undisturbed desert land with no nearby residents, its use would eliminate the concern over residential electric and magnetic field exposures.

C.11.6.3 CEQA LEVEL OF SIGNIFICANCE

With the four conditions of certification recommended for the proposed project, any safety and nuisance impacts from the proposed line would be less than significant.

C.11.7 ORIGINAL PROPOSED PROJECT ALTERNATIVE

The Original Proposed Project Alternative would be a 250 MW solar facility as originally proposed by Solar Millennium. This alternative is analyzed because its use would

reduce the amount of land developed within the Mojave Ground Squirrel Conservation Area while allowing for generation and transmission of the full 250 MW of power that Solar Millennium proposes.

C.11.7.1 SETTING AND EXISTING CONDITIONS

The Original Proposed Project Alternative would consist of 278 solar array loops with a net generating capacity of 250 MW occupying approximately 1,760 acres of land. This alternative would occupy approximately 755 acres north of Brown Road and approximately 685 acres south of Brown Road. A shorter transmission interconnection would be needed, 1,250 feet as compared to 3,900 feet for the project. The boundaries are as shown in **Alternatives Figure 3**. This project footprint would includes two ephemeral desert washes that would require redirection and smaller dry desert washes that also traverse the site. In addition, the site is located on prime desert tortoise and Mojave ground squirrel habitat.

C.11.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff's analysis focuses on the transmission line required to serve the generation facility, and addresses the following issues taking into account both the physical presence of the line and the physical interactions of its electric and magnetic fields:

- Aviation safety;
- Interference with radio-frequency communication;
- Audible noise;
- Fire hazards;
- Hazardous shocks;
- Nuisance shocks; and
- Electric and magnetic field (EMF) exposure.

As with the proposed project, power from the Original Proposed Project Alternative would be transmitted to the SCE power grid through the planned SCE 230-kV substation located near the proposed project site. This alternative would also require relocation of the existing SCE transmission lines but the alignment of the required transmission line would require a line of 550 feet rather than the 0.5 miles currently proposed. This alternative is analyzed because its use would reduce the land developed within the Mojave Ground Squirrel Conservation Area (MGSCA). It would also allow for production of solar energy in the amount presently proposed. However, the area of potential field impacts would be much smaller than for the proposed project because of the shorter distance..

C.11.7.3 CEQA LEVEL OF SIGNIFICANCE

Since staff finds the potential impacts of line operations to be at less than significant levels for the proposed SCE design, staff would expect implementation of this design (as required by the four recommended conditions for certification) to potentially result in

less than significant impacts for both the proposed and the Original Proposed Project Alternative whose related tie-in line would be shorter, proportionately reducing the areas of field and nonfield impacts.

C.11.8 NO ACTION ALTERNATIVE

With the No Project/No Action Alternative, the proposed action would not be undertaken. Unless BLM implements an amendment to the CDCA Plan, the BLM land on which the project is proposed would continue to be managed within BLM's framework of a program of multiple use and sustained yield, and the maintenance of environmental quality [43 U.S.C. 1781 (b)] in conformance with applicable statutes, regulations, policy and land use plan.

C.11.8.1 SETTING AND EXISTING CONDITIONS

The setting for the No Project/No Action Alternative would include lands on which the proposed project would be located along with its linear facilities. Subsection C.11.4.1 (above) describes in detail the lands that would be affected.

C.11.8.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

In the No Project / No Action Alternative, the proposed action would not be undertaken. The BLM land on which the project is proposed would continue to be managed within BLM's framework of a program of multiple use and sustained yield, and the maintenance of environmental quality [43 U.S.C. 1781 (b)] in conformance with applicable statutes, regulations, policy and land use plan. For example, there are seven large solar projects proposed on BLM land within the area served by the BLM El Centro Field Office, and there are currently 70 applications for solar projects covering 611,692 acres pending with BLM in the California Desert District.

Under the No Project/No Action alternative, the transmission line safety and nuisance impacts of the Ridgecrest Solar Power Project would not occur at the proposed site. This would help reduce the total human exposure to area field and non-field impacts from electric power lines in general.

C.11.8.3 CEQA LEVEL OF SIGNIFICANCE

Under the No Project/No Action alternative, the transmission line safety and nuisance impacts from the proposed project line would not occur thereby contributing to the general effort to reduce these impacts on humans. However, given the potentially low levels of these line impacts, such contribution to exposure reduction would be less than significant.

C.11.9 CUMULATIVE IMPACTS

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future

projects (California Code Regulation, Title 14, section 15130). NEPA states that cumulative effects can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR §1508.7).

When field intensities are measured or calculated for a specific location, they reflect the interactive, and therefore, cumulative effects of fields from all contributing conductors. This interaction could be additive or subtractive depending on prevailing conditions. Since the proposed project's transmission line would be designed, built, and operated according to applicable field-reducing SCE guidelines (as currently required by the CPUC for effective field management), any contribution to cumulative area exposures should be at levels expected for SCE lines of similar voltage and current-carrying capacity. It is this similarity in intensity that constitutes compliance with current CPUC requirements on EMF management. The actual field strengths and contribution levels for the proposed line design would be assessed from the results of the field strength measurements specified in Condition of Certification **TLSN-2**.

C.11.10 COMPLIANCE WITH LORS

As previously noted, current CPUC policy on safe EMF management requires that any high-voltage line within a given area be designed to incorporate the field strength-reducing guidelines of the main area utility lines to be interconnected. The utility in this case is SCE. Since the proposed project 230-kV line and related switchyards would be designed according to the respective requirements of the LORS listed in **TLSN Table 1**, and operated and maintained according to current SCE guidelines on line safety and field strength management, staff considers the proposed design and operational plan to be in compliance with the health and safety requirements of concern in this analysis. The actual contribution to the area's field exposure levels would be assessed from results of the field strength measurements required in Condition of Certification **TLSN-2**.

C.11.11 NOTEWORTHY PUBLIC BENEFITS

Since the proposed RSPP tie-in line would pose specific, although insignificant risks of the field and nonfield effects of concern in this analysis, its building and operation would not yield any public benefits regarding the effort to minimize any human risks from these impacts.

C.11.12 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

TLSN-1 The project owner shall construct the proposed transmission line (anywhere along the area identified by the applicant as available for its routing) according to the requirements of: (a) California Public Utility Commission's GO-95, GO-52, GO-131-D, Title 8, and Group 2, (b) High Voltage Electrical Safety Orders, sections 2700 through 2974 of the California Code of Regulations, and (c) Southern California Edison's EMF reduction guidelines.

Verification: At least 30 days before starting the transmission line or related structures and facilities, the project owner shall submit to the Compliance Project

Manager (CPM) a letter signed by a California registered electrical engineer affirming that the lines will be constructed according to the requirements stated in the condition.

TLSN-2 The project owner shall use a qualified individual to measure the strengths of the electric and magnetic fields from the line at the points of maximum intensity along the route for which the applicant provided specific estimates. The measurements shall be made before and after energization according to the American National Standard Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) standard procedures. These measurements shall be completed no later than 6 months after the start of operations.

Verification: The project owner shall file copies of the pre-and post-energization measurements with the CPM within 60 days after completion of the measurements.

TLSN-3 The project owner shall ensure that the rights-of-way of the proposed transmission line are kept free of combustible material, as required under the provisions of section 4292 of the Public Resources Code and section 1250 of Title 14 of the California Code of Regulations.

Verification: During the first 5 years of plant operation, the project owner shall provide a summary of inspection results and any fire prevention activities carried out along the right-of-way and provide such summaries in the Annual Compliance Report on transmission line safety and nuisance-related requirements.

TLSN-4 The project owner shall ensure that all permanent metallic objects within the right-of-way of the project-related lines are grounded according to industry standards regardless of ownership.

Verification: At least 30 days before the lines are energized, the project owner shall transmit to the CPM a letter confirming compliance with this condition.

C.11.13 CONCLUSIONS

Since staff does not expect the proposed 230-kV transmission tie-in line to pose an aviation hazard according to current FAA criteria, we do not consider it necessary to recommend specific location changes on the basis of a potential hazard to area aviation.

The potential for nuisance shocks would be minimized through grounding and other field-reducing measures that would be implemented in keeping with current SCE guidelines (reflecting standard industry practices). These field-reducing measures would maintain the generated fields within levels not associated with radio-frequency interference or audible noise.

The potential for hazardous shocks would be minimized through compliance with the height and clearance requirements of CPUC's General Order 95. Compliance with Title 14, California Code of Regulations, section 1250, would minimize fire hazards while the use of low-corona line design, together with appropriate corona-minimizing construction practices, would minimize the potential for corona noise and its related interference with radio-frequency communication in the area around the route.

Since electric or magnetic field health effects have neither been established nor ruled out for the proposed RSPP and similar transmission lines, the public health significance of any related field exposures cannot be characterized with certainty. The only conclusion to be reached with certainty is that the proposed line's design and operational plan would be adequate to ensure that the generated electric and magnetic fields are managed to an extent the CPUC considers appropriate in light of the available health effects information. The long-term, mostly residential magnetic exposure of health concern in recent years would be insignificant for the proposed line given the absence of residences along the proposed route. On-site worker or public exposure would be short term and at levels expected for SCE lines of similar design and current-carrying capacity. Such exposure is well understood and has not been established as posing a significant human health hazard.

Since the proposed project line would be operated to minimize the health, safety, and nuisance impacts of concern to staff and would be routed through an area with no nearby residences, staff considers the proposed design, maintenance, and construction plan as complying with the applicable LORS. With implementation of the four recommended conditions of certification, any such impacts would be less than significant.

C.11.14 REFERENCES

Solar Millennium 2009a (tn:53100). Application for Certification for the Palen Solar Power Project, Volumes I and II. Submitted to the California Energy Commission on September 1, 2009.

EPRI — Electric Power Research Institute. 1982. Transmission Line Reference Book: 345 kV and Above.

National Institute of Environmental Health Services. 1998. *An Assessment of the Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields*. A Working Group Report, August 1998.

C.12 VISUAL RESOURCES

Testimony of Michael Clayton

C.12.1 SUMMARY OF CONCLUSIONS

Energy Commission staff have analyzed visual resource-related information pertaining to the proposed Solar Millennium Ridgecrest Solar Power Project (RSPP) and conclude that the proposed project would result in a substantial adverse impact to existing scenic resource values as seen from several viewing areas and Key Observation Points in the project vicinity including:

- U.S. 395 in the vicinity of, and on approach to, the project area;
- Brown Road in the vicinity of, and on approach to, the project area;
- Various BLM recreational access roads in the vicinity of the project area;
- Nearby residences;
- The Railroad Bed Bike Trail in the vicinity of the project area; and
- The elevated hill immediately west of the south development area.

Energy Commission staff concludes that these visual impacts would be significant in terms of three of the four criteria of California Environmental Quality Act (CEQA) Appendix G, and could not be mitigated to less than significant levels and would thus; result in significant and unavoidable impacts under CEQA.

Energy Commission staff also concludes that the proposed project would likely result in adverse but less than significant visual impacts on views from the northern ridges of the El Paso Mountains though the extent to which glare and/or glint from project structures is visible from the El Paso Mountains could ultimately determine the significance of the visual impact experienced at that location.

Also, Energy Commission staff concludes that there are no Kern County General Plan goals, policies, or implementation measures pertaining to visual resources that would apply to the proposed project.

Finally, Energy Commission staff concludes that the project in combination with foreseeable future projects (both local and region-wide) would cause significant unavoidable cumulative visual impacts of two kinds:

1. Cumulative impacts in combination with foreseeable future solar, renewable, and other energy and development projects within the immediate project viewshed would be visible within the same field of view; and

2. Cumulative impacts in combination with foreseeable future solar and other renewable energy projects would contribute to a perceived sense of industrialization of the open, undeveloped desert landscape along within the California Desert Conservation Area overall.

If the Energy Commission approves the project, Energy Commission staff recommends that all of the Energy Commission staff's proposed conditions of certification be adopted in order to minimize impacts to the greatest extent feasible. Conditions of certification referred to herein serve the purpose of both the Energy Commission's conditions of certification for purposes of CEQA and BLM's Mitigation Measures for purposes of the National Environmental Policy Act (NEPA).

C.12. 2 INTRODUCTION

Visual resources are the natural and cultural features of the environment that can be viewed. This analysis focuses on whether the Solar Millennium Ridgecrest Solar Power Project (RSPP) would cause significant adverse visual consequences and whether the project would be in compliance with applicable laws, ordinances, regulations, and standards (LORS) including the guidelines of the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). The determination of the potential for significant impacts to visual resources resulting from the proposed project is required by CEQA. The following section describes the visual resources methodology employed for the CEQA analysis (Energy Commission staff's methodology), as well as the thresholds for determining environmental consequences (as discussed above in the Summary of Conclusions section. BLM has agreed to utilize the Energy Commission's methodology for the purpose of this joint document and agrees that the conclusions would likely be similar. Therefore, Energy Commission staff's conclusions based on the staff's methodology will satisfy the NEPA requirements). In accordance with Energy Commission staff's procedure, conditions of certification are proposed as needed to reduce potentially significant impacts (under CEQA) to less than significant levels or to the extent possible, and to ensure LORS conformance, if feasible.

C.12.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

BLM has agreed to utilize the Energy Commission's methodology for the purpose of this joint document and agrees that the conclusions would likely be similar. Therefore, because of the similarity of the methodological inputs and outcomes of the Energy Commission staff's methodology compared to BLM's VRM methodology, Energy Commission staff concludes that the visual contrast and level of change determinations under the staff's method would be comparable to the visual contrast and level of change results of the Visual Contrast Rating methodology under the VRM System. Therefore, the visual analysis for PSPP utilized the Energy Commission staff's standard visual assessment methodology (Visual Sensitivity – Visual Change) to satisfy the requirements under CEQA and NEPA.

The approach is based on detailed analysis from representative Key Observation Points (KOPs). KOPs are generally selected to be representative of the most critical locations from which the project would be seen. KOPs are selected based on their usefulness in evaluating existing landscapes and potential impacts on visual resources with various levels of sensitivity, in different landscape types and terrain, and from various vantage points. Typical KOP locations for the proposed project and alternatives include (1) along major or significant travel corridors (U.S. 395); (2) local roads (Brown Road); (3) along

recreational access 4WD roads and trails; (4) at key vista points; (5) from publically accessible vantagepoints within designated Wilderness or other protected areas; and (6) at locations that provide good examples of the existing landscape context and viewing conditions.

At each KOP, the existing landscape was characterized. Where possible, photographs were obtained to indicate existing conditions without the project and then were modified to include a simulation of the project. Consequently, Energy Commission staff would typically have a visual representation of the viewshed before and after a project is introduced to assist in the analysis. However, in some cases, digital terrain (Google Earth) perspectives were developed to assist in the understanding of project visibility, particularly when existing conditions photographs and/or visual simulations were not available in time for the analysis. The Google Earth perspectives are not simulations and do not indicate what the project would look like, nor the degree of contrast in form, line, color, and texture. They do indicate location, project dominance and mass, and basic visibility from specific vantagepoints.

The following subsections describe the approach for analyzing the existing visual setting and project-induced environmental consequences as well as the thresholds for determining environmental consequences.

VISUAL SETTING

When analyzing existing conditions, Energy Commission staff considers the elements of visual quality, viewer concern, visibility, number of viewers, and duration of view. Those parameters are then factored into an overall rating of viewer sensitivity. Each rating component is discussed in the following paragraphs.

Visual Quality

Visual quality is an expression of the visual impression or appeal of a given landscape (landforms, rock forms, water features, vegetative patterns, and cultural features). Visual quality is rated from *low to high*. Landscapes rated *low* are often dominated by visually discordant human alterations. Landscapes rated high generally are memorable because of the way the components combine in a visual pattern. In addition, those landscapes are typically free from encroaching elements, thus retaining their visual integrity. Finally, landscapes with high visual quality are visually coherent and harmonious when each element is considered as part of the whole.

Viewer Concern

Viewer concern addresses the level of interest or concern of viewers regarding an area's visual resources and the potential for visible change in the landscape. Viewer concern is closely associated with viewers' expectations for a given viewshed (an area of land visible from a fixed vantage point) and reflects the importance placed on a given landscape based on the human perceptions of the intrinsic beauty and visual interest of the existing landscape characteristics. Official statements of public values and goals and adopted expressions of local public policy pertaining to visual resources (e.g. Conservation Plans, General Plans and Conservation Area designations) reflect viewers' expectations regarding a visual setting and are given great weight in determining levels of viewer concern.

Land uses associated with 1) designated parks, monuments, and wilderness areas, 2) scenic highways and corridors, 3) recreational areas, 4) conservation areas, and 5) residential areas are generally considered to have high viewer concern. However, existing landscape character may temper viewer concern on some State and locally designated scenic highways and corridors though, in general, people driving for pleasure or engaged in recreational activities tend to have high viewer concern.

Travelers on other highways and roads, including those in rural or agricultural areas, may have moderate viewer concern depending on viewer expectations as conditioned by regional and local landscape features.

Commercial uses and their occupants, including business parks and hotels, typically have low-to-moderate viewer concern, though some commercial developments have specific requirements related to visual quality, with respect to landscaping, building height limitations, building design, and prohibition of above-ground utility lines, that indicate high viewer concern.

Industrial uses typically have the lowest viewer concern because workers are focused on their work, and generally are working in surroundings with relatively low visual value. However, some areas of lower visual quality and degraded visual character may contain particular views of substantially higher visual quality or interest to the public.

Visibility

Visibility is a measure of how well an object can be seen. Visibility depends on the angle or direction of views; viewing distance; extent of visual screening; and topographical relationships between the object and existing homes, streets, or parks. Visibility takes into consideration any and all obstructions that may be in the sightline including trees and other vegetation, buildings, transmission poles or towers, general air quality conditions such as haze, and general weather conditions such as fog.

Number of Viewers

Number of viewers is a measure of the number of viewers per day who would have a view of the proposed project and can range from *low* to *high*. The types of viewers can include residents, motorists and recreationists.

Duration of View

Duration of view is the amount of time to view the site. For example, a high or extended view of a project site is one reached across a distance in two minutes or longer. In contrast, a low or brief duration of view is reached in a short amount of time—generally less than ten seconds.

Viewer Exposure

Viewer exposure is a function of three elements previously listed, *visibility*, *number of viewers*, and *duration of view*. Viewer exposure can range from a *low* to *high*. A partially obscured and brief background view for a few motorists represents a low value; and an unobstructed foreground view from a large number of residences represents a high value.

Visual Sensitivity

Visual sensitivity is derived from three elements previously listed, *visual quality*, *viewer concern*, and *viewer exposure* and is a concluding assessment as to an existing landscape's susceptibility to an adverse visual outcome. A landscape with a high degree of visual sensitivity is able to accommodate only a lower degree of adverse visual change without resulting in a significant visual impact. A landscape with a low degree of visual sensitivity is able to accommodate a higher degree of adverse visual change before exhibiting a significant visual impact. Visual sensitivity can range from *low* to *high*.

PROJECT-INDUCED VISUAL CHANGE

To determine the visual change that the project would cause, Energy Commission staff considered the elements of contrast, dominance and view blockage that would be experienced at each representative KOP. Where available, photographic simulations of the project were also utilized to assist in the analysis. Each component of the visual change analysis is discussed below.

Visual Contrast

Visual contrast concerns the degree to which a project's visual characteristics or elements —form, line, color, and texture — differ from the same visual elements in the existing landscape. The degree of contrast can range from *low* to *high*. A landscape with forms, lines, colors, and textures similar to those of the proposed energy facility is more visually absorbent; that is, more capable of accepting those characteristics than a landscape in which those elements are absent.[1] Generally, visual absorption is inversely proportional to visual contrast. Visual contrast ranges from *low* to *high*.

Dominance

Dominance is a measure of (a) the proportion of the total field of view occupied by the feature; (b) a feature's apparent size relative to other visible landscape features; and (c) the conspicuousness of the feature due to its location in the view.

A feature's level of dominance tends to be lower in a panoramic setting compared to a setting with confined sightlines with a focus on the feature itself. A feature's level of dominance is higher if it is (1) near the center of the view; (2) elevated relative to the viewer; or (3) has the sky as a backdrop. As the distance between a viewer and a feature increases, its apparent size decreases; and consequently, its dominance decreases. The level of dominance ranges from *subordinate* to *dominant*.

View Blockage

The extent to which any previously visible landscape features are blocked from view constitutes view blockage or impairment. The view is also impaired when the continuity of the view is interrupted. When considering a project's features, higher quality landscape features can be blocked by lower quality project features, thus resulting in adverse visual impacts. The degree of view blockage can range from *none* to *high*.

[1] Typically, the Energy Commission does not consider texture in its visual analyses.

Visual Change

Visual change is derived from the three elements – *contrast*, *dominance*, and *view blockage* and is a concluding assessment as to the degree of change that would be caused by a project. The degree of visual change can range from *low* to *high*.

THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

The following regulatory criteria were considered in determining whether a visual impact would be significant under CEQA.

State

The CEQA *Guidelines* define a "significant effect" on the environment to mean a "substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including . . . objects of historic or aesthetic significance." (Cal. Code Regs., tit.14, § 15382.) Appendix G of the *Guidelines*, under Aesthetics, lists the following four questions to be addressed regarding whether the potential impacts of a project are significant:

1. Would the project have a substantial adverse effect on a scenic vista?

2. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

3. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

4. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Local

Energy Commission staff considers any local goals, policies, or designations regarding visual resources. Conflicts with such laws, ordinances, regulations, and standards can constitute significant visual impacts. See Section C.12.10 for Applicable **LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)**.

C.12.4 PROPOSED PROJECT

C.12.4.1 SETTING AND EXISTING CONDITIONS

Regional Landscape

The proposed project landscape is part of the Great Basin section of Fenneman's Basin and Range physiographic province, a vast desert area of the western U.S. extending from eastern Oregon to western Texas, characterized by periodic north-south trending, highly eroded mountain ranges that rise sharply from and are separated by broad, flat desert valleys (Fenneman, 1931). The project site is located in the southern portion of Indian Wells Valley within the high elevation Mojave Desert. The site is adjacent and to the southwest of U.S. 395, approximately five miles southwest of Ridgecrest in

northeastern Kern County. The southern portion of the broad valley floor is an expansive, high desert plain bordered by the southern extent of the Sierra Nevada Mountains to the west, the Coso and Argus Ranges to the north, the Spangler Hills to the east and the El Paso Mountains to the south.

Project Site

At an elevation of approximately 2,700 feet, the project site is presently undeveloped and appears predominantly intact. As noted in the AFC, the natural features of the site form a strong, coherent pattern, and the visual integrity in the natural landscape is high (SM 2009a, page 5.15-7). The site landscape consists primarily of desert scrub vegetation and desert dry wash woodland composed largely of creosote bush and species typical of the riparian shrub woodland community respectively. The site is crossed by Brown Road and a desert wash. Two transmission lines also cross the western edge of the southern development area. U.S. 395 passes immediately adjacent and to the northeast of the site and there are numerous BLM 4WD roads and established 4WD tracks that provide recreational access through the site to the surrounding valley and hills. A railroad grade bike trail also passes immediately to the southwest to west of the site. **Visual Resources Figure 1**, *Characteristic Landscape of the Project Site*, presents a view of the project site and shows the primarily natural setting comprised of a mosaic of, shrubby vegetation of pale greens and tans, low-growing grasses and light-colored soils. The rugged ridges, angular forms and bluish hue of the Sierra Nevada Mountains to the west of the project site provide a contrast of visual interest to the flat, light-, earth-toned colored, horizontal landform of the valley floor and project site. The area immediately surrounding the project site is lightly populated (AFC, Page 5.15-7).

Project Viewshed

The *viewshed* or area of potential visual effect (the area within which the project could potentially be seen) is extensive and encompasses much of Indian Wells Valley and many of the surrounding mountain ranges including the El Paso Mountains to the south, Scodie and Sierra Nevada Mountains to the west, Coso and Argus Ranges to the north, and the Spangler Hills to the east (see the orange colored area in **Visual Resources Figure 2**). The computer-generated viewshed mapping in **Visual Resources Figure 2** is based on the height of the proposed power block units and the 10-meter resolution (horizontal) USGS digital elevation model (DEM). A feature of this desert landscape is the potential for large projects to be seen over great distances where elevated viewpoints exist, due to the large open areas of level topography and absence of intervening landscape features.

Key Observation Points (KOPs)

Energy Commission staff evaluated the visual setting and proposed project in detail from several viewing areas represented by the following six key observation points including:

- **KOP 1** – U.S. 395, north of the project site in the vicinity of coordinates – Latitude: 35^{o} 34’ 48.32” N, Longitude: 117^{o} 44’ 19.83” W, viewing to the south.

- **KOP 2** – Westbound Brown Road, in the central project area in the vicinity of coordinates – Latitude: 35^{o} 33’ 21.21” N, Longitude: 117^{o} 44’ 40.05” W, viewing to the west-southwest.
- **KOP 3** – Eastbound Brown Road, in the central project area in the vicinity of coordinates – Latitude: 35^{o} 33’ 27.88” N, Longitude: 117^{o} 45’ 12.64” W, viewing to the east-northeast.
- **KOP 4** – Railroad Bed Bike Trail, southwest of the south development area, in the vicinity of coordinates – Latitude: 35^{o} 32’ 32.82” N, Longitude: 117^{o} 45’ 36.75” W, viewing to the north-northeast.
- **KOP 5** – West Hilltop, west of the south development area, in the vicinity of coordinates – Latitude: 35^{o} 33’ 7.14” N, Longitude: 117^{o} 46’ 14.36” W, viewing to the east.
- **KOP 6** – El Paso Mountains Wilderness, 4.5 miles southwest of the project, in the vicinity of coordinates – Latitude: 35^{o} 30’ 47.39” N, Longitude: 117^{o} 49’ 25.96” W, viewing to the northeast.

Each of these six key observation points is shown on **Visual Resources Figure 3**. At each KOP a visual analysis was conducted and a discussion of the visual setting for each KOP is presented in the following paragraphs and summarized in the figures following this section. Where available, existing conditions photographs are presented in **Visual Resources Attachment 1A-1D, 2A, 2B, 3A, 3B, 4A, and 4B** along with any available simulations and Google Earth perspectives.

KOP 1 – U.S. Highway 395

KOP 1 was selected to characterize the visual impact to travelers on U.S. 395 in the project vicinity. KOP 1 is located at the northeast corner of the north development area. The view is to the south and is depicted in the Google Earth perspective presented as **Visual Resources Figure 4A**. **Visual Resources Figure 4B** presents an existing view photograph from a nearby location on U.S. 395 approximately 0.5 mile further northwest. KOP 1 provides a panoramic, open and unobstructed view of the site. The foreground terrain is flat and supports desert scrub vegetation. The existing landscape appears predominantly natural in appearance with the exception of two transmission lines that pass along the southwest edge of the site (faintly visible in the image presented in **Visual Resources Figure 4B**). The project would be visible in the immediate foreground. The rugged, rolling to angular forms of the El Paso Mountains are visible in the background.

Visual Quality

Low-to-moderate. The foreground to middleground views from U.S. 395 encompass a broad, open and predominantly undeveloped landscape consisting of a relatively non-descript, flat valley floor with shrubby vegetation of pale greens and tans, low-growing grasses and light-colored soils, backdropped by the rolling to angular forms of the El Paso Mountains to the south. The mountain range adds visual interest and contributes to the low-to-moderate rating for visual quality.

Viewer Concern

High. As the landscapes along the U.S. 395 corridor become more and more industrialized with the addition of built features with industrial character, opportunities for expansive views of natural appearing high desert landscapes, such as those visible from KOP 1, are diminishing. Travelers on U.S. 395 (the primary north-south travel corridor east of the Sierra Nevada Mountains) would have expectations of observing higher quality landscape features while traveling through the northern high deserts within the designated conservation area (CDCA). Travelers would be highly sensitive to the introduction of industrial character to this predominantly naturally appearing landscape, particularly when such facilities would impair panoramic views of the mountains framing the southern Indian Wells Valley. Therefore, overall viewer concern is rated high.

Viewer Exposure

High. Site visibility is high in that the view of the site from KOP 1 is unobstructed at a foreground viewing distance. The number of viewers would be high and the view duration (with uninterrupted sightlines) would be extended given the project's spatial prominence within the primary cone of vision of both northbound and southbound travelers on U.S. 395. The high visibility and number of viewers, combined with the extended duration of view, would result in high viewer exposure.

Visual Sensitivity

Moderate-to-high. For viewers on U.S. 395 in general and KOP 1 specifically, the low-to-moderate visual quality combined with high viewer concern and viewer exposure result in an overall moderate-to-high visual sensitivity of the visual setting and viewing characteristics.

KOP 2 – Westbound Brown Road

KOP 2 was selected to characterize the visual impact to travelers on Brown Road when viewing to the south toward the El Paso Mountains in the project vicinity. KOP 2 is located on westbound Brown Road in the central project area, approximately 0.1 mile northeast of the south development area. The view is to the west-southwest and is depicted in the Google Earth perspective presented as **Visual Resources Figure 5A**. **Visual Resources Figure 5B** presents an existing view photograph from a location on Brown Road approximately 1.25 miles further to the southeast, though that view is to the west-northwest. KOP 2 provides a panoramic, open and unobstructed view of the site, which is visible in the immediate foreground. The foreground terrain is flat and supports desert scrub vegetation and is backdropped by the rolling forms of the hill immediately adjacent and to the west of the south development area, and the El Paso Mountains beyond. The existing landscape is predominantly natural in appearance with the exception of two transmission lines that pass along the southwest edge of the site.

Visual Quality

Low-to-moderate. The foreground views from Brown Road encompass a broad, open and predominantly undeveloped landscape consisting of a relatively non-descript, flat valley floor with shrubby vegetation of pale greens and tans, low-growing grasses and light-colored soils, backdropped by the rolling to angular forms of the hill west of the

project site and the El Paso Mountains to the south. Also visible are two transmission lines that pass along the western edge of the south development area. The hill and mountain range add visual interest and contribute to the low-to-moderate rating for visual quality.

Viewer Concern

High. As the landscapes within Indian Wells Valley and along Brown Road (and the U.S. 395 corridor) become more developed, opportunities for expansive, panoramic views of intact and natural appearing high desert landscapes are diminishing. Thus, travelers within the valley and off-road recreationists seeking unspoiled landscapes would be highly sensitive to the introduction of industrial character to this predominantly naturally appearing valley landscape, and would perceive such as an adverse visual change, particularly when such facilities would impair panoramic views of the mountains framing the southern Indian Wells Valley. Therefore, overall viewer concern is rated high.

Viewer Exposure

Moderate-to-high. Site visibility is high in that the view of the site from KOP 2 is unobstructed at a foreground viewing distance. The number of viewers would be low-to-moderate and the view duration (with uninterrupted sightlines) would be extended given the project's spatial prominence within the primary cone of vision of both westbound and eastbound travelers on Brown Road and off-road recreationists in the immediate project area. The high visibility, low-to-moderate number of viewers, combined with the extended duration of view, would result in moderate-to-high viewer exposure.

Visual Sensitivity

Moderate-to-high. For viewers on Brown Road in general and KOP 2 specifically, the low-to-moderate visual quality combined with high viewer concern and moderate-to-high viewer exposure result in an overall moderate-to-high visual sensitivity of the visual setting and viewing characteristics.

KOP 3 – Eastbound Brown Road

KOP 3 was selected to characterize the visual impact to travelers on Brown Road when viewing to the north and east across the valley. KOP 3 is located on eastbound Brown Road in the central project area, approximately 0.3 mile southwest of the power block. The view is to the east-northeast and is depicted in the Google Earth perspective presented as **Visual Resources Figure 6A**. **Visual Resources Figure 6B** presents an existing view photograph from a location on Brown Road approximately 1.1 miles further to the northwest, though that view is to the east-southeast. KOP 3 provides a panoramic, open and unobstructed view of the site, which is visible in the immediate foreground. The foreground terrain is flat and supports desert scrub vegetation and is backdropped by the rolling to angular forms of the Spangler Hills and Argus Range to the east and north, respectively. The existing landscape is predominantly natural in appearance.

Visual Quality

Low-to-moderate. The foreground views from Brown Road encompass a broad, open and predominantly undeveloped landscape consisting of a relatively non-descript, flat

valley floor with shrubby vegetation of pale greens and tans, low-growing grasses and light-colored soils, backdropped by the rolling to angular forms of the Spangler Hills to the east and the Argus Range to the north, both of which add visual interest and contribute to the low-to-moderate rating for visual quality.

Viewer Concern

High. As the landscapes within Indian Wells Valley and along Brown Road (and the U.S. 395 corridor) become more developed, opportunities for expansive, panoramic views of intact and natural appearing high desert landscapes are diminishing. Thus, travelers within the valley and off-road recreationists seeking unspoiled landscapes would be highly sensitive to the introduction of industrial character to this predominantly naturally appearing valley landscape, and would perceive such as an adverse visual change, particularly when such facilities would impair panoramic views of the mountains framing the southern Indian Wells Valley. Therefore, overall viewer concern is rated high.

Viewer Exposure

Moderate-to-high. Site visibility is high in that the view of the site from KOP 3 is unobstructed at a foreground viewing distance. The number of viewers would be low-to-moderate and the view duration (with uninterrupted sightlines) would be extended given the project's spatial prominence within the primary cone of vision of both westbound and eastbound travelers on Brown Road and off-road recreationists in the immediate project area. The high visibility, low-to-moderate number of viewers, combined with the extended duration of view, would result in moderate-to-high viewer exposure.

Visual Sensitivity

Moderate-to-high. For viewers on Brown Road in general and KOP 3 specifically, the low-to-moderate visual quality combined with high viewer concern and moderate-to-high viewer exposure result in an overall moderate-to-high visual sensitivity of the visual setting and viewing characteristics.

KOP 4 – Railroad Bed Bike Trail

KOP 4 was selected to characterize the visual impact to travelers on the Railroad Bed Bike Trail, when viewing to the north to northeast across the southern portion of Indian Wells Valley toward the Coso and Argus Mountain Ranges that define the northern extent of the valley. KOP 4 is located on the Railroad Bed Bike Trail, approximately 0.25 mile west of the south development area. The view is to the north-northeast and is depicted in the existing view photograph presented as **Visual Resources Figure 7A**. KOP 4 provides a panoramic, open and unobstructed view of the site, which is visible in the immediate foreground. The foreground terrain is flat and supports desert scrub vegetation and is backdropped by the horizontal to angular form of the distant Argus Range. The existing landscape is predominantly natural in appearance with the exception of two transmission lines that pass along the southwest edge of the site.

Visual Quality

Low-to-moderate. The foreground views from the Railroad Bed Bike Trail encompass a broad, open and predominantly undeveloped landscape consisting of a relatively non-descript, flat valley floor with shrubby vegetation of pale greens and tans, low-growing

grasses and light-colored soils, backdropped by the horizontal to angular form of the distant Argus Range. Also visible are two transmission lines that pass along the western edge of the south development area. The mountain ranges that border the valley add visual interest and contribute to the low-to-moderate rating for visual quality.

Viewer Concern

High. As the landscapes within Indian Wells Valley and along the Railroad Bed Bike Trail become more developed, opportunities for expansive, panoramic views of intact and natural appearing high desert landscapes are diminishing. Thus, travelers within the valley, cyclists and off-road recreationists seeking unspoiled landscapes would be highly sensitive to the introduction of industrial character to this predominantly naturally appearing valley landscape, and would perceive such as an adverse visual change, particularly when such facilities would impair panoramic views of the mountains framing the southern Indian Wells Valley. Therefore, overall viewer concern is rated high.

Viewer Exposure

Moderate-to-high. Site visibility is high in that the view of the site from KOP 4 is unobstructed at a foreground viewing distance. The number of viewers would be low and the view duration (with uninterrupted sightlines) would be extended given the project's spatial prominence in views from the Bike Trail and the relatively slow travel speeds along the trail. The high visibility and low number of viewers, combined with the extended duration of view, would result in moderate-to-high viewer exposure.

Visual Sensitivity

Moderate-to-high. For travelers on the Bike Trail in general and KOP 4 specifically, the low-to-moderate visual quality combined with high viewer concern and moderate-to-high viewer exposure result in an overall moderate-to-high visual sensitivity of the visual setting and viewing characteristics.

KOP 5 – West Hilltop

KOP 5 was selected to provide an elevated view of the site and to characterize the visual impact to recreationists that would ascend the hill immediately west of the site to obtain a vista view of the southern portion of Indian Wells Valley. KOP 5 is located along the crest of the hill, viewing to the east. The elevated view is depicted in the existing view photograph presented as **Visual Resources Figure 8A**. This location provides panoramic vista views of the site, the valley and the distant hills and mountain ranges beyond. The foreground to background view encompasses the flat valley floor and a portion of a desert wash, backdropped by the rolling to angular forms of the Spangler Hills and the more distant Argus Range to the northeast. From this vantage point, much of the valley floor and hills southwest of Ridgecrest are predominantly natural in appearance.

Visual Quality

Low-to-moderate. The panoramic vista views from the hilltop encompass a broad, open and predominantly undeveloped landscape consisting of a relatively non-descript, flat valley floor with shrubby vegetation of pale greens and tans, low-growing grasses and light-colored soils, backdropped by the horizontal to angular form of the Spangler Hills

and distant Argus Mountain Range. Also visible are two transmission lines that pass along the western edge of the south development area. The mountain ranges that border the valley add visual interest and contribute to the moderate rating for visual quality.

Viewer Concern

High. As the landscapes within Indian Wells Valley become more developed, opportunities for expansive, panoramic views of intact and natural appearing high desert landscapes are diminishing. Thus, travelers within the valley and off-road recreationists seeking vista views of unspoiled landscapes would be highly sensitive to the introduction of industrial character to this predominantly naturally appearing valley landscape, and would perceive such as an adverse visual change, particularly when such facilities would impair panoramic vista views of the valley and the bordering mountain ranges and hills. Therefore, overall viewer concern is rated high.

Viewer Exposure

Moderate-to-high. Site visibility is high in that the view of the site from KOP 5 is unobstructed at a foreground viewing distance. The number of viewers would be very low and the view duration (with uninterrupted sightlines) would be extended given the project's spatial prominence in views from the hilltop. The high visibility and very low number of viewers, combined with the extended duration of view, would result in moderate-to-high viewer exposure.

Visual Sensitivity

Moderate-to-high. For viewers on the hilltop, the moderate visual quality combined with high viewer concern and moderate-to-high viewer exposure result in an overall moderate-to-high visual sensitivity of the visual setting and viewing characteristics.

KOP 6 – El Paso Mountains

KOP 6 was selected to characterize the visual impact on views from the culturally sensitive El Paso Mountains. KOP 6 is located on a north ridge of the El Paso Mountains, approximately 4.5 miles southwest of the south development area. The elevated view to the northeast is depicted in the Google Earth perspective presented as **Visual Resources Figure 9**. This location provides an open but partially screened (by intervening terrain) panoramic vista view of the project site, Indian Wells Valley, and the surrounding mountains and is a view that would be experienced by recreationists seeking the backcountry and wilderness recreational experience. The foreground to background view encompasses a variety of landforms including valley floor, desert washes, rounded hills and angular mountain ranges. From this elevated vantage point, the existing landscape is predominantly natural in appearance and is absent any noticeable built features except for distant areas of development, such as Ridgecrest.

Visual Quality

Moderate-to-high. The foreground to background panoramic vista views from the ridges of the El Paso Mountains, encompass the broad expanses of Indian Wells Valley, ringed by rolling hills and rugged, angular mountain ranges. Visual integrity of the high desert landscape is relatively high with minimal intrusions of visually discordant built

features. The elevated perspective from KOP 5 enables views of considerable visual interest, and overall visual quality is rated moderate-to-high.

Viewer Concern

High. Recreationists seeking the backcountry desert wilderness experience and others visiting this culturally sensitive area would expect to find viewing opportunities that offer expansive views of intact and natural appearing desert landscapes with minimal if any industrial character. These backcountry visitors would be highly sensitive to the introduction of industrial character to this naturally appearing landscape, and would perceive such additions as an adverse visual change. Therefore, overall viewer concern is rated high.

Viewer Exposure

Moderate. Site visibility is moderate-to-high in that the elevated vista view of the site is somewhat distant (at 4.5 miles) and partially obstructed by intervening terrain. However, the large scale of the project will render the project prominent in the field of view to the northeast. While the number of viewers would be very low, the view duration would be extended from the vista viewpoints along the north ridges of the El Paso Mountains. The moderate-to-high visibility, very low numbers of viewers and extended duration of view would result in moderate viewer exposure.

Visual Sensitivity

Moderate-to-high. For viewers at KOP 6 and other nearby, elevated viewing locations within the El Paso Mountains Wilderness, the moderate-to-high visual quality combined with high viewer concern and moderate viewer exposure result in an overall moderate-to-high visual sensitivity of the visual setting and viewing characteristics.

C.12.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Construction Impacts

Construction of the proposed project would cause temporary visual impacts due to the presence of equipment, materials, and workforce. These impacts would occur at the proposed solar power plant site and along the transmission line route. Construction would involve the use of cranes, heavy construction equipment, temporary storage and office facilities, and temporary laydown/staging areas. Construction would include site clearing and grading, construction of the actual facilities, and site cleanup and restoration. Visible traffic would also increase along U.S. 395 and Brown Road during construction. Construction activities would be visible from U.S. 395 (the primary travel corridor in the region), Brown Road, nearby BLM recreational access roads, nearby residences, and El Paso Mountains Wilderness. Throughout the extensive construction period of approximately 28 months, the industrial character of the activities would constitute adverse and significant visual impacts. However, the vast majority of the area disturbed by construction would eventually be occupied by project facilities (see *Operation Impacts* below) though some areas of disturbed soil surfaces (characterized by high color, line and texture contrasts) would still remain and would be visible from the various viewing vantage points. These areas of residual disturbance would require

successful restoration. Proper implementation of Energy Commission staff's proposed restoration mitigation in Condition of Certification **VIS-2** would ensure that the visual impacts of residual disturbed areas associated with project construction remain less than significant. It is also anticipated that construction activity will take place at night. In order to ensure that significant construction lighting impacts do not occur, Energy Commission staff recommends the night lighting mitigation measures contained in Condition of Certification **VIS-3**, presented later in this analysis.

Operation Impacts

An analysis of operation impacts was conducted for the view areas represented by the key viewpoints selected for in-depth visual analysis. The results of the operation impact analysis are discussed below by KOP and presented in the Visual Analysis Summary Table included as **VISUAL RESOURCES APPENDIX VR-1**. The visual impacts of night lighting are discussed in a separate section of this analysis. For each KOP, an evaluation of visual contrast, project dominance, and view blockage is presented with a concluding assessment of the overall degree of visual change caused by the proposed project. Visual change is then considered within the context of the landscape's visual sensitivity to arrive at a determination of visual impact significance. Preceding the KOP evaluations is a brief tabular summation of the project facilities that would cause the visual change.

Project Features

The proposed project would convert approximately 2.25 square miles of naturally-appearing desert plain to an industrial facility characterized by complex, geometric forms and lines and industrial surfaces that are dissimilar to the surrounding natural landscape character. An additional 320 acres would be disturbed during construction. Much of the developed area would be covered with the arrays of parabolic mirrors that would be used to collect heat energy from the sun. **Visual Resources Attachments 1A through 1D** present images of the Kramer Junction SEGS project solar troughs, which are smaller than those proposed for RSPP. **Visual Resources Attachments 2A and 2B** present images of the type of solar collecting arrays that would be utilized for RSPP. Table C.12-1 provides a list of the major project features that would contribute to the apparent visual change of the landscape. A more detailed discussion of the proposed project is presented in Section B. In addition to the features listed in Table C.12-1 below, the proposed project would also include the installation of chain link fencing and desert tortoise fencing around the perimeter of the site for security and protection of sensitive biological resources. Additionally, a 30-foot high wind fence would be installed along the western and eastern borders of the individual development areas (see **Visual Resources Figure 3**). **Visual Resources Attachment 3A and 3B** present images of the wind fence construction.

Visual Resources Table C.12-1
Key Project Components

Component	Dimensions (LxWxH) (Feet) / Capacity	Footprint (square feet)
Switch Yard	13 x 92	1,200
Overflow Vessel And Expansion Vessel	124 x 154	19,000 Ea
Ullage Coolers And Vessel	79 x 20	1,000
Nitrogen System	Incidental	800
Heat Transfer Fluid Heater	50 x 22 x 80 Stack	1,100
Steam Generators	90 x 10 x 24 Ea	900
Weather Station Building	68 x 68 x 24 (Two Level Bldg)	4,600
Parking	18 x 60	1,080
Balance Of Plant Electrical Building	67 x 67 x 24 (Two Level Bldg)	4,500
Reheaters	32 x 10 Ea	320
MCC Cooling Tower	33 x 40 x 32 High	1,320
Steam Turbine	111 x 50 x 40 High	5,500
Deaerator	125 x 57	7,100
Vacuum System	19 x 35 x 24 High	665
Compressed Air System	25 x 25 x 24 High	625
Generator Circuit Breaker	20 x 30 x 20	600
Warehouse	68 x 146 x 30	10,000
Chemical Injection Skid	46 x 47 x 24	2,000
Generator Step-Up Transformers	48 x 32 x 24	1,500
Emergency Diesel Generator	40 x 10 x 20	800
Cooling Tower	33 x 40 x 32 High	1,300
Water Tank (Ro Concentrate) (Ps1 Only)	45 Dia x 24 High / 250,000 Gal	1,590
Service Water Pumps	23' x 12' x 16'	275
Take Off Tower	30' x 35' x 50'	1,000
Blowdown Tanks	28' Dia Ea	570
Auxiliary Boiler	40' x 73' x 32'	2,900
Air Cooled Condenser	245' x 296' 120' High	73,000
Sample Panel & Lab Building	84' x 48' x 24' High	1,100
Demineralized Water Tank	16' Dia x 24' High	200
Water Treatment Area	192 x 148	28,000
Administration Building	60 x 60 x 24 High	3,600
Control Building	68 x 68 x 24 High	3,900
High Voltage Line	4 Dia x 140 High Poles	
Pipe Rack	40 High Misc.	
Treated Water Tank (Also Firewater Storage)	91 Dia x 24 High / 1 Million Gal	6,500
Transmission Line	Approximately 0.5 mile	
Wind Fence (East and West)	54,200 linear feet	

Source: SM 2009a (AFC), Table 5.15-3 except for last entry whose source is SM 2010a.

KOP 1 – U.S. 395

Visual Resources Figure 4A presents a Google Earth perspective of the proposed project site from KOP 1 on U.S. 395 and illustrates the foreground visibility and location of the project area. The yellow-outlined shaded area in the perspective indicates the location of one of the 30-foot tall wind fences. The orange-outlined shaded area indicates the location of one of the development areas at a height of approximately 24 to 25 feet, which is the approximate height of many of the project features. Color assignment in the perspective is not significant and was merely selected to achieve ease of understanding. This perspective was prepared because a visual simulation from this location was not available at the time this Staff Assessment/Draft Plan

Amendment/Draft Environmental Impact Statement (SA/DPA/DEIS) was prepared. However, the visual simulation presented as **Visual Resources Figure 4C** was subsequently provided for a location on U.S. 395 approximately 0.5 mile further northwest. This location is approximately 0.45 mile north of the north development area and approximately 1.5 miles north of the power block. As shown in the simulation, the proposed project would be prominently visible in the foreground of views from U.S. 395.

Visual Contrast

High. The proposed project would add highly visible, structurally complex industrial features to the foreground to middleground landscape. The structures would exhibit considerable industrial character. Such characteristics are not found in the existing landscape. The reflection off the parabolic mirrors could also cause visual distraction and exacerbate the contrast associated with the project facilities. The resulting visual contrast caused by these characteristics would be High (see the Visual Analysis Summary Table presented as **VISUAL RESOURCES APPENDIX VR-1**).

Project Dominance

Co-dominant-to-Dominant. The proposed project would be prominently visible from U.S. 395. Depending on the viewing location along the highway, the project's apparent scale would be comparable to dominant relative to the existing valley floor and background hills and mountains. Overall project dominance would be co-dominant-to-dominant.

View Blockage

Moderate-to-high. From the vicinity of KOP 1, the wind fences, solar arrays and other project components (lower quality landscape features) would block from view substantial portions of Indian Wells Valley floor and the background El Paso Mountains and Spangler Hills (higher quality landscape features). The resulting view blockage would be moderate-to-high.

Overall Visual Change

Moderate-to-high. From KOP 1, the values for visual contrast, project dominance, and view blockage, when taken together, constitutes a moderate-to-high level of overall visual change.

Visual Impact Significance

Significant and unavoidable. When considered within the context of the overall moderate-to-high visual sensitivity of the existing landscape and viewing characteristics, the moderate-to-high visual change that would be perceived from KOP 1 would cause a significant and unavoidable visual impact.

Mitigation

Given the large scale of the impact area, no available mitigation measures were identified that would be adequate to mitigate the significant visual impacts to levels that would be less than significant. However, if the project is approved, Energy Commission staff recommends the following conditions of certification to minimize structure contrast and lighting and glare impacts to the extent possible: **VIS-1**, Surface Color Treatment of

Structures; **VIS-2**, Revegetation of Disturbed Soil Areas; **VIS-3**, Temporary and Permanent Exterior Lighting; **VIS-4**, Reduction of Glint and Glare; and **VIS-5,** Project Design.

Residual Impact Significance After Mitigation

No measures were identified by Energy Commission staff to fully address impacts. Impacts would remain significant and unavoidable.

KOP 2 – Brown Road - Westbound

Visual Resources Figure 5A presents a Google Earth perspective of the proposed project site from KOP 2 on westbound Brown Road, approximately 0.1 mile northeast of the south development area, and illustrates the foreground visibility and location of the project area. The yellow outlined shaded area in the perspective indicates the location of one of the 30-foot tall wind fences. The orange-outlined shaded area indicates the location of one of the development areas at a height of approximately 24 to 25 feet, which is the approximate height of many of the project features. Color assignment in the perspective is not significant and was merely selected to achieve ease of understanding. This perspective was prepared because a visual simulation from this location was not available at the time this SA/DPA/DEIS was prepared. However, the visual simulation presented as **Visual Resources Figure 5C** was subsequently provided for a location on Brown Road approximately 1.25 miles further to the southeast, though that view is to the west-northwest and considerably more distant. This location is approximately 1.3 miles east of the south development area and approximately 1.4 miles east of the power block. As shown in the simulation, the proposed project would be prominently visible in the foreground to middleground of views from Brown Road.

Visual Contrast

High. The proposed project would add highly visible, structurally complex industrial features to the foreground to middleground landscape. The structures would exhibit considerable industrial character. Such characteristics are not found in the existing landscape. The reflection off the parabolic mirrors could also cause visual distraction and exacerbate the contrast associated with the project facilities. The resulting visual contrast caused by these characteristics would be High (see the Visual Analysis Summary Table presented as **VISUAL RESOURCES APPENDIX VR-1**).

Project Dominance

Co-dominant-to-Dominant. The proposed project would be prominently visible from Brown Road. Depending on the viewing location along the road, the project's apparent scale would be comparable to dominant relative to the horizontal form of the valley floor and background hills and mountains. Overall project dominance would be co-dominant-to-dominant.

View Blockage

Moderate-to-high. From the vicinity of KOP 2, the wind fences, solar arrays and other project components (lower quality landscape features) would block from view substantial portions of the background El Paso Mountains (higher quality landscape features). The resulting view blockage would be moderate-to-high.

Overall Visual Change

Moderate-to-high. From KOP 2, the values for visual contrast, project dominance, and view blockage, when taken together, constitutes a moderate-to-high level of overall visual change.

Visual Impact Significance

Significant and unavoidable. When considered within the context of the overall moderate-to-high visual sensitivity of the existing landscape and viewing characteristics, the moderate-to-high visual change that would be perceived from KOP 2 would cause a significant and unavoidable visual impact.

Mitigation

Given the large scale of the impact area, no available mitigation measures were identified that would be adequate to mitigate the significant visual impacts to levels that would be less than significant. However, if the project is approved, Energy Commission staff recommends the following conditions of certification to minimize structure contrast and lighting and glare impacts to the extent possible: **VIS-1**, Surface Color Treatment of Structures; **VIS-2**, Revegetation of Disturbed Soil Areas; **VIS-3**, Temporary and Permanent Exterior Lighting; **VIS-4**, Reduction of Glint and Glare; and **VIS-5,** Project Design.

Residual Impact Significance After Mitigation

No measures were identified by Energy Commission staff to fully address impacts. Impacts would remain significant and unavoidable.

KOP 3 – Brown Road - Eastbound

Visual Resources Figure 6A presents a Google Earth perspective of the north development area to the east-northeast from KOP 3 on eastbound Brown Road, approximately 0.3 mile southwest of the power block. The perspective illustrates the foreground visibility and location of the project area. The yellow outlined shaded area in the perspective indicates the location of one of the 30-foot tall wind fences. The orange-outlined shaded area indicates the location of one of the development areas at a height of approximately 24 to 25 feet, which is the approximate height of many of the project features. The blue outline and shaded area indicates the location of the power block. The purple area indicates the location of the 150-foot tall air-cooled condenser. Color assignment in the perspective is not significant and was merely selected to achieve ease of understanding. This perspective was prepared because a visual simulation from this location was not available at the time this SA/DPA/DEIS was prepared. However, the visual simulation presented as **Visual Resources Figure 6C** was subsequently provided for a location on Brown Road approximately 1.1 miles further to the northwest, though that view is to the east-southeast and considerably more distant. This location is

approximately 1.4 miles west of the power block. As shown in the simulation, the proposed project would be prominently visible in the foreground to middleground of views from Brown Road.

Visual Contrast

High. The proposed project would add highly visible, structurally complex industrial features to the foreground to middleground landscape. The structures would exhibit considerable industrial character. Such characteristics are not found in the existing landscape. The reflection off the parabolic mirrors could also cause visual distraction and exacerbate the contrast associated with the project facilities. The resulting visual contrast caused by these characteristics would be High (see the Visual Analysis Summary Table presented as **VISUAL RESOURCES APPENDIX VR-1**).

Project Dominance

Co-dominant-to-Dominant. The proposed project would be prominently visible from Brown Road. Depending on the viewing location along the road, the project's apparent scale would be comparable to dominant relative to the existing valley floor and background hills and mountains. Overall project dominance would be co-dominant-to-dominant.

View Blockage

Moderate-to-high. From the vicinity of KOP 3, the wind fences, solar arrays, power block, air-cooled condenser and other project components (lower quality landscape features) would block from view substantial portions of the background Spangler Hills and Argus Range (higher quality landscape features). The resulting view blockage would be moderate-to-high.

Overall Visual Change

Moderate-to-high. From KOP 3, the values for visual contrast, project dominance, and view blockage, when taken together, constitute a moderate-to-high level of overall visual change.

Visual Impact Significance

Significant and unavoidable. When considered within the context of the overall moderate-to-high visual sensitivity of the existing landscape and viewing characteristics, the moderate-to-high visual change that would be perceived from KOP 3 would cause a significant and unavoidable visual impact.

Mitigation

Given the large scale of the impact area, no available mitigation measures were identified that would be adequate to mitigate the significant visual impacts to levels that would be less than significant. However, if the project is approved, Energy Commission staff recommends the following conditions of certification to minimize structure contrast and lighting and glare impacts to the extent possible: **VIS-1**, Surface Color Treatment of Structures; **VIS-2**, Revegetation of Disturbed Soil Areas; **VIS-3**, Temporary and Permanent Exterior Lighting; **VIS-4**, Reduction of Glint and Glare; and **VIS-5,** Project Design.

Residual Impact Significance After Mitigation

No measures were identified by Energy Commission staff to fully address impacts. Impacts would remain significant and unavoidable.

KOP 4 – Railroad Bed Bike Trail

Visual Resources Figure 7B presents a visual simulation of the proposed project to the northeast from KOP 4 on Railroad Bed Bike Trail, immediately adjacent and to the southwest of the south development area. The simulated view to the north-northeast captures a substantial portion of the south development area, the power block, the air-cooled condenser, transmission lines and a portion of the north development area and illustrates the foreground visibility of the project area.

Visual Contrast

High. As is apparent from the simulation, the expansive solar fields and associated facilities would substantially transform the existing landscape with the complex industrial character of the project sharply contrasting with the predominantly natural appearing features. The proposed project would add highly visible, structurally complex industrial features to the foreground to middleground of views from the Bike Trail. The structures would exhibit considerable industrial character and such characteristics are not found in the existing landscape. The reflection off the parabolic mirrors could also cause visual distraction and exacerbate the contrast associated with the project facilities. The resulting visual contrast caused by these characteristics would be High (see the Visual Analysis Summary Table presented as **VISUAL RESOURCES APPENDIX VR-1**).

Project Dominance

Co-dominant-to-Dominant. The proposed project would be prominently visible from the Bike Trail. Depending on the viewing location along the Trail, the project's apparent scale would be comparable to dominant relative to the existing valley floor and background hills and mountains. Overall project dominance would be co-dominant-to-dominant.

View Blockage

Moderate-to-high. From the vicinity of KOP 4, the wind fences, solar arrays, power block, air-cooled condenser, transmission lines and other project components (lower quality landscape features) would block from view substantial portions of the background Argus Range (higher quality landscape features). The resulting view blockage would be moderate-to-high.

Overall Visual Change

Moderate-to-high. From KOP 4, the values for visual contrast, project dominance, and view blockage, when taken together, constitutes a moderate-to-high level of overall visual change.

Visual Impact Significance

Significant and unavoidable. When considered within the context of the overall moderate-to-high visual sensitivity of the existing landscape and viewing characteristics, the moderate-to-high visual change that would be perceived from KOP 4 would cause a significant and unavoidable visual impact.

Mitigation

Given the large scale of the impact area, no available mitigation measures were identified that would be adequate to mitigate the significant visual impacts to levels that would be less than significant. However, if the project is approved, Energy Commission staff recommends the following conditions of certification to minimize structure contrast and lighting and glare impacts to the extent possible: **VIS-1**, Surface Color Treatment of Structures; **VIS-2**, Revegetation of Disturbed Soil Areas; **VIS-3**, Temporary and Permanent Exterior Lighting; **VIS-4**, Reduction of Glint and Glare; and **VIS-5,** Project Design.

Residual Impact Significance After Mitigation

No measures were identified by Energy Commission staff to fully address impacts. Impacts would remain significant and unavoidable.

KOP 5 – West Hilltop

Visual Resources Figure 8B presents a visual simulation of the proposed project from the elevated perspective of KOP 5 on the hilltop, immediately adjacent and to the west of the south development area. The simulated view to the east-northeast captures a majority of the north development area, the power block, air-cooled condenser, transmission lines and a portion of the south development area, and illustrates the foreground visibility of the project area.

Visual Contrast

High. As is apparent from the simulation, the expansive solar fields and associated facilities would substantially transform the existing landscape with the complex industrial character of the project sharply contrasting with the predominantly natural appearing features. Because of the elevated perspective, the entire facility would be visible from the hilltop and would add highly visible, structurally complex industrial features to the foreground to middleground of views from the hilltop. The structures would exhibit considerable industrial character and such characteristics are not found in the existing landscape. The reflection off the parabolic mirrors could also cause visual distraction and exacerbate the contrast associated with the project facilities. The resulting visual contrast caused by these characteristics would be High (see the Visual Analysis Summary Table presented as **VISUAL RESOURCES APPENDIX VR-1**).

Project Dominance

Co-dominant-to-dominant. The proposed project would appear highly prominent given the spatial prominence of the proposed facility within (a) the center of valley floor view and (b) the center of a primary field of view toward the Argus Range, Ridgecrest and Spangler Hills. The proposed project would appear comparable in prominence to the

broad, horizontal form of the valley floor, and dominant to the more distant horizontal to angular forms of the background hills and mountains. Overall project dominance would be co-dominant-to-dominant.

View Blockage

Moderate-to-high. From the hilltop (KOP 5), the project facilities (lower quality landscape features) would block from view a substantial portion of the southern Indian Wells Valley (higher quality landscape feature). The resulting view blockage would be moderate-to-high.

Overall Visual Change

Moderate-to-high. From KOP 5, the values for visual contrast, project dominance, and view blockage, when taken together, would constitute a moderate-to-high level of overall visual change.

Visual Impact Significance

Significant and unavoidable. When considered within the context of the overall moderate-to-high visual sensitivity of the existing landscape and viewing characteristics, the moderate-to-high visual change that would be perceived from KOP 5 would cause a significant and unavoidable visual impact.

Mitigation

Given the large scale of the impact area, no available mitigation measures were identified that would be adequate to mitigate the significant visual impacts to levels that would be less than significant. However, if the project is approved, Energy Commission staff recommends the following conditions of certification to minimize structure contrast and lighting and glare impacts to the extent possible: **VIS-1**, Surface Color Treatment of Structures; V**IS-2**, Revegetation of Disturbed Soil Areas; **VIS-3**, Temporary and Permanent Exterior Lighting; **VIS-4**, Reduction of Glint and Glare; and **VIS-5,** Project Design.

Residual Impact Significance After Mitigation

No measures were identified by Energy Commission staff to fully address impacts. Impacts would remain significant and unavoidable.

KOP 6 – El Paso Mountains Wilderness

Visual Resources Figure 9 presents a Google Earth perspective of the proposed project site and illustrates the visibility of the project area from the elevated perspectives available along the northern ridges of the El Paso Mountains Wilderness, a viewing distance of approximately 5.5 miles southwest of the power block. This perspective was prepared because an appropriate visual simulation was not available at the time this SA/DPA/DEIS was prepared. The yellow lines in the perspective indicate approximate locations for the 30-foot high wind fence. The orange lines indicate the approximate boundaries of the various development areas at a height of approximately 24 to 25 feet (a typical height of many of the project components). The blue area indicates the

location of the power block and the purple area indicates the location of the air-cooled condenser. As shown in the perspective, the project would be partially screened from view by intervening terrain.

Visual Contrast

Low-to-moderate. The proposed project would convert a noticeable portion of the existing, natural-appearing desert valley landscape to an industrial facility that would be characterized by geometric forms and complex to strong horizontal and vertical lines and industrial surfaces. Because of the elevated perspective, much of the facility would be visible including the wind fences, solar arrays, overflow and expansion vessels, steam turbine, warehouse and support facilities, air cooled condenser, water treatment facilities, chain-link fencing and transmission line, though at this viewing distance (approximately 5.5 miles) many structural details would not be discernible. However, not all of the facility would be visible because of the screening provided by intervening terrain. The introduced industrial characteristics are not found in the existing landscape. Furthermore, while there is the potential for this location to experience reflective glare/glint off the parabolic mirrors, which could cause visual distraction, the effect is not expected to substantially increase visual contrast. Therefore, visual contrast would remain low-to-moderate.

Project Dominance

Subordinate-to-co-dominant. The proposed project would appear quite noticeable given the spatial prominence of the proposed facility within the center of the view to the northeast toward the Argus Range. Although the extent of the development area is considerable, the site is partially screened by intervening terrain and at this viewing distance, the proposed project would appear subordinate to the broad, horizontal form of the valley floor and co-dominant relative to the rolling to angular forms of the background mountains. Overall project dominance would be subordinate.

View Blockage

Low-to-moderate. From the vicinity of KOP 6, the project facilities (lower quality landscape features) would block from view a noticeable portion of Indian Wells Valley floor (higher quality landscape feature). The resulting view blockage would be low-to-moderate.

Overall Visual Change

Low-to-moderate. From KOP 6, the values for visual contrast, project dominance, and view blockage, when taken together, would constitute a low-to-moderate level of overall visual change.

Visual Impact Significance

Adverse but less than significant. When considered within the context of the overall moderate-to-high visual sensitivity of the existing landscape and viewing characteristics, the low-to-moderate visual change that would be perceived from KOP 6 could cause an adverse but less than significant visual impact.

Mitigation

Given the large scale of the impact area, Energy Commission staff recommends the following conditions of certification to minimize structure contrast and lighting and glare impacts to the extent possible: **VIS-1**, Surface Color Treatment of Structures; **VIS-2**, Revegetation of Disturbed Soil Areas; **VIS-3**, Temporary and Permanent Exterior Lighting; **VIS-4**, Reduction of Glint and Glare; and **VIS-5,** Project Design.

Residual Impact Significance After Mitigation

Following mitigation, impacts would remain adverse but less than significant. However, it should also be noted that while KOP 6 is evaluating the visual impact of the proposed project on views from the El Paso Mountains (considered a sacred area by native Americans), it is also understood that there are several locations within the project footprint that have been traditionally used as staging areas for religious pilgrimages into the El Paso Mountains and an unobstructed view toward the mountains from the starting point of the pilgrimage is evidently of major importance. Clearly the adverse visual impact of the project on views from the pilgrimage starting points would be significant unless the starting points were situated south of any development area or facility component. Depending on the spiritual values associated with a particular starting point and the ability to relocate the starting point (if necessary), the visual impact may or may not be mitigable.

Project Closure and Decommissioning

After the end of the project's useful life, it would require decommissioning. However, no Draft or Decommissioning Plan has been prepared and even the complete removal of the facility would leave a very prominent visual impact over the entire site due to the strong color contrast created between graded, disturbed soil areas and undisturbed soil areas in the vicinity of the project site. In addition, revegetation of areas in this desert region are difficult and generally of limited success. Thus, visual recovery from land disturbance of closure and decommissioning would likely occur only over a very long period of time.

C.12.4.3 CEQA LEVEL OF SIGNIFICANCE

This analysis considered the potential impacts of the proposed project in relation to the four significance criteria for visual resource impacts listed in Appendix G of the CEQA Guidelines, under Aesthetics, specified below.

1. Would the project have a substantial adverse effect on a scenic vista?

Yes. Although no designated scenic vistas were identified in the study area, panoramic and highly scenic vistas are available to backcountry recreationists that access the hilltop immediately adjacent and to the west of the project site, the El Paso Mountains to the south, Scodie and Sierra Nevada Mountains to the west, Coso and Argus Ranges to the north, and the Spangler Hills to the east. While all of these areas overlook Indian Wells Valley and the project site, only the scenic vista views from the adjacent west hilltop would be substantially effected by the proposed project (see **Visual Resources Figure 8B**). The considerable viewing distances or intervening terrain would prevent the project from appearing prominent in views from the other locations. For example, as

shown in **Visual Resources Figure 9**, the project would be noticeably visible from the El Paso Mountains. But the viewing distance of approximately 5.5 miles and the presence of intervening terrain that would partially screen the project from certain views would limit the project's visual contrast and prominence. The resulting visual impact on the scenic vista views from the west hilltop would be adverse and significant.

2. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

No. Indian Wells Valley in the project area consists primarily of desert scrub vegetation with some desert wash woodlands. The project site is located adjacent to U.S. 395, which is not listed as an eligible State Scenic Highway in this area and there are no notable scenic features or historic structures located within the site. Therefore, the project would not substantially damage scenic resources such as trees, rock outcroppings, or historic buildings within a state scenic highway.

3. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

Yes. As discussed in a previous section of this analysis, the proposed project would introduce prominent structures with industrial character into the foreground to middleground views from U.S. 395, Brown Road, BLM recreational access roads, the Railroad Bed Bike Trail, and nearby residences in the vicinity of Brown Road. The resulting visual change would be moderate-to-high when viewed from five of the six KOPs, resulting in a substantial degradation of the existing visual character or quality of the site and its surroundings.

4. Would the project create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?

Yes. The project has the potential to create a new source of substantial light that would adversely affect nighttime views in the area. While not specifically identified, lighting plans for other similar projects (Blythe Solar Power Project and Palen Solar Power Project) call for security lighting in the power block and solar fields to operate approximately 3,600 hours per year during non-operating, non-sunlight hours, which is assumed would be the case for RSPP. However, Energy Commission staff believes that with effective implementation of Condition of Certification **VIS-3**, night lighting impacts could be mitigated to levels that would be less than significant for most off-site viewers. However, it is understood that stargazer groups from the China Lake Astronomical Society use the site at least once a month and have done so for at least 20 years. Clearly, nighttime plant lighting would adversely affect visibility of the night sky from the site and potential nearby sites, and the silhouettes of structures against the horizon would obstruct low horizon observations (the southern end of Indian Wells Valley is essentially shaped like a shallow bowl). This impact would be significant and unavoidable for any on-site or nearby stargazing locations.

Potentially. Daytime glare is also a major issue of concern for the proposed project, not only for aesthetic reasons, but also for safety reasons due to the proximity of U.S. 395, Brown Road, nearby residences, and nearby BLM recreational access roads. Potentially

affected receptors would include travelers and recreationists on the nearby roads and BLM recreational access roads and nearby residences. Any visible glare or reflected light would draw viewer's attention to the facility, even from more distant locations. As noted in the Applicant's response to comment DR-VIS-248, *"It is possible that the back reflected light or light not absorbed by both the envelope and steel annulus of the Heat Collecting Element (HCE) can be seen in the reflection of the parabolic mirror at certain angles above the horizon* [from an elevated perspective such as the adjacent Hilltop, El Paso Mountains or Spangler Hills]*."* Also, see **Visual Resources Attachments 1C, 4A and 4B** for examples of visible glint and reflected light at the existing Kramer Junction SEGS project.

An independent third-party analysis of glare potential has determined that, once the solar troughs are past moving into or out of stow position, they will reflect the sky and a portion of sunlight by diffuse refraction. Furthermore, at the time of moving into or out of stow position, the troughs have the potential to produce "bright spots," which are the product of spread reflection of the direct image of the sun. These bright spots can be characterized as "blurry" or "hazy" and will move as the observer changes position relative to the sun and mirror, with the result that the bright spot appears to "follow" the observer. Since the moving bright spot is several orders of brightness greater than the reflected sky and clouds on the mirrors, it may prove to be an especially annoying distraction.

C.12.5 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because (1) it eliminates about 42% of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources (desert tortoise and Mohave ground squirrel), cultural resources, and recreational uses, and (2) avoids constructing a solar facility in the Mohave Ground Squirrel Conservation Area (MGSCA). The Northern Unit Alternative would consist of 167 solar collector array loops with a net generating capacity of approximately 146 MW. The total disturbance area would be approximately 1134 acres of land. This alternative would retain 58% of the proposed solar array loops and would affect 58% of the land of the proposed 250 MW project. The boundaries of the Northern Unit Alternative are shown in **Alternatives Figure 1**.

C.12.5.1 SETTING AND EXISTING CONDITIONS

The Northern Unit Alternative is contained within the originally proposed ROW boundary north of Brown Road (north development area) though it extends the solar fields further to the north (along U.S. 395) and retracts the western boundary to stay east of the desert wash. Because the Northern Unit Alternative would still be located within the previously evaluated ROW boundary (which is more expansive then the originally proposed project development area boundaries), the setting and existing conditions descriptions would be the same as for the proposed project. The reader is referred to Section C.12.4.1 above for a complete discussion of the existing visual setting for the proposed project, which would also be the same for the Northern Unit Alternative.

C.12.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Although the solar field would extend further along U.S. 395 (see KOP 1), the slight increase in visual prominence would not affect the visual change determination or impact significance conclusions (significant and unavoidable). All other KOPs (2 through 6) would experience visual impacts similar to those of the proposed project and the visual change descriptions and impact significance conclusions would remain the same. The reader is referred to Section C.12.4.2 above for a complete discussion of the visual impacts that would be experienced at each KOP as a result of the proposed project, which would be the same or similar for the Northern Unit Alternative. In the case of KOP 2 (westbound Brown Road), the west-southwest view orientation illustrated in the Google Earth perspective provided as **Visual Resources Figure 5A** would not be applicable. However, the view could simply be oriented to the north and a similar visual impact would be experienced with the same impact characterization and significance conclusion. In the case of KOP 4 (Railroad Bed Bike Trail), the south unit would not be visible in the simulation shown in **Visual Resources Figure 7B** though the north unit would be visible. While the impact would be lessened, both the impact characterization and significance conclusion would remain the same as for the proposed project. The same would be true for KOPs 5 and 6.

Because the visual impacts resulting from this alternative would be essentially the same as those of the proposed project, the mitigation measures proposed and residual impacts remaining after mitigation would remain the same as for the proposed project. The reader is referred to the individual KOP discussions in Section C.12.4.2 above for a complete discussion of the mitigation measures (conditions of certification) that are recommended for the proposed project, which would also apply to the Northern Unit Alternative.

C.12.6 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would be a 104 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because it eliminates about 58% of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources, and cultural resources. The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of approximately 104 MW. The total disturbance area would be approximately 908 acres of land. This alternative would retain 42% of the proposed solar array loops and would affect 42% of the land of the proposed 250 MW project. The boundaries of the Southern Unit Alternative are shown in **Alternatives Figure 2**. This area was would avoid a large portion of the wash area and sensitive biological resources, including areas that were mapped as occupied tortoise and Mohave ground squirrel habitat (live tortoise and/or active burrows and sign).

C.12.6.1 SETTING AND EXISTING CONDITIONS

The Southern Unit Alternative is contained within the originally proposed ROW boundary south of Brown Road and is fairly close to the original boundaries of the south solar field. Because the Southern Unit Alternative would still be located within the

previously evaluated ROW boundary (which is more expansive then the originally proposed project development area boundaries), the setting and existing conditions descriptions would be the same as for the proposed project. The reader is referred to Section C.12.4.1 above for a complete discussion of the existing visual setting for the proposed project, which would also be the same for the Southern Unit Alternative.

C.12.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Southern Unit Alternative would eliminate the north solar field, which would reduce the visual impact on U.S. 395 and residences located north of Brown Road. However, the elimination of the north solar field would not affect the visual change determination or impact significance conclusions (significant and unavoidable) for the various KOPs given that the south solar field would still be visible as would the power block and air-cooled condenser north of Brown Road, along with the transmission line. In the case of KOP 3 (eastbound Brown Road), the east-northeast view orientation illustrated in the Google Earth perspective provided as **Visual Resources Figure 6A** would still capture the power block and air-cooled condenser though the north solar field would not be visible. However, the view could simply be oriented to the south and a visual impact similar to that of the proposed project would be experienced with the same impact characterization and significance conclusion. In the case of KOP 6 (El Paso Mountains Wilderness), the north unit would not be visible in the perspective provided as **Visual Resources Figure 9**. Only a small portion of the south solar field, power block, and air-cooled condenser would be visible, which would substantially reduce the visual impact on KOP 6 and the El Paso Mountains. However, the impact characterization and significance conclusion (adverse but less than significant) would be the same as for the proposed project. All other KOPs would experience visual impacts similar to or the same as those of the proposed project and the visual change descriptions and impact significance conclusions would remain the same. The reader is referred to Section C.12.4.2 above for a complete discussion of the visual impacts that would be experienced at each KOP as a result of the proposed project, which again, would be the same or similar for the Southern Unit Alternative except as clarified above.

Because the visual impacts resulting from this alternative would be essentially the same as those of the proposed project, the mitigation measures proposed and residual impacts remaining after mitigation would be the same as for the proposed project. The reader is referred to the individual KOP discussions in Section C.12.4.2 above for a complete discussion of the mitigation measures (conditions of certification) that are recommended for the proposed project, which would also apply to the Southern Unit Alternative.

C.12.7 NO PROJECT / NO ACTION ALTERNATIVE

C.12.7.1 NO PROJECT/NO ACTION ALTERNATIVE #1: NO ACTION ON RIDGECREST SOLAR POWER PROJECT APPLICATION AND ON CDCA LAND USE PLAN AMENDMENT

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA

Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the views of the site are not expected to change noticeably from existing conditions under this alternative and, therefore, this No Project/No Action Alternative would not result in adverse visual, light, and glare impacts at this location. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations

C.12.7.2 NO PROJECT/NO ACTION ALTERNATIVE #2: NO ACTION ON RIDGECREST SOLAR POWER PROJECT AND AMEND THE CDCA LAND USE PLAN TO MAKE THE AREA AVAILABLE FOR FUTURE SOLAR DEVELOPMENT

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site will be developed with another solar technology. As a result, it is possible that views of the site could change substantially based on the required buildings and structures on the site for the different solar technologies. Different solar technologies would create different visual effects based on the technology components. It is expected that the views of the site could change substantially with a different solar technology, similar to the changes in views under the proposed project. Therefore, this No Project/No Action Alternative could result in adverse visual, light, and glare impacts similar to the impacts under the proposed project.

C.12.7.3 NO PROJECT/NO ACTION ALTERNATIVE #3: NO ACTION ON RIDGECREST SOLAR POWER PROJECT APPLICATION AND AMEND THE CDCA LAND USE PLAN TO MAKE THE AREA UNAVAILABLE FOR FUTURE SOLAR DEVELOPMENT

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended so no solar projects can be approved for the site under this alternative, it is expected that the site would continue to remain in its

existing condition, with no new structures or facilities constructed or operated on the site. As a result, the views of the site are not expected to change noticeably from existing conditions under this alternative and, therefore, this No Project/No Action Alternative would not result in adverse visual, light, and glare impacts. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.12.8 COMPARISON OF ALTERNATIVES AND PROPOSED PROJECT

Visual Table 2
Comparison of Proposed Project and Alternatives

	Proposed Project (250 MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250 MW)	No Project/No Action*
	The project would substantially degrade the existing visual character or quality of the site and its surroundings as a result of the addition of noticeable geometric and structurally complex forms with horizontal to vertical to curvilinear lines and complex industrial character.	The project would substantially degrade the existing visual character or quality of the site and its surroundings as a result of the addition of noticeable geometric and structurally complex forms with horizontal to vertical to curvilinear lines and complex industrial character.	Slightly reduced impact on U.S. 395 and El Paso Mountains Wilderness.	The project would substantially degrade the existing visual character or quality of the site and its surroundings as a result of the addition of noticeable geometric and structurally complex forms with horizontal to vertical to curvilinear lines and complex industrial character.	#'s 1 and 2 The project would substantially degrade the existing visual character or quality of the site and its surroundings as a result of the addition of noticeable geometric and structurally complex forms with horizontal to vertical to curvilinear lines and complex industrial character. #3 No visual impact.
	The project would create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area.	The project would create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area.	Slightly reduced impact on U.S. 395 and El Paso Mountains Wilderness.	The project would create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area.	#'s 1 and 2 The project would create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area. #3 No impact.
Ranking	**4**	**3**	**2**	**4**	**1** - #3 **4** - #'s 1 and 2

*All No Project/No Action alternatives assume that the RSPP project would not be built on the proposed site

C.12.9 CUMULATIVE IMPACTS

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (California Code Regulation, Title 14, section 15130). This concept is very similar to that of NEPA, which states that cumulative effects can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR §1508.7).

Cumulative impacts to visual resources would occur where project facilities occupy the same field of view as other built facilities or impacted landscapes, and an adverse change in the visible landscape character is perceived. In some cases, a cumulative impact could also occur if a viewer perceives that the general visual quality or landscape character of a localized area (Indian Wells Valley or U.S. 395 corridor) or larger region (California Desert District) is diminished by the proliferation of visible structures or construction effects, even if the changes are not within the same field of view as existing (or future) structures or facilities. The result is a perceived "industrialization" of the existing landscape character.

There is the potential for substantial future development in the Ridgecrest area and throughout the California Desert District. As shown on **Cumulative Impacts Figures 1** and 2 and Cumulative Impacts Tables 1A and 1B, solar and wind applications for use of BLM, State and private land, cover approximately 1 million acres of the California Desert Conservation Area. Analysis of cumulative impacts is based in part on data provided in the Cumulative Impacts section and includes:

- **Cumulative Impacts Figure 1**, Regional Renewable Applications
- **Cumulative Impacts Figure 2**, Renewable Energy Applications in the Ridgecrest District Area
- **Cumulative Impacts Figure 3**, Existing and Future/Foreseeable Projects in the Ridgecrest Area
- **Cumulative Analysis Table 1A**, Renewable Energy Projects in the California Desert District
- **Cumulative Analysis Table 1B**, Renewable Energy Projects on State and Private Lands in the California Desert District
- **Cumulative Analysis Table 2**, Existing Projects in the Ridgecrest Area
- **Cumulative Scenario Table 3**, Future Foreseeable Projects in the Ridgecrest Area

The analysis in this section first defines the geographic area over which cumulative impacts to visual resources could occur. The cumulative impact analysis then describes the potential for cumulative impacts to occur as a result of implementation of the proposed project along with the listed local and regional projects.

C.12.9.1 GEOGRAPHIC EXTENT

Cumulative impacts could occur if implementation of the Ridgecrest Solar Power Project (RSPP) would combine with those of other local or regional projects. RSPP is potentially associated with two types of cumulative impact:

1. Cumulative impacts within the immediate project viewshed (local projects within fifteen miles of RSPP), essentially comprising existing and foreseeable future projects in Indian Wells Valley and along the nearby stretches of U.S. 395; and

2. Cumulative impacts of existing and foreseeable future solar, renewable and other energy and development projects within Indian Wells Valley and the Ridgecrest area (beyond the local viewshed), other broad basin of the project's affected landscape type, or the California Desert District as a whole (regional projects).

The following discussion of cumulative impacts will address the RSPP's contribution to cumulative impacts within the context of the existing cumulative conditions and within the context of future foreseeable projects.

C.12.9.2 EFFECTS OF PAST AND PRESENT PROJECTS

There has been limited development and/or industrialization of the project landscape within the RSPP viewshed (extending out 15 miles). One existing project – the China Lake Naval Weapons Center, falls within the viewshed of RSPP though it is located on the north side of the City of Ridgecrest, which would substantially separate the two viewsheds (see **Cumulative Impacts Table 2** and **Cumulative Impacts Figure 3**). The Naval Weapons Center is a military industrial complex covering approximately 1.1 million acres of land to the north of the City of Ridgecrest, approximately 10 miles northeast of the project site. Elements of the Weapons Center possess industrial character (complex forms or lines) similar to that of an energy facility such as RSPP though much of the Weapons Center is enclosed within the geometric forms of buildings. Also, the close proximity of the Weapons Center to Ridgecrest, contributes to the appearance of the Weapons Center almost as an industrial district of the City. Thus, while RSPP could cause cumulatively significant effects when considered in the context of the Weapons Center, most travelers in the area would not associate the two projects as sufficiently similar to constitute a cumulative impact either within the same field of view or as contributory to the proliferation of energy or industrial facilities within the CDCA. Therefore, RSPP is not expected to cause a cumulatively significant effect within the context of existing cumulative conditions established by the China Lake Naval Weapons Center.

C.12.9.3 EFFECTS OF REASONABLY FORESEEABLE FUTURE PROJECTS

The cumulative contribution of RSPP must also be considered within the context of future foreseeable projects, including future projects within the project area and future projects within the larger contexts of California Desert as a whole.

Foreseeable Projects in the Project Area.

Cumulative Impacts Table 3 and **Cumulative Impacts Figure 3** list 9 future and foreseeable projects that would be located within RSPP's viewshed of 15 miles including:

- China Lake Naval Weapons Air Center Base Realignment and Closure
- Super Wal-Mart in Ridgecrest, CA
- Freeman Gulch Four-Lane Project
- Inyokern Four-Lane Project
- City of Ridgecrest New Waste Water Treatment Plant
- Solar Project – CACA 49511
- Wind Project – CACA 050020
- Wind Project – CACA 048948
- Wind Project – CACA 050319

The base realignment, commercial and road projects (first four projects in the list above) would not share similar visual characteristics with RSPP. The last five projects in the list above would share similar visual characteristics with RSPP and would contribute to the conversion of natural desert landscapes to landscapes with prominent industrial character (complex industrial forms and lines and surface textures and colors not found in natural desert landscapes). Therefore, there would be a significant cumulative impact to visual resources from the combination of RSPP and the last five foreseeable projects listed above, both individually (each project plus RSPP) and collectively (all five projects plus RSPP).

Foreseeable Renewable Projects in the California Desert.

In a regional context, **Cumulative Impacts Tables 1A and 1B** and **Cumulative Impacts Figures 1 and 2** identify 96 renewable energy projects scattered throughout the California Desert Conservation Area. The number of projects shown in Figure 1 is so great that there will not be a single major travel corridor through the Southern California Desert that will not experience at least some visible "industrialization" due to the presence of nearby energy projects. As a result, travelers will encounter numerous industrial landscapes en-route to regionally and nationally significant desert destinations such as Anza-Borrego Desert State Park, the Salton Sea, Joshua Tree National Park, Mojave National Preserve, Death Valley National Park, and the Colorado River. Therefore, as a result of this collective industrialization of the Conservation Area landscapes, RSPP would contribute a significant cumulative visual impact to visual resources in combination with foreseeable renewable projects in the California desert.

C.12.9.4 OVERALL CUMULATIVE IMPACT CONCLUSION

The RSPP would not result in a significant cumulative visual impact in the context of existing cumulative conditions. However, RSPP's contribution to the visible industrialization of the desert landscape would constitute a significant visual impact when considered with existing and future foreseeable projects, both within the

immediate project viewshed (extending 15 miles from the project site) and in a broader context that encompasses the whole of the California Desert Conservation Area.

C.12.10 COMPLIANCE WITH LORS

The proposed project would be subject to the laws, ordinances, regulations, and standards (LORS) of the U.S. Government (Bureau of Land Management – BLM) and State of California. Compliance with these LORS is summarized in the following paragraphs and presented in more detail in Table C.12-3.

C.12.10.1 COMPLIANCE WITH FEDERAL LORS

The project was found to be in compliance with the impact disclosure requirements of the California Desert Conservation Area (CDCA) Plan (through the visual impact analysis presented here).

C.12.10.2 COMPLIANCE WITH STATE LORS

The proposed project was found to be in compliance with the State Scenic Highway Program as pertains to compliance with scenic highway management objectives (the adjacent U.S. 395 is neither an eligible or designated scenic highway under the state program).

C.12.10.3 COMPLIANCE WITH LOCAL LORS

With the exception of a portion of the underground water supply pipeline (which would not be visible above ground), the project would be located entirely on public lands administered by the U.S. Bureau of Land Management, which is outside the jurisdiction of Kern County. However, a review of the County LORS was conducted but no County LORS pertaining to the protection or management of visual resources was identified as applicable to the proposed project. It should be noted that the County has recommended a condition of certification requiring the landscaping of a minimum of 5% of the developed area with xeriscape or drought tolerant plantings and the continuous maintenance of such in good condition, in accordance with the requirements of Chapter 19.86 of the Zoning Ordinance. Although the Energy Commission does give consideration to local LORS, a condition of certification pertaining to landscaping was not required in the Visual Resources SA/DPA/DEIS because such landscaping would impart essentially no mitigating effect on the significant visual impact that would result from a project the scale of RSPP. Furthermore, it would be somewhat impractical to implement such a measure given the large area, remote location and arid conditions of the site, and maintenance of the landscaping in good condition would be extremely difficult to achieve. Since such a measure would have no mitigating benefit (for visual impacts), the request for landscaping is considered more appropriately addressed in the Land Use section.

Visual Resources Table C.12-3
Laws, Ordinances, Regulations and Standards

Applicable LORS	Description	Consistency (assumes implementation of Energy Commission staff-recommended Conditions of Certification)
Federal		
California Desert Conservation Area (CDCA) Plan	RSPP is located within the California Desert Conservation Area Plan, which is the BLM Resource Management Plan applicable to the project site (USDOI, 1980, as amended). BLM manages the project site pursuant to the CDCA Plan, as amended by the West Mojave (WEMO) Plan in 2006. The CDCA and WEMO Plans organize BLM-managed lands into one of four multiple-use classes (MUCs). The RSPP site is located on lands classified as MUC L (Limited Use) and non-classified lands. MUC L protects sensitive, natural, scenic, ecological, and cultural resource values. Lands within the WEMO planning area that are designated as MUC L are "…managed to provide for generally lower-intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished." For MUC L lands, wind and solar electric generation facilities may be allowed after NEPA requirements are met. Although the CDCA Plan did not include Visual Resource Management (VRM) inventory or management classes, the Recreation Element of the Plan specifies that VRM objectives and the Contrast Rating procedure be used to manage visual resources.	**Consistent**. Solar electrical generation plants are specifically allowed for under the Multiple Use Class (MUC) L Guidelines if NEPA requirements are met.
State		
State Scenic Highway Program	The California State Department of Transportation (Caltrans) identifies a state system of eligible and designated scenic highways, which, if designated, are subject to various controls, intended to preserve their scenic quality (Ca. Streets and Highways Code, Sections 260 through 263). U.S. 395 within the project viewshed is not listed as an eligible State Scenic Highway.	**Consistent**. U.S. 395 within the project viewshed is not an eligible or designated State scenic highway.

Applicable LORS	Description	Consistency (assumes implementation of Energy Commission staff-recommended Conditions of Certification)
Local		
None identified. It should be noted that with the exception of a portion of the underground water supply pipeline (which would have no above-ground visual impacts) the project site is located entirely on public lands administered by the U.S. Bureau of Land Management .		

C.12.11 NOTEWORTHY PUBLIC BENEFITS

No noteworthy public benefits in the area of visual resources were identified.

C.12.12 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

The Energy Commission staff recommends the following conditions of certification:

SURFACE TREATMENT OF PROJECT STRUCTURES AND BUILDINGS

VIS-1 The project owner shall treat the surfaces of all project structures and buildings visible to the public such that a) their colors minimize visual intrusion and contrast by blending with the existing tan and brown color of the surrounding landscape; b) their colors and finishes do not create excessive glare; and c) their colors and finishes are consistent with local policies and ordinances. The transmission line conductors shall be non-specular and non-reflective, and the insulators shall be non-reflective and non-refractive.

Following in-field consultation with the CEC/BLM Visual Resources specialist and other representatives as deemed necessary, the project owner shall submit for Compliance Project Manager (CPM) review and approval, a specific Surface Treatment Plan that will satisfy these requirements. The treatment plan shall include:

A. A description of the overall rationale for the proposed surface treatment, including the selection of the proposed color(s) and finishes based on the BLM Environmental Color Chart or other appropriate source;

B. A list of each major project structure, building, tank, pipe, and wall; the transmission line towers and/or poles; and fencing, specifying the color(s) and finish proposed for each. Colors must be identified by vendor, name, and number; or according to a universal designation system;

C. One set of color brochures or color chips showing each proposed color and finish;

D. A specific schedule for completion of the treatment; and

E. A procedure to ensure proper treatment maintenance for the life of the project.

The project owner shall not specify to the vendors the treatment of any buildings or structures treated during manufacture, or perform the final treatment on any buildings or structures treated in the field, until the project owner receives notification of approval of the treatment plan by BLM's Authorized Officer and the CPM. Subsequent modifications to the treatment plan are prohibited without BLM's Authorized Officer and CPM approval.

Verification: At least 90 days prior to specifying to the vendor the colors and finishes of the first structures or buildings that are surface treated during manufacture, the project owner shall submit the proposed treatment plan to BLM's Authorized Officer and the CPM for review and approval and simultaneously to Riverside County for review and comment. If BLM's Authorized Officer and the CPM determine that the plan requires revision, the project owner shall provide to BLM's Authorized Officer and the CPM a plan with the specified revision(s) for review and approval by BLM's Authorized Officer and the CPM before any treatment is applied. Any modifications to the treatment plan must be submitted to BLM's Authorized Officer and the CPM for review and approval.

Prior to the start of commercial operation, the project owner shall notify BLM's Authorized Officer and the CPM that surface treatment of all listed structures and buildings has been completed and they are ready for inspection and shall submit to each one set of electronic color photographs from the same key observation points identified in (d) above. The project owner shall provide a status report regarding surface treatment maintenance in the Annual Compliance Report. The report shall specify a): the condition of the surfaces of all structures and buildings at the end of the reporting year; b) maintenance activities that occurred during the reporting year; and c) the schedule of maintenance activities for the next year.

REVEGETATION OF DISTURBED SOIL AREAS

VIS-2 The project owner shall revegetate disturbed soil areas to the greatest practical extent, as described in Condition of Certification **BIO-7**. In order to address specifically visual concerns, the required Closure, Revegetation and Rehabilitation Plan shall include reclamation of the area of disturbed soils used for laydown, project construction, and siting of the substation and other ancillary operation and support structures.

Verification: Refer to Condition of Certification **BIO-19**.

TEMPORARY AND PERMANENT EXTERIOR LIGHTING

VIS-3 To the extent feasible, consistent with safety and security considerations, the project owner shall design and install all permanent exterior lighting and all temporary construction lighting such that a) lamps and reflectors are not visible from beyond the project site, including any off-site security buffer areas; b) lighting does not cause excessive reflected glare; c) direct lighting does not illuminate the nighttime sky, except for required FAA aircraft safety lighting (which should be an on-demand, audio-visual warning system that is triggered by radar technology); d) illumination of the project and its immediate vicinity is minimized, and e) the plan complies with local policies and ordinances. The project owner shall submit to BLM's Authorized Officer and the CPM for review and approval and simultaneously to the County of Kern for review and comment a lighting mitigation plan that includes the following:

A. Location and direction of light fixtures shall take the lighting mitigation requirements into account;

B. Lighting design shall consider setbacks of project features from the site boundary to aid in satisfying the lighting mitigation requirements;

C. Lighting shall incorporate fixture hoods/shielding, with light directed downward or toward the area to be illuminated;

D. Light fixtures that are visible from beyond the project boundary shall have cutoff angles that are sufficient to prevent lamps and reflectors from being visible beyond the project boundary, except where necessary for security;

E. All lighting shall be of minimum necessary brightness consistent with operational safety and security; and

F. Lights in high illumination areas not occupied on a continuous basis (such as maintenance platforms) shall have (in addition to hoods) switches, timer switches, or motion detectors so that the lights operate only when the area is occupied.

Verification: At least 90 days prior to ordering any permanent exterior lighting or temporary construction lighting, the project owner shall contact BLM's Authorized Officer and the CPM to discuss the documentation required in the lighting mitigation plan. At least 60 days prior to ordering any permanent exterior lighting, the project owner shall submit to BLM's Authorized Officer and the CPM for review and approval and simultaneously to the County of Kern for review and comment a lighting mitigation plan. If BLM's Authorized Officer and the CPM determine that the plan requires revision, the project owner shall provide to BLM's Authorized Officer and the CPM a revised plan for review and approval by BLM's Authorized Officer and the CPM.

The project owner shall not order any exterior lighting until receiving BLM Authorized Officer and CPM approval of the lighting mitigation plan.

Prior to commercial operation, the project owner shall notify BLM's Authorized Officer and the CPM that the lighting has been completed and is ready for inspection. If after

inspection, BLM's Authorized Officer and the CPM notify the project owner that modifications to the lighting are needed, within 30 days of receiving that notification the project owner shall implement the modifications and notify BLM's Authorized Officer and the CPM that the modifications have been completed and are ready for inspection.

Within 48 hours of receiving a lighting complaint, the project owner shall provide BLM's Authorized Officer and the CPM with a complaint resolution form report as specified in the Compliance General Conditions including a proposal to resolve the complaint, and a schedule for implementation. The project owner shall notify BLM's Authorized Officer and the CPM within 48 hours after completing implementation of the proposal. A copy of the complaint resolution form report shall be submitted to BLM's Authorized Officer and the CPM within 30 days.

REDUCTION OF GLINT AND GLARE

VIS-4 The project owner shall install slatted fencing along the perimeters of the solar fields (development areas) such that intrusive glare and bright spots (which are the product of spread reflection of the direct image of the sun on the parabolic mirrors) are substantially screened from the views of motorists on U.S. 395 and Brown Road, travelers on nearby BLM recreational access roads and nearby residents. The project owner shall submit to BLM's Authorized Officer and the CPM for review and approval and simultaneously to the County of Kern for review and comment a glare mitigation plan that describes how the slatted fence (and wind fence) design will reduce both the potential for retinal damage and potentially intrusive and distracting brightness.

Verification: At least 90 days prior to ordering any permanent fencing materials, the project owner shall contact BLM's Authorized Officer and the CPM to discuss the documentation required in the glare mitigation plan. At least 60 days prior to ordering any permanent fencing materials, the project owner shall submit to BLM's Authorized Officer and the CPM for review and approval and simultaneously to the County of Kern for review and comment a glare mitigation plan. If BLM's Authorized Officer and the CPM determine that the plan requires revision, the project owner shall provide to BLM's Authorized Officer and the CPM a revised plan for review and approval by BLM's Authorized Officer and the CPM.

The project owner shall not order any fencing materials until receiving BLM Authorized Officer and CPM approval of the glare mitigation plan.

Prior to commercial operation, the project owner shall notify BLM's Authorized Officer and the CPM that the fencing has been completed and is ready for inspection. If after inspection, BLM's Authorized Officer and the CPM notify the project owner that modifications to the fencing are needed, within 30 days of receiving that notification the project owner shall implement the modifications and notify BLM's Authorized Officer and the CPM that the modifications have been completed and are ready for inspection.

Within 48 hours of receiving a glare complaint, the project owner shall provide BLM's Authorized Officer and the CPM with a complaint resolution form report as specified in the Compliance General Conditions including a proposal to resolve the complaint, and a

schedule for implementation. The project owner shall notify BLM's Authorized Officer and the CPM within 48 hours after completing implementation of the proposal. A copy of the complaint resolution form report shall be submitted to BLM's Authorized Officer and the CPM within 30 days.

C.12.13 Conclusions

Energy Commission staff concludes that the proposed project would result in a substantial adverse impact to existing scenic resource values as seen from several viewing areas and Key Observation Points in the project vicinity including:

- U.S. 395 in the vicinity of, and on approach to, the project area;
- Brown Road in the vicinity of, and on approach to, the project area;
- Various BLM recreational access roads in the vicinity of the project area;
- Nearby residences;
- The Railroad Bed Bike Trail in the vicinity of the project area; and
- The elevated hill immediately west of the south development area.

Energy Commission staff concludes that these visual impacts would be significant in terms of three of the four criteria of CEQA Appendix G, (the project would have a substantial adverse effect on scenic vistas, the project would substantially degrade the existing visual character or quality of the site and its surroundings, and the project would create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area). Also, Energy Commission staff concludes that these visual impacts would be significant in terms of the context and intensity of the effects in general. Specifically, the context of the project is one of a broad open desert valley with panoramic vista views of the surrounding rugged mountain ranges and designated wilderness areas including the El Paso Mountains (and Wilderness) to the south, Scodie and Sierra Nevada Mountains to the west, Coso and Argus Ranges to the north, and the Spangler Hills to the east. The panoramic vista views are largely unobstructed and encompass wide-open desert spaces. The proposed project would introduce a densely developed and geographically extensive industrial feature into a landscape presently absent similar features. Also of concern is the potential for discomfort or disability glare from the solar reflectors; and the cumulative visual effects of renewable projects along the U.S. 395 corridor and within Indian Wells Valley and the CDCA as a whole.

Energy Commission staff has concluded that the potentially significant visual impacts at the locations cited above could not be mitigated to less than significant levels and would thus, result in significant and unavoidable impacts under CEQA.

Energy Commission staff also concludes that the proposed project would likely result in adverse but less than significant visual impacts on views from the northern ridges of the El Paso Mountains though the extent to which glare and/or glint from project structures is visible from the El Paso Mountains could ultimately determine the significance of the visual impact experienced at that location.

Because the project has the potential to result in exposure of travelers on U.S. 395, Brown Road and local four-wheel drive (4WD) roads, as well as hikers to solar radiation

and glare reflected from project facilities, **VISUAL RESOURCES** Condition of Certification **VIS-4** are recommended to ensure that potential glare from the project is minimized to the maximum extent possible and does not pose a health and safety risk. Energy Commission staff, however, concludes that with these measures, remaining glare may represent a hazard and could represent a visually prominent feature as seen from the viewing areas identified above. Remaining glare could alter the character of views within this portion of Indian Wells Valley and from the surrounding mountains and wilderness areas, affecting the public's ability to enjoy those views, though not preventing them.

Also, Energy Commission staff concludes that there are no Kern County General Plan goals, policies, or implementation measures pertaining to visual resources that would apply to the proposed project.

Finally, Energy Commission staff concludes that the project in combination with foreseeable future projects (both local and region-wide) would cause significant unavoidable cumulative visual impacts of two kinds:

1. Cumulative impacts in combination with foreseeable future solar, renewable, and other energy and development projects within the immediate project viewshed would be visible within the same field of view; and

2. Cumulative impacts in combination with foreseeable future solar and other renewable energy projects would contribute to a perceived sense of industrialization of the open, undeveloped desert landscape along within the California Desert Conservation Area overall.

As stated, Energy Commission staff concludes that the project would have significant unavoidable adverse impacts in both a direct and cumulative context. However, if the Energy Commission approves the project, Energy Commission staff recommends that all of staff 's proposed conditions of certification be adopted in order to minimize impacts to the greatest feasible extent. Conditions of certification referred to herein serve the purpose of both the Energy Commission's conditions of certification for purposes of CEQA and BLM's Mitigation Measures for purposes of NEPA.

The visual impacts of the proposed project alternatives, "Northern Unit Alternative" and "Southern Unit Alternative", would be similar to those of the proposed project, though the Southern Unit Alternative would result in a slightly reduced impact on U.S. 395and El Paso Mountains Wilderness. Therefore, the proposed project's impact significance conclusions and conditions of certification would also apply to the proposed project alternatives.

C.12.14 REFERENCES

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VISUAL RESOURCES APPENDIX VR-1
SUMMARY OF ANALYSIS

APPENDIX VR – 1
RIDGECREST SOLAR POWER PROJECT SA/DPA/DEIS - SUMMARY OF VISUAL RESOURCES ANALYSIS

VIEWPOINT		EXISTING VISUAL SETTING							VISUAL CHANGE					IMPACT SIGNIFICANCE	
Key Observation Point (KOP)	Description	Visual Quality	Viewer Concern	Viewer Exposure				Overall Visual Sensitivity	Description of Visual Change	Visual Contrast	Project Dominance	View Blockage	Overall Visual Change	Mitigation / Conditions	Impact Significance with Mitigation
				Visibility	Number of Viewers	Duration of View	Overall Viewer Exposure								
KOP 1 **U.S. 395** **Figure 4A** **(see also) Figures 4B/C**	View to the south from southbound U.S. 395, at the northeast corner of the north development area.	**Low to Moderate** The foreground to middleground views from U.S. 395 encompass a broad, open and predominantly undeveloped landscape consisting of a relatively non-descript, flat valley floor with shrubby vegetation of pale greens and tans, low-growing grasses and light-colored soils, backdropped by the rolling to angular forms of the El Paso Mountains to the south. The mountain range adds visual interest and contributes to the low-to-moderate rating for visual quality.	**High** As the landscapes along the U.S. 395 corridor become more and more industrialized with the addition of built features with industrial character, opportunities for expansive views of natural appearing high desert landscapes, such as those visible from KOP 1, are diminishing. Travelers on U.S. 395 (the primary north-south travel corridor east of the Sierra Nevada Mountains) would have expectations of observing higher quality landscape features while traveling through the northern high deserts within the designated conservation area (CDCA). Travelers would be highly sensitive to the introduction of industrial character to this predominantly naturally appearing landscape, particularly when such facilities would impair panoramic views of the mountains framing the southern Indian Wells Valley.	**High**	**Low**	**Extended**	**High**	**Moderate to High**	Addition of noticeable geometric and structurally complex forms with horizontal to vertical to curvilinear lines and complex industrial character. Facilities would be prominently visible at this foreground to middleground viewing distance.	**High**	**Co-Dominant to Dominant**	**Moderate to High**	**Moderate to High**	**Energy Commission Staff's Conditions:** **VIS-1** **VIS-2** **VIS-3** **VIS-4** **VIS-5**	**Significant and Unavoidable)**
KOP 2 **WESTBOUND BROWN ROAD** **Figure 5A** **(see also) Figures 5B/C**	View to the west-southwest from westbound Brown Road, in the central project area, approximately 0.1 mile northeast of the south development area.	**Low to Moderate** The foreground views from Brown Road encompass a broad, open and predominantly undeveloped landscape consisting of a relatively non-descript, flat valley floor with shrubby vegetation of pale greens and tans, low-growing grasses and light-colored soils, backdropped by the rolling to angular forms of the hill west of the project site and the El Paso Mountains to the south. Also visible are two transmission lines that pass along the western edge of the south development area. The hill and mountain range adds visual interest and contributes to the low-to-moderate rating for visual quality.	**High** As the landscapes within Indian Wells Valley and along Brown Road (and the I-10 corridor) become more developed, opportunities for expansive, panoramic views of intact and natural appearing high desert landscapes are diminishing. Thus, travelers within the valley and off-road recreationists seeking unspoiled landscapes would be highly sensitive to the introduction of industrial character to this predominantly naturally appearing valley landscape, and would perceive such as an adverse visual change, particularly when such facilities would impair panoramic views of the mountains framing the southern Indian Wells Valley.	**High**	**Low to Moderate**	**Extended**	**Moderate to High**	**Moderate to High**	Addition of noticeable geometric and structurally complex forms with horizontal to vertical to curvilinear lines and complex industrial character. Facilities would be prominently visible at this foreground to middleground viewing distance.	**High**	**Co-Dominant to Dominant**	**Moderate to High**	**Moderate to High**	**Energy Commission Staff's Conditions:** **VIS-1** **VIS-2** **VIS-3** **VIS-4** **VIS-5**	**Significant and Unavoidable)**
KOP 3 **EASTBOUND BROWN ROAD** **Figure 6A** **(see also) Figures 6B/C**	View to the east-northeast from eastbound Brown Road, in the central project area, approximately 0.3 mile southwest of the power block.	**Low to Moderate** The foreground views from Brown Road encompass a broad, open and predominantly undeveloped landscape consisting of a relatively non-descript, flat valley floor with shrubby vegetation of pale greens and tans, low-growing grasses and light-colored soils, backdropped by the rolling to angular forms of the Spangler Hills to the east and the Argus Range to the north, both of which add visual interest and contribute to the low-to-moderate rating for visual quality.	**High** As the landscapes within Indian Wells Valley and along Brown Road (and the I-10 corridor) become more developed, opportunities for expansive, panoramic views of intact and natural appearing high desert landscapes are diminishing. Thus, travelers within the valley and off-road recreationists seeking unspoiled landscapes would be highly sensitive to the introduction of industrial character to this predominantly naturally appearing valley landscape, and would perceive such as an adverse visual change, particularly when such facilities would impair panoramic views of the mountains framing the southern Indian Wells Valley.	**High**	**Low to Moderate**	**Extended**	**Moderate to High**	**Moderate to High**	Addition of noticeable geometric and structurally complex forms with horizontal to vertical to curvilinear lines and complex industrial character. Facilities would be prominently visible at this foreground to middleground viewing distance.	**High**	**Co-Dominant to Dominant**	**Moderate to High**	**Moderate to High**	**Energy Commission Staff's Conditions:** **VIS-1** **VIS-2** **VIS-3** **VIS-4** **VIS-5**	**Significant and Unavoidable)**

APPENDIX VR – 1
RIDGECREST SOLAR POWER PROJECT SA/DPA/DEIS - SUMMARY OF VISUAL RESOURCES ANALYSIS

VIEWPOINT		EXISTING VISUAL SETTING							VISUAL CHANGE					IMPACT SIGNIFICANCE	
Key Observation Point (KOP)	Description	Visual Quality	Viewer Concern	Viewer Exposure				Overall Visual Sensitivity	Description of Visual Change	Visual Contrast	Project Dominance	View Blockage	Overall Visual Change	Mitigation / Conditions	Impact Significance with Mitigation
				Visibility	Number of Viewers	Duration of View	Overall Viewer Exposure								
KOP 4 **RAILROAD BED BIKE TRAIL** **Figures 7A / 7B**	View to the north-northeast from the Railroad Bed Bike Trail, approximately 0.25 mile west of the south development area.	**Low to Moderate** The foreground views from the Railroad Bed Bike Trail encompass a broad, open and predominantly undeveloped landscape consisting of a relatively non-descript, flat valley floor with shrubby vegetation of pale greens and tans, low-growing grasses and light-colored soils, backdropped by the horizontal to angular form of the distant Argus Mountain Range. Also visible are two transmission lines that pass along the western edge of the south development area. The mountain ranges that border the valley add visual interest and contribute to the low-to-moderate rating for visual quality.	**High** Recreationists seeking the backcountry desert experience would expect to find viewing opportunities that offer expansive views of intact and natural appearing desert landscapes with minimal if any industrial character. These backcountry visitors would be highly sensitive to the introduction of industrial character to this predominantly natural appearing landscape, and would perceive such additions as an adverse visual change.	**High**	**Low**	**Extended**	**Moderate to High**	**Moderate to High**	Addition of noticeable geometric and structurally complex forms with horizontal to vertical to curvilinear lines and complex industrial character. Facilities would be prominently visible at this foreground to middleground viewing distance.	**High**	**Co-Dominant to Dominant**	**Moderate to High**	**Moderate to High**	**Energy Commission Staff's Conditions:** **VIS-1** **VIS-2** **VIS-3** **VIS-4** **VIS-5**	**Significant and Unavoidable)**
KOP 5 **WEST HILLTOP** **Figures 8A / 8B**	View to the east from the hilltop, immediately adjacent and to the west of the south development area.	**Moderate** The panoramic vista views from the hilltop encompass a broad, open and predominantly undeveloped landscape consisting of a relatively non-descript, flat valley floor with shrubby vegetation of pale greens and tans, low-growing grasses and light-colored soils, backdropped by the horizontal to angular form of the Spangler Hills and distant Argus Mountain Range. Also visible are two transmission lines that pass along the western edge of the south development area. The mountain ranges that border the valley add visual interest and contribute to the low-to-moderate rating for visual quality.	**High** As the landscapes within Indian Wells Valley become more developed, opportunities for expansive, panoramic views of intact and natural appearing high desert landscapes are diminishing. Thus, travelers within the valley and off-road recreationists seeking vista views of unspoiled landscapes would be highly sensitive to the introduction of industrial character to this predominantly naturally appearing valley landscape, and would perceive such as an adverse visual change, particularly when such facilities would impair panoramic vista views of the valley and the bordering mountain ranges and hills.	**High**	**Very Low**	**Extended**	**Moderate to High**	**Moderate to High**	Addition of prominent geometric forms with horizontal to vertical to curvilinear lines and complex industrial character. Facilities would be visible and co-dominant-to-dominant at this foreground to middleground viewing distance.	**High**	**Co-Dominant to Dominant**	**Moderate to High**	**Moderate to High**	**Energy Commission Staff's Conditions:** **VIS-1** **VIS-2** **VIS-3** **VIS-4** **VIS-5**	**Significant and Unavoidable**
KOP 6 **EL PASO MOUNTAINS WILDERNESS** **Figure 9**	View to the northeast from a north ridge in the El Paso Mountains Wilderness, approximately 4.5 miles southwest of the south development area.	**Moderate to High** Although built features are visible in the vicinity of the span, much of the landscape visible to the north and south of I-10 is characterized by a broad, open and predominantly undeveloped landscape consisting of a relatively non-descript, flat, grass- and shrub-covered mesa, which is backdropped by the rolling to angular forms of the McCoy Mountains, north of I-10. The mountains add visual interest.	**High** As the landscapes along the I-10 corridor become more and more industrialized with the addition of built features with industrial character, opportunities for expansive views of natural appearing desert landscapes are rapidly diminishing. Combined with the high volume of travelers on I-10 (the primary travel corridor between Southern California and Phoenix) and viewer expectations of observing higher quality landscape features while traveling through a designated conservation area (CDCA), travelers would be highly sensitive to the introduction of additional industrial character to this predominantly naturally appearing landscape, which would be perceived as an adverse visual change.	**Moderate to High**	**Very Low**	**Extended**	**Moderate**	**Moderate to High**	Addition of prominent linear forms with horizontal to vertical and curvilinear lines and simple industrial character. Facilities would be visible but subordinate-to-co-dominant at this viewing distance.	**Low to Moderate**	**Subordinate to Co-Dominant**	**Low to Moderate**	**Low to Moderate**	**Energy Commission Staff's Conditions:** **VIS-1** **VIS-2** **VIS-3** **VIS-4** **VIS-5**	**Adverse but Less than Significant**

VISUAL RESOURCES - FIGURE 1

Ridgecrest Solar Power Project - Characteristic Landscape of the Project Site

MARCH 2010

VISUAL RESOURCES

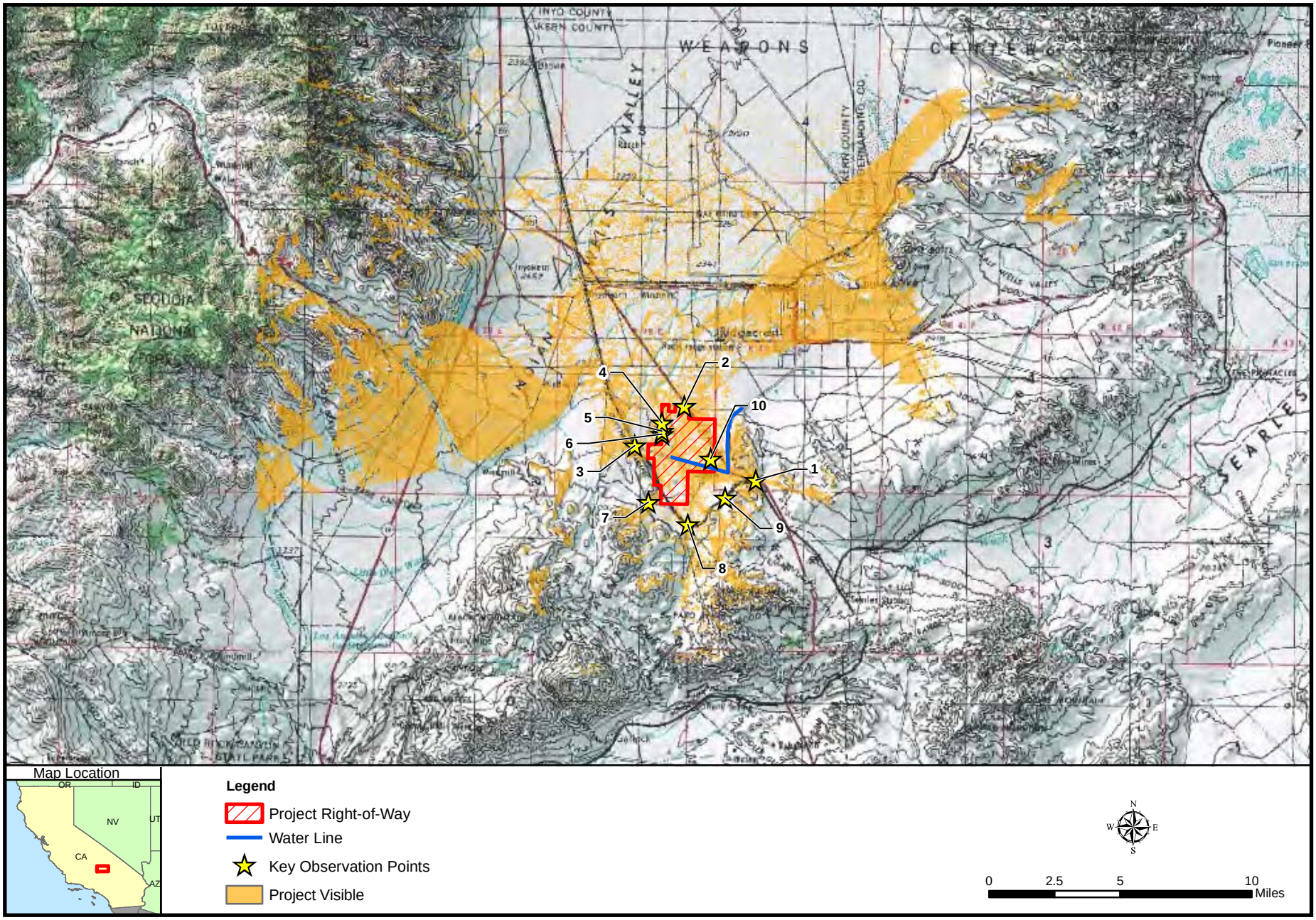
CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Michael Clayton

MARCH 2010

VISUAL RESOURCES - FIGURE 2

Ridgecrest Solar Power Project - Project Viewshed



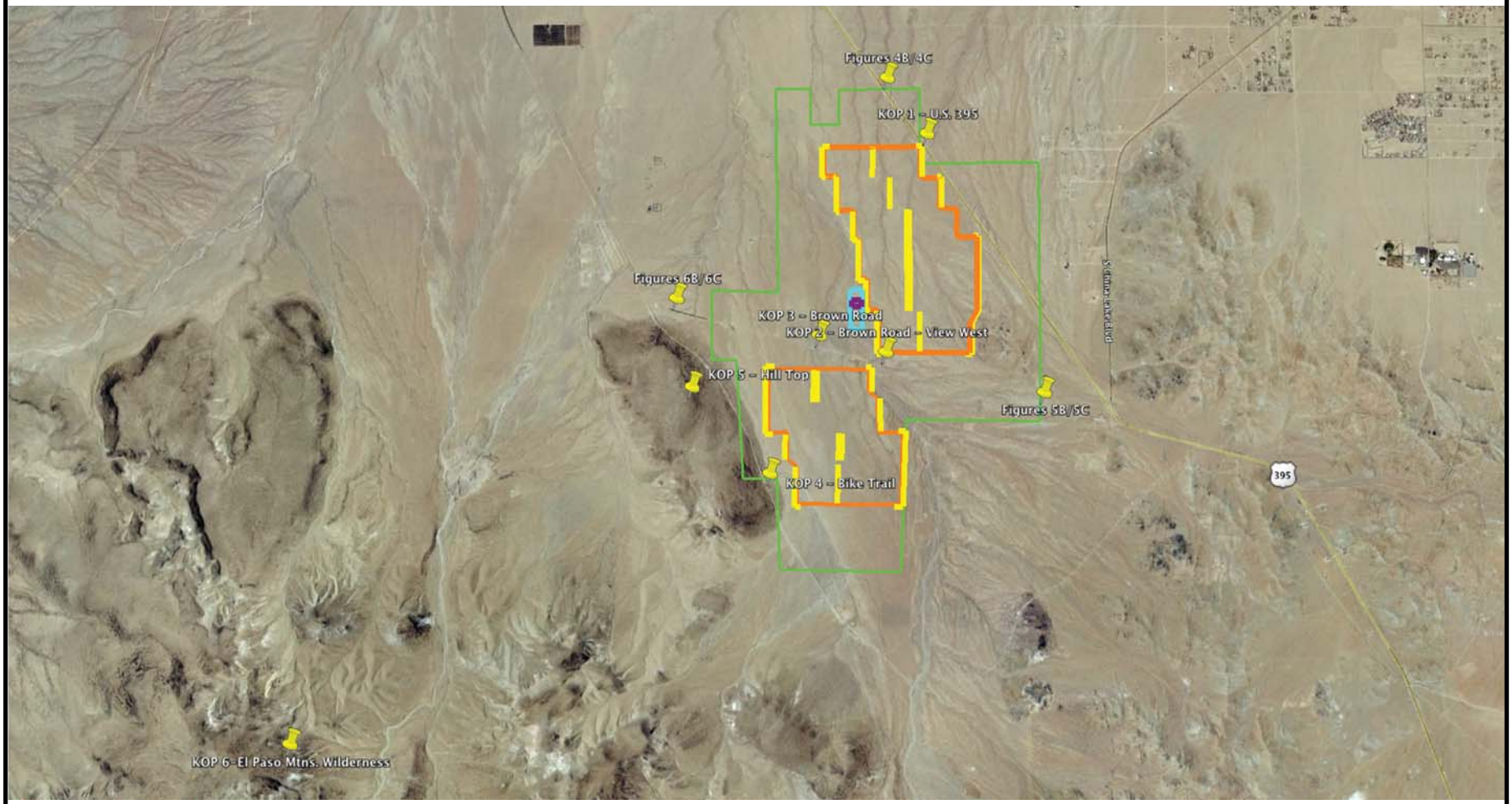
CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: AFC

VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 3

Ridgecrest Solar Power Project - Location of Key Observation Points (KOPs)



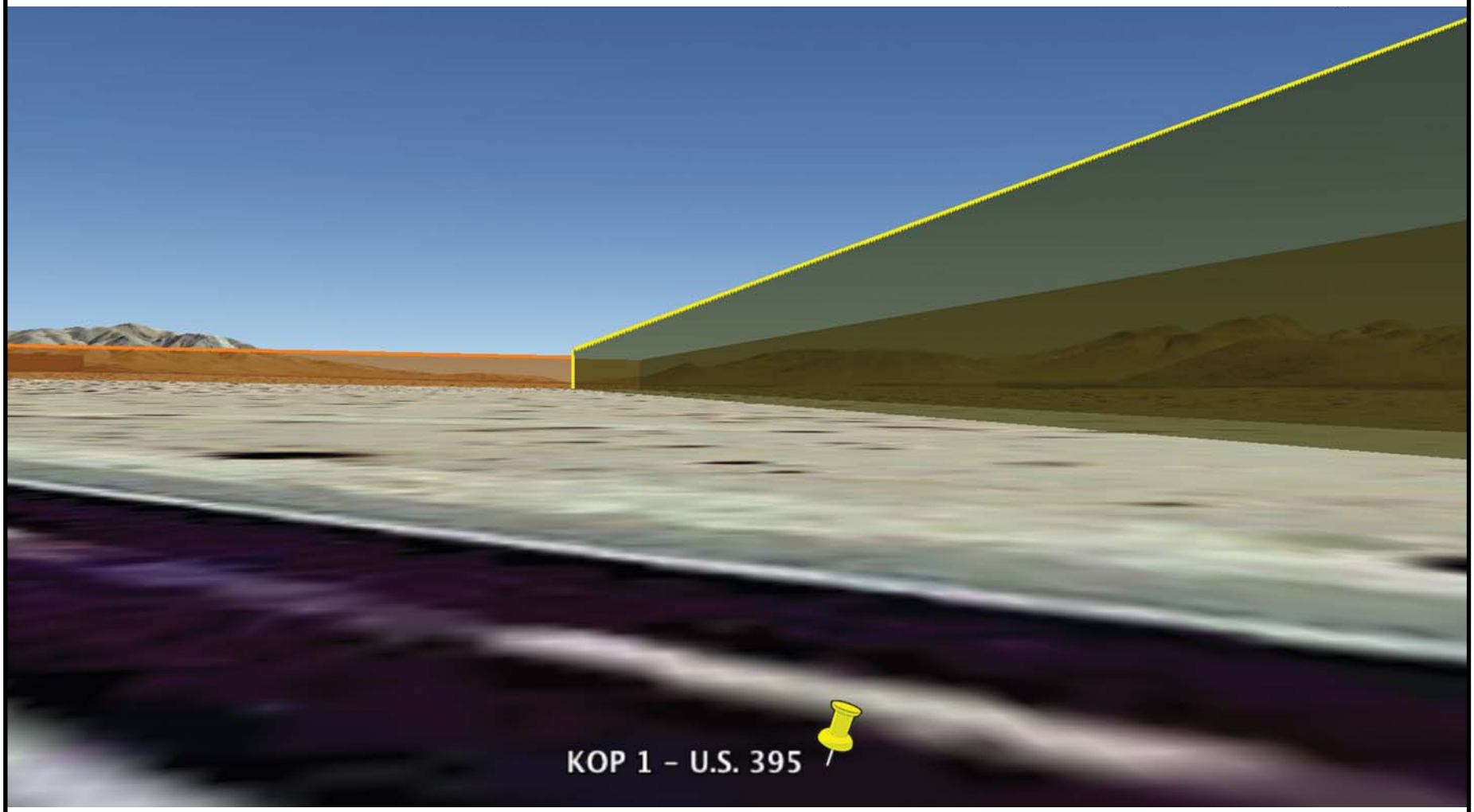
CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Michael Clayton

VISUAL RESOURCES - FIGURE 4A

Ridgecrest Solar Power Project - KOP 1 - Southbound U.S. 395, Google Earth Perspective of the Project Site

MARCH 2010



VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Michael Clayton

VISUAL RESOURCES - FIGURE 4B

Ridgecrest Solar Power Project - KOP 1 - Southbound U.S. 395, Existing View of the Project Site

MARCH 2010

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Michael Clayton

VISUAL RESOURCES - FIGURE 4C

Ridgecrest Solar Power Project - KOP 1 - Southbound U.S. 395, Visual Simulation of the Proposed Project

MARCH 2010

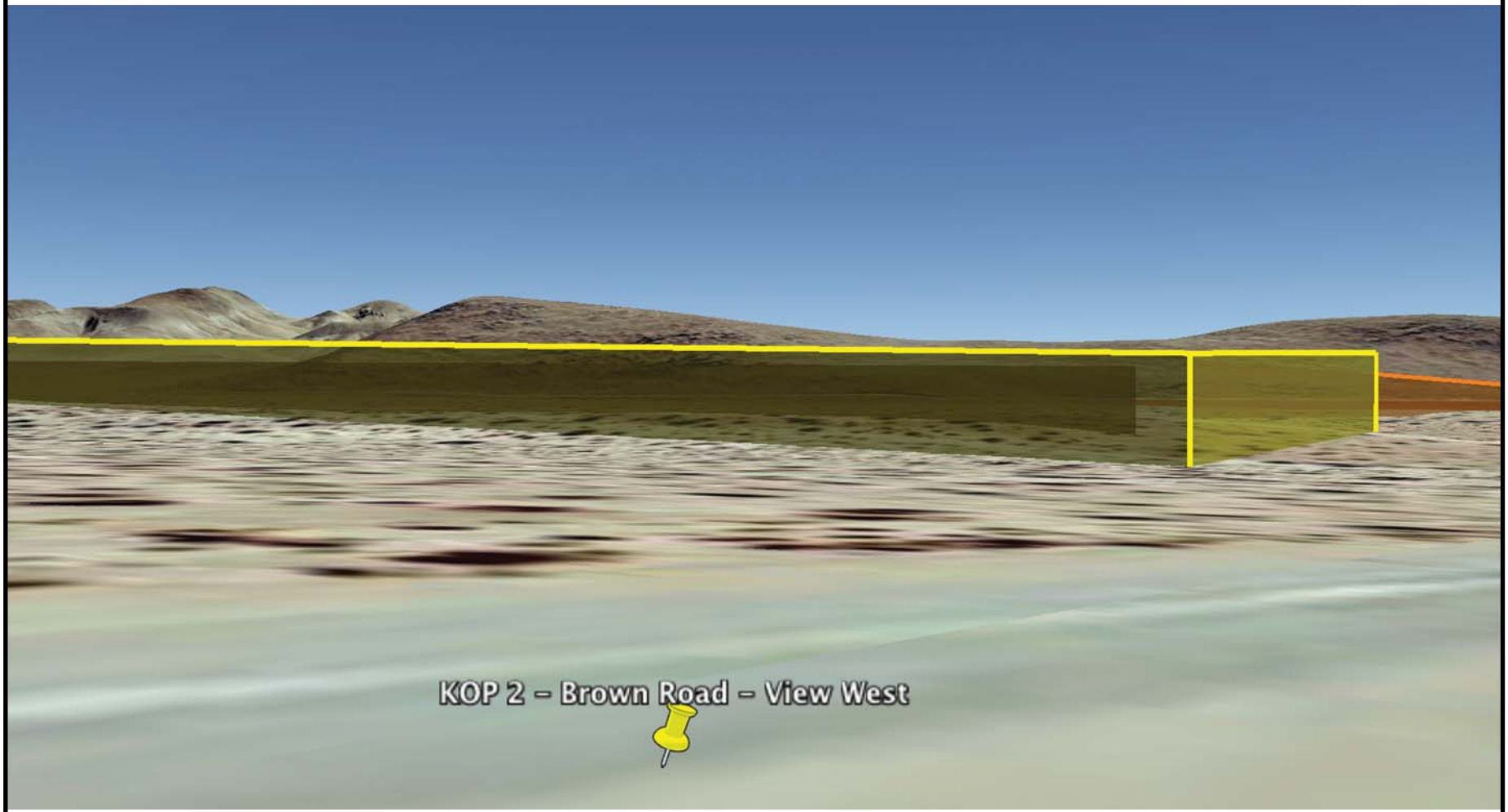
VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Michael Clayton

VISUAL RESOURCES - FIGURE 5A

Ridgecrest Solar Power Project - KOP 2 - Westbound Brown Road, Google Earth Perspective of the Project Site



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Michael Clayton

VISUAL RESOURCES - FIGURE 5B

Ridgecrest Solar Power Project - KOP 2 - Westbound Brown Road, Existing View of the Project Site

MARCH 2010

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Michael Clayton

VISUAL RESOURCES - FIGURE 5C

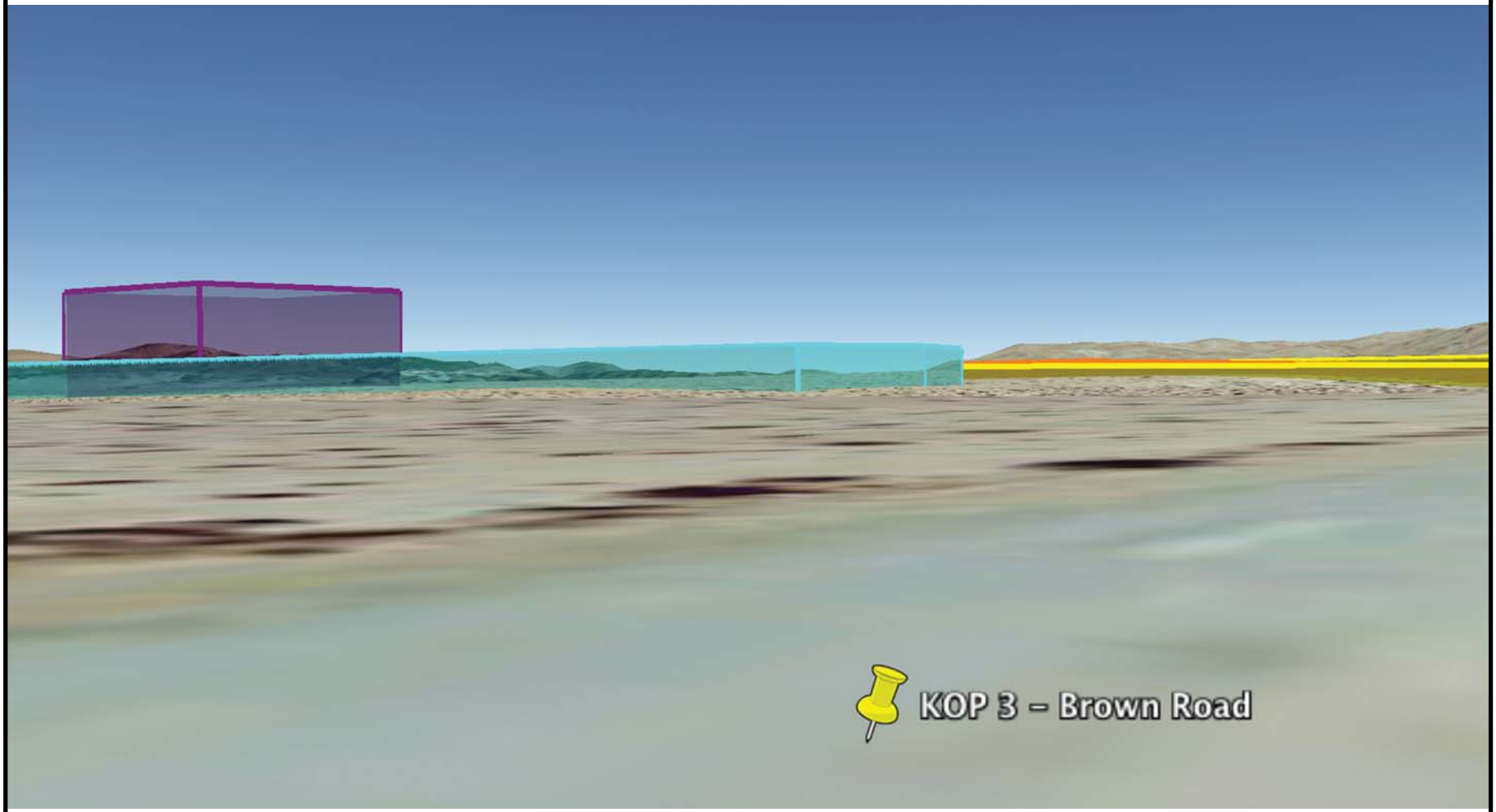
Ridgecrest Solar Power Project - KOP 2 - Westbound Brown Road, Visual Simulation of the Proposed Project

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Michael Clayton

VISUAL RESOURCES - FIGURE 6A

Ridgecrest Solar Power Project - KOP 3 - Eastbound Brown Road, Google Earth Perspective of the Project Site

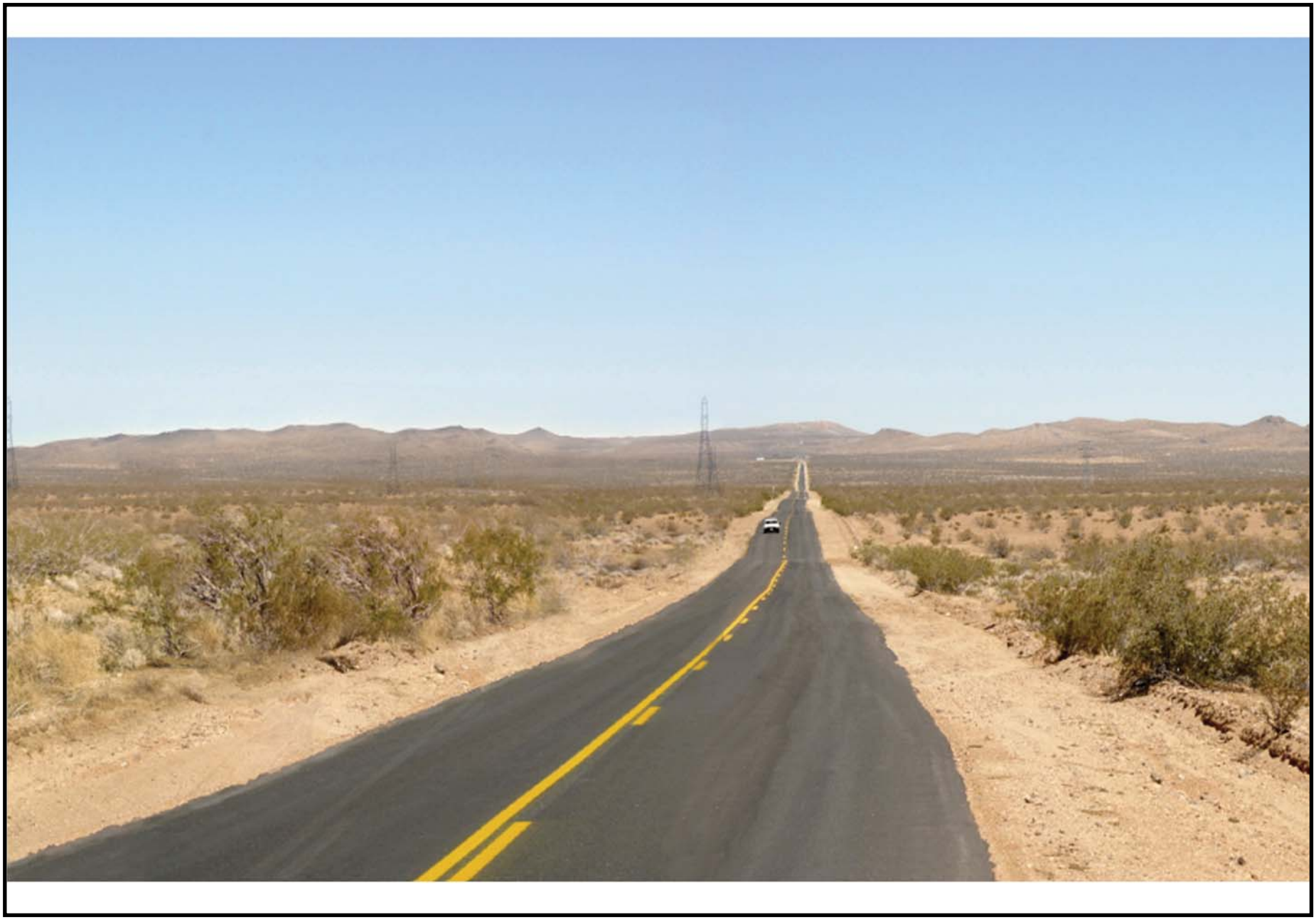


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Michael Clayton

VISUAL RESOURCES - FIGURE 6B

Ridgecrest Solar Power Project - KOP 3 - Eastbound Brown Road, Existing View of the Project Site



MARCH 2010

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Michael Clayton

VISUAL RESOURCES - FIGURE 6C

Ridgecrest Solar Power Project - KOP 3 - Eastbound Brown Road, Visual Simulation of the Proposed Project

MARCH 2010

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Michael Clayton

VISUAL RESOURCES - FIGURE 7A

Ridgecrest Solar Power Project - KOP 4 - Adjacent Railroad Bed Bike Trail, Existing View of the Project Site

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Michael Clayton

VISUAL RESOURCES - FIGURE 7B

Ridgecrest Solar Power Project - KOP 4 - Adjacent Railroad Bed Bike Trail, Visual Simulation of the Proposed Project

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Michael Clayton

VISUAL RESOURCES - FIGURE 8A

Ridgecrest Solar Power Project - KOP 5 - Adjacent Hilltop to the West, Existing View of the Project Site

MARCH 2010

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Michael Clayton

VISUAL RESOURCES - FIGURE 8B

Ridgecrest Solar Power Project - KOP 5 - Adjacent Hilltop to the West, Visual Simulation of the Proposed Project

MARCH 2010

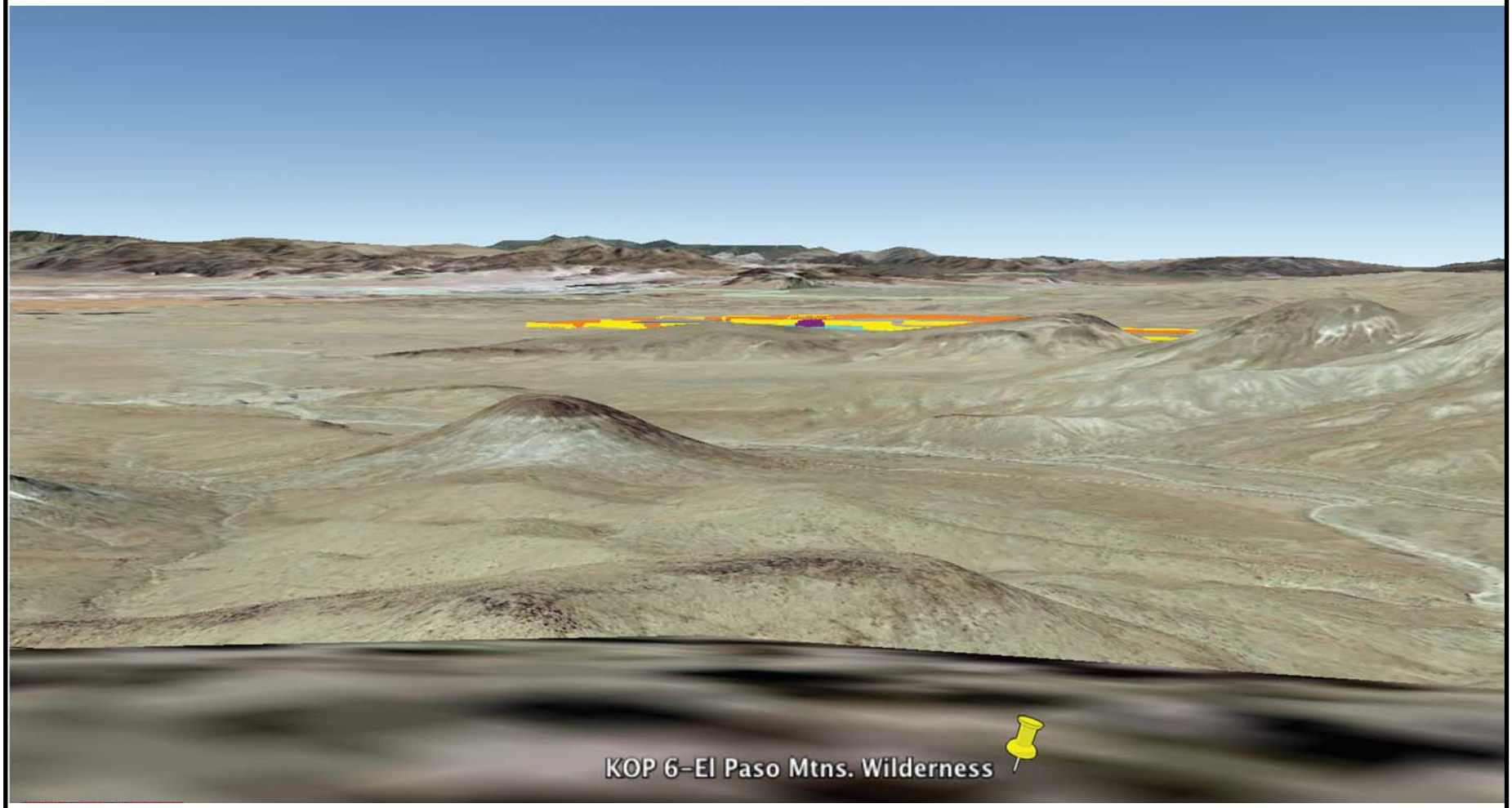
VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Michael Clayton

VISUAL RESOURCES - FIGURE 9

Ridgecrest Solar Power Project - KOP 6 - El Paso Mountains Wilderness, Google Earth Perspective of the Project Site



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Michael Clayton

VISUAL RESOURCES - ATTACHMENT 1A

Ridgecrest Solar Power Project - Existing View to the North toward the Kramer Junction SEGS Project

MARCH 2010

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Michael Clayton

VISUAL RESOURCES - ATTACHMENT 1B

Ridgecrest Solar Power Project - Existing View to the Southwest toward the Kramer Junction SEGS Project

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Michael Clayton

VISUAL RESOURCES - ATTACHMENT 1C

Ridgecrest Solar Power Project - Existing View to the West-Southwest toward the Kramer Junction SEGS Project

MARCH 2010

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Michael Clayton

VISUAL RESOURCES - ATTACHMENT 1D

Ridgecrest Solar Power Project - Existing View to the Northwest toward the Kramer Junction SEGS Project

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Michael Clayton

VISUAL RESOURCES - ATTACHMENT 2A

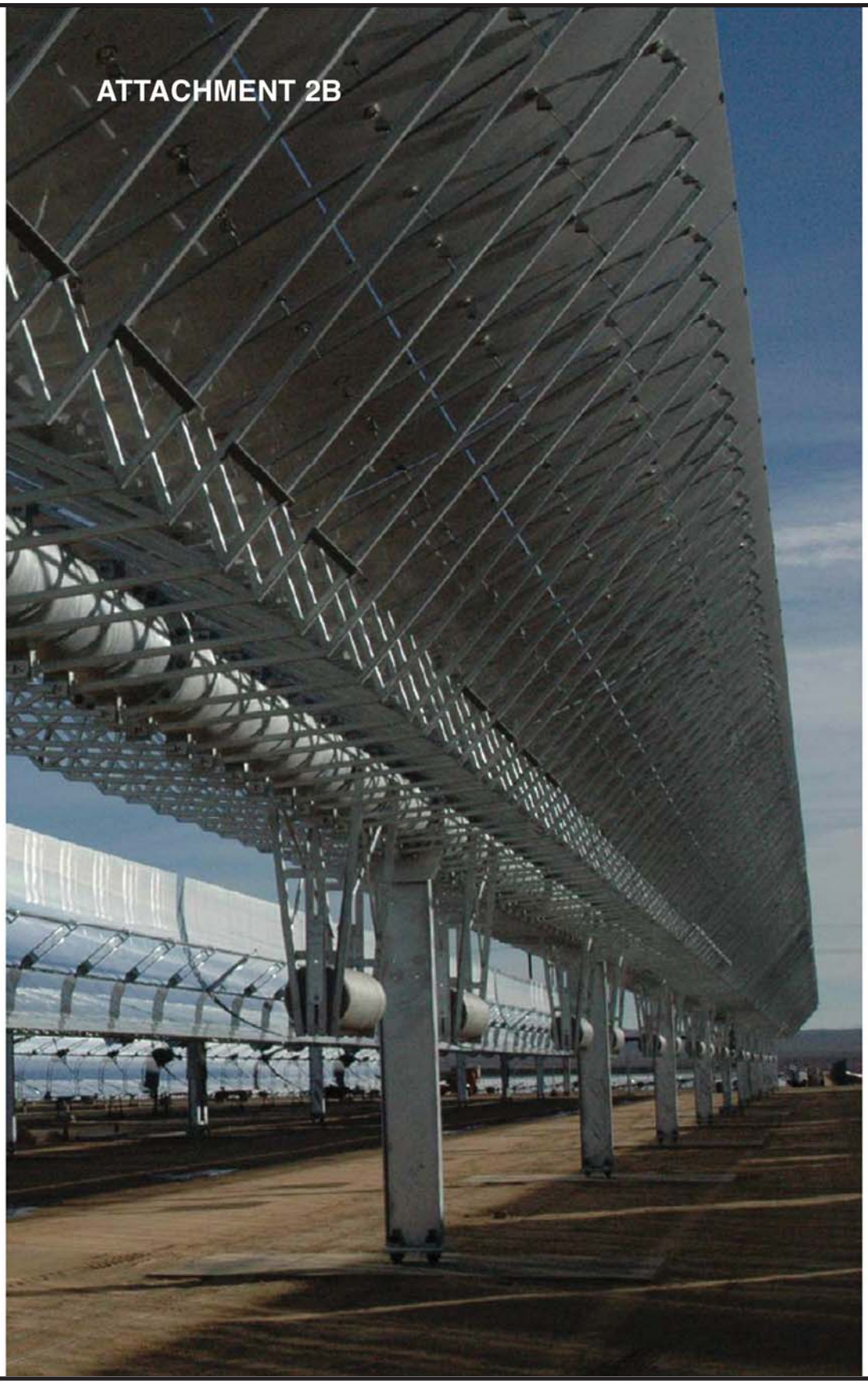
Ridgecrest Solar Power Project - Same SCA to be Installed (View from Front)

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Michael Clayton

VISUAL RESOURCES - ATTACHMENT 2B

Ridgecrest Solar Power Project - Same SCA to be Installed (View from Below)



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Michael Clayton

VISUAL RESOURCES - ATTACHMENT 3A

Ridgecrest Solar Power Project - Framing of the Wind Fence prior to Installation of the Horizontal Steel Ropes and Iron Mesh

MARCH 2010

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Michael Clayton

VISUAL RESOURCES - ATTACHMENT 3B

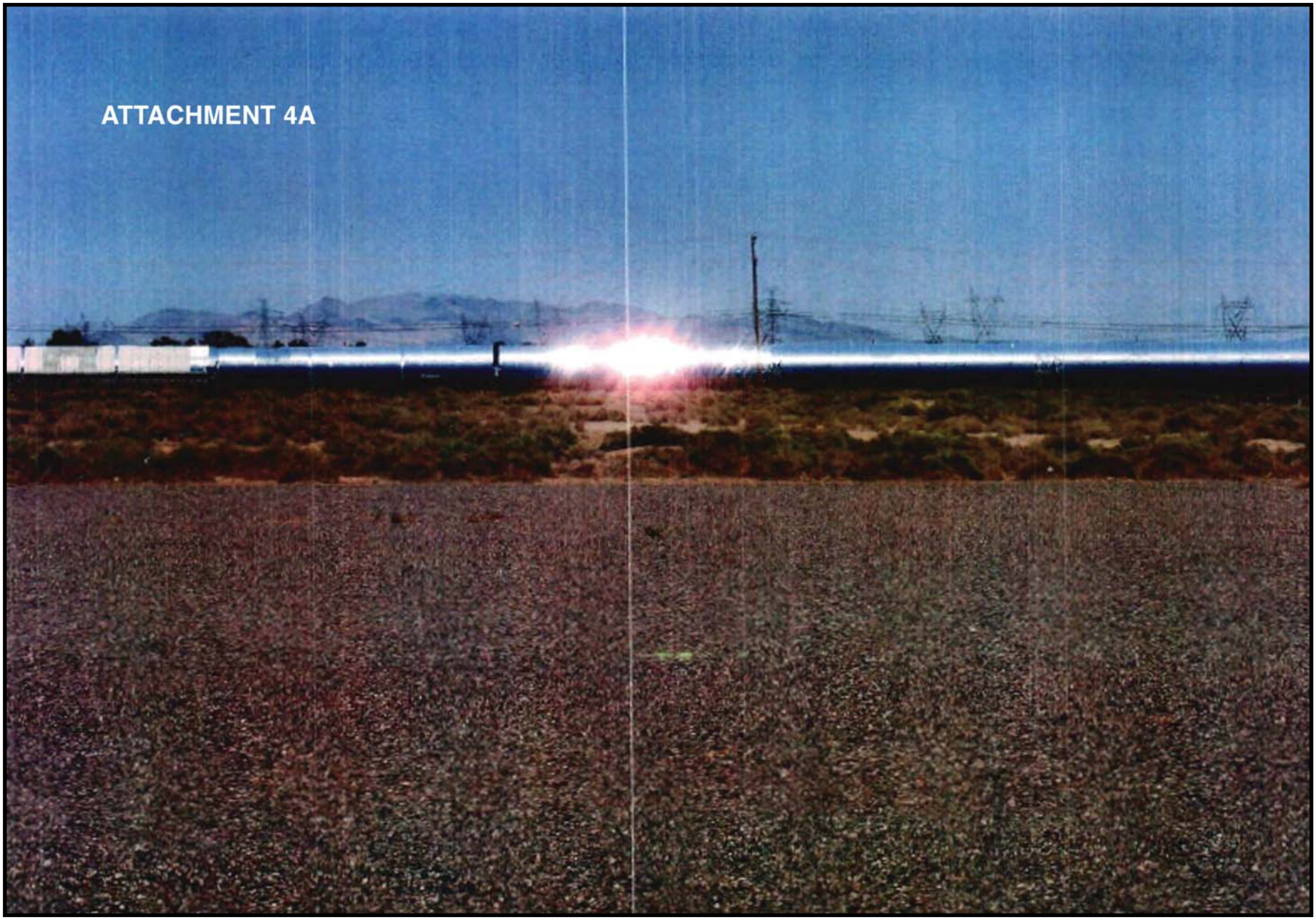
Ridgecrest Solar Power Project - Close-up View of Wind Fence

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Michael Clayton

VISUAL RESOURCES - ATTACHMENT 4A

Ridgecrest Solar Power Project - Example of Glint off of the Kramer Junction SEGS Project (Ground-Level View)

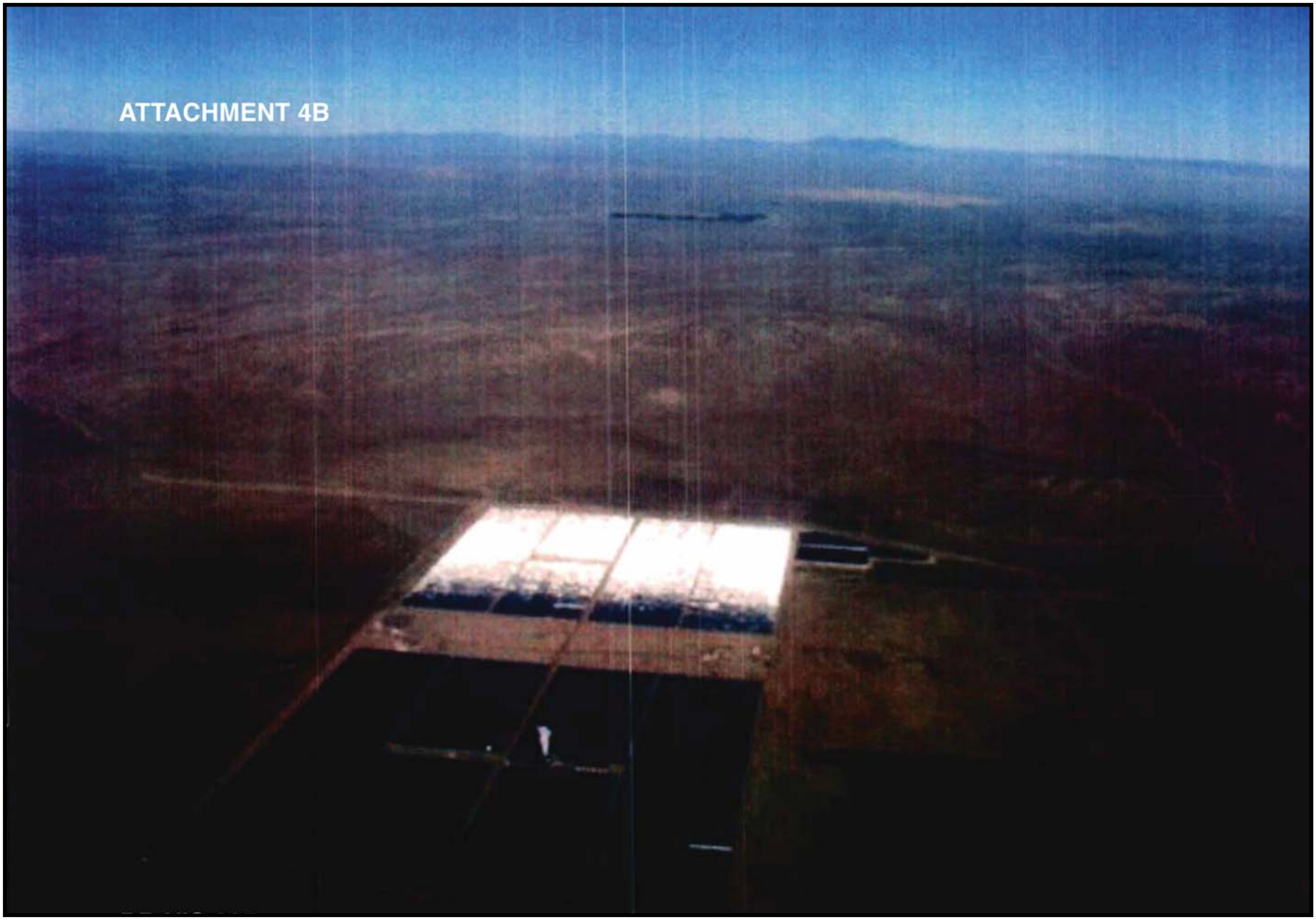


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Michael Clayton

VISUAL RESOURCES - ATTACHMENT 4B

Ridgecrest Solar Power Project - Example of Glint off of the Kramer Junction SEGS Project (Aerial View)



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: Michael Clayton

C.13 WASTE MANAGEMENT

Testimony of Suzanne Phinney, D.Env.

C.13.1 SUMMARY OF CONCLUSIONS

Management of the waste generated during construction, operation and closure/decommissioning of the Ridgecrest Solar Power Project (RSPP or proposed project) would not generate a significant adverse impact under the California Environmental Quality Act (CEQA) guidelines (Appendix G: Environmental Checklist Section XVI- Utilities and Service Systems). There is sufficient landfill capacity, and the project would be consistent with the applicable waste management laws, ordinances, regulations, and standards if the measures proposed in the Application for Certification (AFC) and California Energy Commission (Commission) staff's proposed conditions of certification are implemented. Similar to the proposed project, Commission staff considers project compliance with CEQA guidelines; applicable waste management laws, ordinances, regulations, and standards; and staff's conditions of certification to be sufficient to ensure that no significant adverse impacts would occur as a result of waste management associated with the Southern Unit Alternative, Northern Unit Alternative, or Original Proposed Project Alternative. No cumulative waste management impacts would occur.

C.13. 2 INTRODUCTION

This section presents an analysis of issues associated with wastes generated from the construction, operation and closure/decommissioning of the proposed project. The technical scope of this analysis encompasses solid and liquid wastes existing onsite and wastes that would likely be generated during facility construction, operation and closure/decommissioning. Management and discharge of wastewater is addressed in the **SOIL AND WATER RESOURCES** section of this document. Additional information related to waste management may also be covered in the **WORKER SAFETY** and **HAZARDOUS MATERIALS MANAGEMENT** sections of this document.

The objectives of the Bureau of Land Management (BLM) and California Energy Commission (Commission) in conducting this waste management analysis are to ensure that:

- The management of project wastes would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS). Compliance with LORS ensures that wastes generated during the construction, operation and closure/decommissioning of the proposed project would be managed in an environmentally safe manner.
- The disposal of project wastes would not adversely impact existing waste disposal facilities.
- The site is managed in such a way that project wastes and waste constituents would not pose a risk to humans or the environment.

C.13.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

In accordance with CEQA guidelines (Appendix G: Environmental Checklist Section XVI- Utilities and Service Systems), Commission staff evaluated project wastes in terms of landfill capacity and LORS compliance. The federal, state, and local environmental LORS listed in **Waste Management Table 1** have been established to ensure the safe and proper management of both solid and hazardous wastes in order to protect human health and the environment.

Waste Management Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Title 42, United States Code (U.S.C.), §6901, et seq. Solid Waste Disposal Act of 1965 (as amended and revised by the Resource Conservation and Recovery Act of 1976, et al.)	The Solid Waste Disposal Act, as amended and revised by the Resource Conservation and Recovery Act (RCRA) et al., establishes requirements for the management of solid wastes (including hazardous wastes), landfills, underground storage tanks, and certain medical wastes. The statute also addresses program administration, implementation and delegation to states, enforcement provisions, and responsibilities, as well as research, training, and grant funding provisions. RCRA Subtitle C establishes provisions for the generation, storage, treatment, and disposal of hazardous waste, including requirements addressing: • Generator record keeping practices that identify quantities of hazardous wastes generated and their disposition; • Waste labeling practices and use of appropriate containers; • Use of a manifest when transporting wastes; • Submission of periodic reports to the United States Environmental Protection Agency (U.S. EPA) or other authorized agency; and • Corrective action to remediate releases of hazardous waste and contamination associated with RCRA-regulated facilities. RCRA Subtitle D establishes provisions for the design and operation of solid waste landfills. RCRA is administered at the federal level by U.S. EPA and its 10 regional offices. The Pacific Southwest regional office (Region 9) implements U.S. EPA programs in California, Nevada, Arizona, and Hawaii.
Title 42, U.S.C., §9601, et seq. Comprehensive Environmental Response, Compensation and Liability Act	The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), also known as *Superfund*, establishes authority and funding mechanisms for cleanup of uncontrolled or abandoned hazardous waste sites, as well as cleanup of accidents, spills, or emergency releases of pollutants and contaminants into the environment. Among other things, the statute addresses: • Reporting requirements for releases of hazardous substances; • Requirements for remedial action at closed or abandoned hazardous waste sites, and brownfields; • Liability of persons responsible for releases of hazardous substances or waste; and

Applicable Law	Description
	• Requirements for property owners/potential buyers to conduct "all appropriate inquiries" into previous ownership and uses of the property to 1) determine if hazardous substances have been or may have been released at the site, and 2) establish that the owner/buyer did not cause or contribute to the release. A Phase I Environmental Site Assessment is commonly used to satisfy CERCLA "all appropriate inquiries" requirements.
Title 40, Code of Federal Regulations (C.F.R.), Subchapter I – Solid Wastes	These regulations were established by U.S. EPA to implement the provisions of the Solid Waste Disposal Act and RCRA (described above). Among other things, the regulations establish the criteria for classification of solid waste disposal facilities (landfills), hazardous waste characteristic criteria and regulatory thresholds, hazardous waste generator requirements, and requirements for management of used oil and universal wastes. • Part 257 addresses the criteria for classification of solid waste disposal facilities and practices. • Part 258 addresses the criteria for municipal solid waste landfills. • Parts 260 through 279 address management of hazardous wastes, used oil, and universal wastes (i.e., batteries, mercury-containing equipment, and lamps). U.S. EPA implements the regulations at the federal level. However, California is an RCRA-authorized state, so most of the solid and hazardous waste regulations are implemented by state agencies and authorized local agencies in lieu of U.S. EPA.
Title 49, C.F.R., Parts 172 and 173. Hazardous Materials Regulations	These regulations address the United States Department of Transportation (DOT) established standards for transport of hazardous materials and hazardous wastes. The standards include requirements for labeling, packaging, and shipping of hazardous materials and hazardous wastes, as well as training requirements for personnel completing shipping papers and manifests. Section 172.205 specifically addresses use and preparation of hazardous waste manifests in accordance with Title 40, CFR, Section 262.20.
Federal Clean Water Act, 33 U.S.C. § 1251 *et seq.*	The Clean Water Act controls discharge of wastewater to the surface waters of the U.S.
State	
California Health and Safety Code (Health and Safety Code), Chapter 6.5, §25100, et seq. Hazardous Waste Control Act of 1972, as amended	This California law creates the framework under which hazardous wastes must be managed in California. The law provides for the development of a state hazardous waste program that administers and implements the provisions of the federal RCRA program. It also provides for the designation of California-only hazardous wastes and development of standards (regulations) that are equal to or, in some cases, more stringent than federal requirements. The California Environmental Protection Agency (Cal/EPA), Department of Toxic Substances Control (DTSC) administers and implements the provisions of the law at the state level. Certified Unified Program Agencies (CUPAs) implement some elements of the law at the local level.
Title 22, California Code of Regulations (Cal. Code Regs.), Division 4.5.	These regulations establish requirements for the management and disposal of hazardous waste in accordance with the provisions of the California Hazardous Waste Control Act and federal RCRA. As with the federal requirements, waste generators must determine if their wastes are hazardous according to specified characteristics or lists of wastes.

Applicable Law	Description
Environmental Health Standards for the Management of Hazardous Waste	Hazardous waste generators must obtain identification numbers; prepare manifests before transporting the waste off site; and use only permitted treatment, storage, and disposal facilities. Generator standards also include requirements for record keeping, reporting, packaging, and labeling. Additionally, while not a federal requirement, California requires that hazardous waste be transported by registered hazardous waste transporters. The standards addressed by Title 22, CAL. CODE REGS. include: • Identification and Listing of Hazardous Waste (Chapter 11, §66261.1, et seq.). • Standards Applicable to Generator of Hazardous Waste (Chapter 12, §66262.10, et seq.). • Standards Applicable to Transporters of Hazardous Waste (Chapter 13, §66263.10, et seq.). • Standards for Universal Waste Management (Chapter 23, §66273.1, et seq.). • Standards for the Management of Used Oil (Chapter 29, §66279.1, et seq.). • Requirements for Units and Facilities Deemed to Have a Permit by Rule (Chapter 45, §67450.1, et seq.). The Title 22 regulations are established and enforced at the state level by DTSC. Some generator and waste treatment standards are also enforced at the local level by CUPAs.
Health and Safety Code, Chapter 6.11 §§25404 – 25404.9 Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program)	The Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of the six environmental and emergency response programs listed below. • Aboveground Petroleum Storage Act requirements for Spill Prevention, Control, and Countermeasure (SPCC) Plans. • Hazardous Materials Release and Response Plans and Inventories (Business Plans). • California Accidental Release Prevention (CalARP) Program. • Hazardous Materials Management Plan / Hazardous Materials Inventory Statements. • Hazardous Waste Generator / Tiered Permitting Program. • Underground Storage Tank Program. The state agencies responsible for these programs set the standards for their programs while local governments implement the standards. The local agencies implementing the Unified Program are known as CUPAs. The Kern County Environmental Health Services Department is the CUPA for the RSPP. Note: The Waste Management analysis only considers application of the Hazardous Waste Generator/Tiered Permitting element of the Unified Program.
Title 27, Cal. Code Regs., Division 1, Sub-division 4, Chapter 1, §15100, et seq.	While these regulations primarily address certification and implementation of the program by the local CUPAs, the regulations do contain specific reporting requirements for businesses. • Article 9 – Unified Program Standardized Forms and Formats (§§ 15400–15410).

Applicable Law	Description
Unified Hazardous Waste and Hazardous Materials Management Regulatory Program	• Article 10 – Business Reporting to CUPAs (§§15600–15620).
Public Resources Code, Division 30, §40000, et seq. California Integrated Waste Management Act of 1989	The California Integrated Waste Management Act (CIWMA) establishes mandates and standards for management of solid waste in California. The law addresses solid waste landfill diversion requirements; establishes the preferred waste management hierarchy (source reduction first, then recycling and reuse, and treatment and disposal last); sets standards for design and construction of municipal landfills; and addresses programs for county waste management plans and local implementation of solid waste requirements.
Title 14, Cal. Code Regs., Division 7, §17200, et seq. California Integrated Waste Management Board	These regulations implement the provisions of the California Integrated Waste Management Act and set forth minimum standards for solid waste handling and disposal. The regulations include standards for solid waste management, as well as enforcement and program administration provisions. • Chapter 3 – Minimum Standards for Solid Waste Handling and Disposal. • Chapter 3.5 – Standards for Handling and Disposal of Asbestos Containing Waste. • Chapter 7 – Special Waste Standards. • Chapter 8 – Used Oil Recycling Program. • Chapter 8.2 – Electronic Waste Recovery and Recycling.
Health and Safety Code, Division 20, Chapter 6.5, Article 11.9, §25244.12, et seq. Hazardous Waste Source Reduction and Management Review Act of 1989	This law was enacted to expand the state's hazardous waste source reduction activities. Among other things, it establishes hazardous waste source reduction review, planning, and reporting requirements for businesses that routinely generate more than 12,000 kilograms (approximately 26,400 pounds) of hazardous waste in a designated reporting year. The review and planning elements are required to be done on a four-year cycle, with a summary progress report due to DTSC every fourth year.
Title 22, Cal. Code Regs., §67100.1 et seq. Hazardous Waste Source Reduction and Management Review	These regulations further clarify and implement the provisions of the Hazardous Waste Source Reduction and Management Review Act of 1989 (noted above). The regulations establish the specific review elements and reporting requirements to be completed by generators subject to the act.
Title 23, Cal. Code Regs., Division 3, Chapters 16 and 18	These regulations relate to hazardous material storage and petroleum UST cleanup, as well as hazardous waste generator permitting, handling, and storage. The DTSC Imperial County CUPA is responsible for local enforcement.

Applicable Law	Description
California Water Code Section 13000 et seq. Porter-Cologne Water Quality Control Act	The Act controls discharge of any waste material that could affect the quality of the surface waters or groundwaters of California. Its policies are to protect the quality of all the waters of the State, to regulate all activities and factors affecting the quality of water to attain the highest water quality within reason, and protect the quality of water from degradation with full power and jurisdiction of the State. It established the State Water Resources Control Board and nine Regional Water Quality Control Boards to implement its provisions.
Title 24, CCR, Part 9 California Fire Code	These regulations are based on the 2006 Edition of the International Fire Code. They provide for safeguarding to a reasonable degree, life and property from the hazards of fire and explosion; dangerous conditions arising from the storage, handling and use of hazardous materials and devices; and hazardous conditions in the use or occupancy of buildings or premises The CFC also contains provisions to assist emergency response personnel.
Local	
Kern County General Plan, Chapter 4.9 Safety Element	The element describes the County's policies and siting criteria identified in the Kern County and Incorporated Cities Hazardous Waste Management Plan including encouragement of innovative technologies to manage hazardous waste streams and facility compliance with the Uniform Fire Code.
Kern County Code, Chapters 8.04 and 8.28 Health and Safety	These regulations establish permits and fee requirements, as well as requirements for the generation, storage, transportation, and disposal of solid wastes within the County.
Kern County Code, Chapter 17.32 Kern County Fire Code	The County Fire Code adopts, with additions and exceptions, the California Fire Code.

C.13.4 PROPOSED PROJECT

C.13.4.1 SETTING AND EXISTING CONDITIONS

The RSPP would use parabolic trough technology to generate 250 MW. The proposed site is approximately 5 miles southwest of Ridgecrest, off Brown Road on the west side of U.S. Highway 395. It is on 3,995 acres with 2,002 disturbed acres of undeveloped public land administered by the BLM (ROW# CACA 49016). The site has no existing structures, but features 115-kV and 230-kV Southern California Edison power lines (in the southwest portion), a former Southern Pacific Railroad Right of Way (ROW) (in the western portion), Brown Road (bisecting east to west), and over 10 miles of unpaved roads. Miscellaneous trash and debris consistent with household dumping are located throughout the site. World War II-era unexploded ordnance (UXO) may also be present. A burn dump (which received municipal waste from surrounding towns prior to the 1970s) is located on an adjacent property.

Two solar fields, a northern field located north of Brown Road and a southern field located south of Brown Road, would have acreages of 894 acres and 554 acres, respectively. The Applicant staggered the rows of arrays to avoid the El Paso Wash. The two fields would feed into a single power block, located north of Brown Road. Major components of the power block would include administration, control, warehouse, maintenance, and lab buildings; HTF pumping and freeze protection system; solar steam generator; propane-fired auxiliary boiler; steam turbine generator; air-cooled condenser; generator step-up transformer; transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment. Soil contaminated with spills and leaks from the HTF system would be treated in an 8-acre land treatment unit (LTU) (which includes stockpile and bioremediation areas), to be located north of Brown Road in the eastern portion of the site. A new 3.2-acre, 230-kVswitchyard would tie into SCE's InyoKern-Kramer transmission line, with a 3,900 foot long onsite gen-tie; the Applicant expects an Interconnection Agreement in the fourth quarter of 2010. Propane for quick startup and heat transfer fluid freeze protection (not energy generation) would be trucked to the site. The project would be dry-cooled, reducing water use. Approximately 150 acre feet per year of groundwater would be supplied by a new 5-mile pipeline from the Indian Wells Valley Water District (IWVWD); the pipeline route would follow China Lake Boulevard and Brown Road.

There are seven Class III landfills in Kern County that accept non-hazardous waste. The facility closest to the proposed project site is the Ridgecrest-Inyokern Sanitary Landfill at less than 7 miles away; remaining capacity at this landfill is 5,000,989 cubic yards with an estimated closure date of 2014. Two Class I facilities – Clean Harbors Buttonwillow Landfill in Kern County and the Chemical Waste Management Kettleman Hills Landfill in Kings County – could accept hazardous wastes generated by the RSPP. They have a combined excess of 10 million cubic yards of remaining hazardous waste disposal capacity.

The Applicant expects construction to begin late 2010 and last approximately 28 months. Commercial operation would begin mid-2013 for a planned operational life of 30 years. The RSPP could operate for a longer or shorter period depending on economic or other circumstances (SM 2009a sections 2, 3, and 5.16; AECOM 2009; SM 2010a DR-ALT-49).

Refer to **SECTION B.1, PROJECT DESCRIPTION,** for a more detailed description of the proposed project and accompanying figures identifying project features and facilities.

C.13.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This waste management analysis addresses: a) existing project site conditions and the potential for contamination associated with prior activities on or near the project site, and b) the impacts from the generation and management of wastes during project construction, operation and closure/decommissioning.

Existing Project Site Conditions and Potential for Contamination

For any site in California proposed for the construction of a power plant, the applicant must provide documentation about the nature of any potential or existing releases of hazardous substances or contamination at the site. If potential or existing releases or contamination at the site are identified, the CEQA significance of the release or contamination would be determined by site-specific factors, including, but not limited to: the amount and concentration of contaminants or contamination; the proposed use of the area where the contaminants/contamination is found; and any potential pathways for workers, the public, or sensitive species or environmental areas to be exposed to the contaminants. Any unmitigated contamination or releases of hazardous substances that pose a risk to human health or environmental receptors would be considered significant under CEQA by Commission staff.

As a first step in documenting existing site conditions, the Energy Commission's power plant site certification regulations require that a Phase I Environmental Site Assessment (ESA) be prepared[1] and submitted as part of an AFC. The Phase I ESA is conducted to identify any conditions indicative of releases and threatened releases of hazardous substances at the site and to identify any areas known to be contaminated (or a source of contamination) on or near the site.

In general, the Phase I ESA uses a qualified environmental professional to conduct inquiries into past uses and ownership of the property, research hazardous substance releases and hazardous waste disposal at the site and within a certain distance of the site, and visually inspect the property, making observations about the potential for contamination and possible areas of concern. After conducting all necessary file reviews, interviews, and site observations, the environmental professional then provides findings about the environmental conditions at the site. In addition, since the Phase I ESA does not include sampling or testing, the environmental professional may also give an opinion about the potential need for any additional investigation. Additional investigation may be needed, for example, if there were major gaps in the information available about the site, if an ongoing release is suspected, or to confirm an existing environmental condition.

If additional investigation is needed to identify the extent of possible contamination, a Phase II ESA may be required. The Phase II ESA usually includes sampling and testing of potentially contaminated media to verify the level of contamination and the potential for remediation at the site.

In conducting its assessment of a proposed project, staff will review the project's Phase I ESA and work with the appropriate oversight agencies as necessary to determine if additional site characterization work is needed and if additional mitigation is necessary to ensure protection of human health and the environment from hazardous substance releases and on-site contamination.

[1] Title 20, California Code of Regulations, section 1704(c) and Appendix B, section (g)(12)(A). Note that the Phase I ESA must be prepared according to American Society for Testing and Materials protocol or an equivalent method agreed upon by the applicant and the Energy Commission staff.

A Phase I ESA, dated June 2009, was prepared by AECOM, Inc. in accordance with the American Society for Testing and Materials Standard Practice E 1527-05 for ESAs, and is included as Appendix I of the project's AFC. The Phase I ESA addressed conditions on subject parcels in Township 28 South, Range 39 East and Township 27 South, Range 39 East, but did not encompass the offsite water pipeline from the IWVWD. The pipeline would follow public roads (China Lake Boulevard and Brown Road), and potential contamination would likely have already been encountered during road construction and maintenance. Staff therefore does not consider an additional Phase I ESA for the pipeline necessary.

The Phase I ESA did not identify any Recognized Environmental Conditions (RECs) in connection with historic or current site operations. A REC is the presence or likely presence of any hazardous substances or petroleum products on a property under the conditions that indicated an existing release, past release, or a material threat of a release of any hazardous substance or petroleum products into structures on the property or in the ground, groundwater, or surface water of the property.

Impacts from Generation and Management of Wastes during Construction, Operation and Project Closure/Decommissioning

As mentioned previously, Commission staff considers project waste management to result in no significant adverse impacts, as defined per CEQA guidelines in Checklist Section XVI, if there is available landfill capacity and the project complies with LORS. Commission staff thus reviewed the applicant's proposed solid and hazardous waste management methods regarding the management of project-related wastes generated during construction, operation, and closure/decommissioning of the proposed project to determine whether the methods proposed are consistent with the LORS identified for waste disposal and recycling. Staff then reviewed the capacity available at off-site treatment and disposal sites to determine whether or not the proposed power plant's waste would impact the available capacity.

The handling and management of waste generated by the RSPP would follow the hierarchical approach of source reduction, recycling, treatment, and disposal as specified in California Public Resources Code Sections 40051 and 40196. The first priority of the project owner is to use materials that reduce the waste that is generated. The next level of waste management would involve reusing or recycling wastes. For wastes that cannot be recycled, treatment would be used, if possible, to make the waste nonhazardous. Finally, waste that cannot be reused, recycled, or treated would be transported off site to a permitted treatment, storage, or disposal facility.

The project's General Compliance Conditions of Certification, including Compliance Monitoring and Closure Plan (Compliance Plan) have been established as required by Public Resources Code section 25532. The plan provides a means for assuring that the facility is constructed, operated and closed in compliance with public health and safety, environmental and other applicable regulations, guidelines, and conditions adopted or established by the California Energy Commission. This Compliance Plan will include Conditions of Certification identified in the following sections.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Existing Site Conditions

The RSPP ROW is 3,995 acres, and consists of 9 contiguous parcels of BLM administered land in Township 28 South, Range 39 East; and Township 27 South, Range 39 East. The actual project footprint would disturb a total of 2,002 acres.

Photographs, maps, and other historic records indicate the site has been historically undeveloped with buildings or structures, but has been traversed by SCE 115-kV and 230-kV power lines, Southern Pacific Railroad (the Terese Siding), Brown Road, and unpaved access roads. The transmission lines are depicted by the 1943 topographic map, but not in the 1915 map. The railroad was constructed in 1908 to support construction of the Los Angeles Aqueduct. According to the BLM, it stopped operating in the early 1980s and the tracks were removed in the late 1990s. A 1915 topographic map depicts the present day Brown Road as U.S. Highway 395; the highway's current configuration was later developed. Numerous unimproved roads show up in the 1972 topographic map. In addition, a water well is depicted in the southwestern portion of the site in a topographic map from 1953, but is not on record with the Kern County Environmental Health Services Department (AECOM 2009).

AECOM did not identify any RECs or HRECs in connection with the RSPP site, and did not observe hazardous waste during its February 16 and 17, 2009 site reconnaissance. Miscellaneous trash and debris consistent with household dumping was observed at various locations throughout the site. No discolored soil, water, unusual vegetative conditions, staining, or evidence of hazardous materials release was observed. Similarly, no aboveground storage tanks and no evidence of underground storage tanks were observed. Although transmission lines cross the site, no evidence of transformers or PCB-containing equipment was observed. The Southern Pacific Railroad ROW remains, and includes raised berms, bridges, and stormwater conveyances. AECOM (on April 23, 2009) located the water well depicted in the 1953 map, and observed it is no longer in use and has been filled with rocks (AECOM 2009).

The California Hazardous Material Incident Report System (CHMIRS) lists a hazardous materials incident on the site, in the dirt parking/driveway area on the south side of Brown Road. The spill occurred in 1989, and is not associated with any other contamination-related listing. AECOM does not consider the listing to represent a REC at the project site. The site also featured mining claims in the area of the rocky knoll northwest of the Highway 395 and Brown Road intersection. BLM indicated that prospecting, but no successful mining activities occurred on the property (AECOM 2009).

A burn dump (which received municipal waste from surrounding towns prior to the 1970s) is located in an adjacent property, 550 feet south of the RSPP site. The dump site contains burned debris (including some tires and pieces of glass, plaster, brick, ceramic, and metal), but is unlikely to have contaminated groundwater (which is approximately 100 to 200 feet below ground surface in the area). As soil was likely the only media potentially impacted by the dump, AECOM does not expect the adjacent site to present a concern to the subject property (AECOM 2009).

AECOM observed World War II-era unexploded ordnance (UXO) on the site, south of Brown Road. Historical information indicates that the site is located approximately 10 miles south of the historic United States Naval Ordnance Test Station (NOTS), a present day Naval Weapons Test Center associated with China Lake (AECOM 2009). The Applicant provided a summary of orphan sites in the project vicinity listed by Environmental Data Resources (EDR). No listed orphan sites are located on the proposed RSPP site; however, the orphan site study was not able to determine if activities from the China Lake Naval Weapons Test Center have left any Munitions and Explosives of Concern (MECs) or UXO at the site. There are 10 listed orphan sites within 5 miles of the project site, and 4 orphan sites (associated with the Ridgecrest Landfill) 0.63 miles away. Based on distance from the project site and/or the non-contamination nature of the listings, staff concurs with the Applicant that the orphan sites are unlikely present a concern to the RSPP (SM 2010a DR-WASTE-244 and 245).

The AECOM Phase I ESA recommended that the potential presence of UXO be investigated in geophysical surveys performed by a company with specific expertise in UXO identification, and that remnants of munitions or bullets identified during development of the subject property be removed and disposed of in accordance with applicable LORS. Commission staff proposes Condition of Certification **WASTE-1**, which would require further UXO training, investigation, removal, and disposal.

In the event that contamination is identified during any phase of construction, Commission staff proposes Condition of Certification **WASTE-2**, which would require that an experienced and qualified Professional Engineer or Professional Geologist be available for consultation in the event contaminated soil is encountered. If contaminated soil is identified, **WASTE-3** would require that the Professional Engineer or Professional Geologist inspect the site, determine what is required to characterize the nature and extent of contamination, and provide a report to the Energy Commission Compliance Project Manager (CPM), BLM Authorized Office (AO) and DTSC with findings and recommended actions.

Proposed Project

Proposed Project - Construction Impacts and Mitigation

Site preparation and construction of the proposed solar project and its associated facilities would last approximately 28 months and generate non-hazardous, universal, and hazardous wastes in solid and liquid forms. Before construction begins, the project owner would develop and implement a Construction Waste Management Plan to ensure that waste is recycled when possible and properly landfilled as necessary. Proposed Condition of Certification **WASTE-4** would require the project owner to submit the Construction Waste Management Plan to the CPM and AO at least 30 days prior to the start of construction activities.

Non-Hazardous Waste

Construction activities would generate an estimated 70 cubic yards per week of non-hazardous solid wastes, consisting of scrap wood, concrete, steel, glass, plastic, paper,

insulating materials, aluminum, and food waste. For all construction waste, recyclable materials would be separated and removed to recycling facilities; non-recyclable materials would be disposed of at a Class III landfill.

Non-hazardous liquid wastes would be generated during construction, and would include storm water runoff, sanitary waste, dust suppression drainage, and equipment wash water. Storm water runoff would be managed in accordance with appropriate LORS. Sanitary wastes would be pumped to tanker trucks by licensed contractors for transport to a sanitary water treatment plant. Potentially contaminated equipment wash water would be contained at designated wash areas and transported to a wastewater treatment facility via a licensed hauler. Please see the **SOIL AND WATER RESOURCES** section of this document for more information on the management of project wastewater.

Universal Waste

Anticipated universal waste generated during construction would include spent batteries (e.g., alkaline dry cell, nickel-cadmium, and lithium ion) and empty or nonempty aerosol cans. Estimated quantities are 30 spent batteries (in 2 ½ years) and eight drums of aerosol cans (per year). Spent batteries and aerosol cans would be recycled by licensed universal waste handlers.

Universal waste would be accumulated for less than one year and recycled off site.

Hazardous Waste

During construction, anticipated hazardous waste includes: empty hazardous material containers; solvents, used oil, paint, and oily rags; heat exchanger cleaning waste (chelant-type solution); and flushing and cleaning wash water. Estimated quantities are: one cubic yard of empty containers (per week); 175 gallons of solvents, used oil, paint, and oily rags (every 90 days); 1,000 gallons of heat exchanger cleaning waste (once per power plant unit); and variable amounts of flushing and cleaning wash water. Empty hazardous material containers would be returned to the vendor or disposed of at a hazardous waste facility; solvents, used oils, paint, and oily rags would be disposed of at a hazardous waste facility, recycled, or used for energy recovery; heat exchanger cleaning waste would be disposed of at a permitted hazardous waste disposal facility; and flushing and cleaning wash water would be recycled, used for energy recovery, or disposed of depending on specific waste stream characteristics (SM 2009a, pages 5.16-13 to 5.16-15).

In the unlikely event that contaminated soil is encountered during excavation activities, the soil would be segregated, sampled, and tested to determine appropriate disposal and treatment options. If the soil is classified as hazardous, the Kern County Environmental Health Services Department would be notified and the soil hauled to a Class I landfill or other appropriate soil treatment and recycling facility, as required. The Kern County Environmental Health Services Department would be notified also if previously unknown wells, tanks, or other underground storage facilities are discovered during construction. Subsequent removal of such equipment, including potential remediation activities, would be conducted in accordance with applicable LORS (SM 2009a, pages 5.16-14 to 15). Commission staff finds that proposed Conditions of

Certification **WASTE-2** and **-3** would be adequate to address any soil contamination contingency that may be encountered during construction of the project and would further support compliance with LORS.

The generation of hazardous waste requires a unique hazardous waste generator identification number. The hazardous waste generator number is determined based on site location and therefore, both the construction contractor and the RSPP project owner/operator could be considered the generator of hazardous wastes at the site. The RSPP project owner would obtain a unique hazardous waste generator identification number for the site prior to starting construction. This would ensure compliance with California Code of Regulation Title 22, Division 4.5. Proposed Condition of Certification **WASTE-5** would require the RSPP project owner to submit the notification and issued identification number documentation to the CPM and AO.

Hazardous wastes would be collected in hazardous waste accumulation containers and stored in a laydown area, warehouse area, or storage tank on equipment skids for less than 90 days (or less than 180 days in the case of lead acid batteries). The accumulated wastes would then be properly manifested, transported, and disposed of at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal firms. Commission staff reviewed the disposal methods and concluded that all wastes would be disposed of in accordance with all applicable LORS. Should any construction waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner would be required by proposed Condition of Certification **WASTE-6** to notify the CPM and AO whenever the owner becomes aware of such action.

Commission staff has reviewed the proposed waste management methods described in AFC section 5.16.3.1 and concludes that project construction wastes would be managed in accordance with all applicable LORS. Absent any unusual circumstances, staff considers project compliance with LORS and staff's proposed conditions of certification to be sufficient to ensure that no significant adverse impacts would occur (per CEQA Guidelines) as a result of construction waste management activities.

Proposed Project - Construction and Demolition (C&D) Waste Diversion and Mitigation

The Integrated Waste Management Act of 1989 [Assembly Bill (AB) 939, Sher, Chapter 1095, Statutes of 1989] set landfill waste diversion goals of 50% (by 2000) for local jurisdictions. To meet this goal, many jurisdictions require applicants for construction and demolition projects to submit a reuse/recycling plan for at least 50% of C&D materials prior to the issuance of a building or demolition permit. While the proposed project is not responsible to a local jurisdiction (neither Ridgecrest nor Kern County has a construction and demolition waste diversion ordinance), Commission staff will require the applicant to meet the 50% waste diversion rate. Adoption of Condition of Certification **WASTE-7** will ensure the applicant meets the waste diversion goals of the C&D program.

Proposed Project - Operation Impacts and Mitigation

The proposed project would generate non-hazardous, universal, and hazardous wastes in solid and liquid forms under normal operating conditions. Table 5.16-6 of the project AFC summarizes the anticipated operation waste streams, estimated waste volumes and generation frequency, and proposed management methods. This information is presented below in **Waste Management Table 2**.

Waste Management Table 2
Summary of Operation Waste Streams and Management Methods

Waste Stream and Classification[1]	Origin and Composition	Estimated Amount	Estimated Frequency of Generation	Waste Management Method	
				Onsite	Offsite
Soil contaminated with HTF (>10,000 mg/kg) – Non-RCRA Hazardous	Solar array equipment leaks	10 cy/year	Intermittent	Accumulate for <90 days	Dispose at Class I landfill or soil thermal treatment facility
Soil contaminated with HTF (< 10,000 mg/kg) – Non-hazardous	Solar array	750 cy/year	Intermittent	Bioremediation or land farming at LTU	Dispose at permitted waste management facility
Spent batteries – Universal waste	Batteries containing heavy metals such as alkaline dry cell, nickel-cadmium, or lithium ion.	<10/month	Continuous	Accumulate for <one year	Recycle
Spent carbon – RCRA Hazardous	Spent activated carbon from air pollution control of HTF vent	60,000 pounds/ year	Intermittent	Contained in engineered process vessel; no accumulation outside of process	Regeneration at a permitted management facility
Spent batteries – Hazardous (exempt if managed as prescribed by Title 22 CCR Chapter 16).	Lead acid	20 every two years	Intermittent	Accumulated for <180 days	Recycle
Spent fluorescent bulbs or high-intensity discharge lamps – Universal waste	Facility lighting	< 50 per year	Intermittent	Accumulate for <one year	Recycle
Dirty shop rags – recyclable material	Maintenance cleaning operations	50 pounds/ month	Routine	None	Clean and recycle at commercial laundry

Waste Stream and Classification[1]	Origin and Composition	Estimated Amount	Estimated Frequency of Generation	Waste Management Method	
				Onsite	Offsite
Oil absorbent, and oil filters – Non-RCRA hazardous	Various	Five 55-gallon drums/ month	Intermittent	Accumulate for <90 days	Recover or dispose at Class I landfill
Effluent from oily water separation system – Non-RCRA hazardous	Plant wash down area/oily water separation system	3,000 gallons/ year	Intermittent	None	Recycle
Used hydraulic fluid, oils, and grease – Non-RCRA hazardous	HTF system, turbine, and other hydraulic equipment	50,000 gallons/year	Intermittent	Accumulate for <90 days	Recycle
Spent demineralizer resin – Non-hazardous	Demineralizer	250 cubic feet (ft^3)	Once every three years	None	Recycle
Reverse Osmosis (RO) Membrane Cleaning Waste – Non-hazardous	Acidic and/or caustic chemicals	3,000 to 6,000 gallons per cleaning	Up to four times per year	Adjust pH and use as dust suppressant	Dispose at permitted waste management facility
RO system concentrate – Inert or liquid designated waste	Auxiliary cooling tower and boiler blowdown	TBD	Routine	Used for dust control if inert waste	Dispose at permitted waste management facility if designated waste
Auxiliary cooling tower basin sludge – Nonhazardous	Auxiliary cooling tower	1,000 pounds/ year	Annually	None	Dispose at permitted waste management facility
Spent softener resin – Non-hazardous	Softener	500 ft^3	Once every 3 years	None	Recycle
Damaged parabolic mirrors – Non-hazardous	Metals and other materials	TBD	Variable	None	Recycle for metal content and/or other materials or send for landfill disposal
Sanitary wastewater - Non-hazardous	Toilets, washrooms	2,800 gallons/day	Continuous	Septic leach field	None

[1] Classification under Title 22 CCR Division 4.5, Chapters 11, 12, and 23.

The project owner would develop and implement an Operations Waste Management Plan. In addition, the project owner would be required to document the project's actual operational waste stream and obtain approval for the Operations Waste Management Plan prior to the start of construction per proposed Condition of Certification **WASTE-8**. These measures would ensure that operational wastes are treated in compliance with all LORS and that an accurate record of the project's waste generation, storage, and disposal practices is maintained.

Heat Transfer Fluid Releases

The RSPP would use Therminol VP-1™ (a synthetic oil consisting of diphenyl ether and biphenyl) for the heat transfer fluid (HTF). Approximately 8,300 metric tons (1.3 million gallons of Therminol VP-1™ would be present within the solar system, including the piping and necessary expansion tanks; no additional HTF would be stored on site (SM 2009a, page 5.6-17).

Occasional spills of HTF from either equipment failure or human error can result in the generation of contaminated soil. HTF spills typically spread laterally on the bare ground and soak down to a relatively shallow depth. The contaminated soil is regulated as a hazardous material by the State of California due to the constituent biphenyl. Biphenyl is listed in Title 22, CCR, Chapter 11 Appendix X (list #299) as an extremely hazardous waste. The listing of a chemical in Appendix X creates the regulatory presumption that a waste containing that chemical (i.e. HTF contaminated soil) is hazardous unless determined otherwise, pursuant to specified procedures. The determination is required to be based on criteria and lists in Title 22, California Code of Regulations, Section 66261.1 et seq., which identify hazardous wastes subject to regulation. DTSC made a 1995 determination that a 10,000 mg/kg concentration of HTF would be assumed hazardous for SEGS III-VI at Kramer Junction. This determination, however, cannot be extrapolated to the proposed project, and DTSC has indicated that determination of whether a discharge of HTF constitutes a hazardous waste would have to be made on a case by case basis (CEC2009t). Once a history of discharges has been established, the applicant may petition DTSC for their concurrence on a standardized waste classification for HTF contaminated soils generated at the facility (Title 22, CCR, section 66260.200(d)). Depending on DTSC findings an operator could modify their operations to standardize treatment and eliminate the need for case by case determinations.

Title 22, CCR, section 66260.200(f) places the responsibility of determining whether a waste must be classified as hazardous on the generator of that waste. The RSPP project owner would therefore be required to assess the waste classification for HTF-impacted soils at the RSPP facility in consultation with the CEC, AO, DTSC, and Lahontan Regional Water Quality Control Board (RWQCB).

The applicant estimates generating 750 cubic yards per year of soil with HTF concentrations less than 10,000 mg/kg and10 cubic yards per year of soil with higher concentrations. (see **Waste Management Table 2**). The two solar fields would share the same LTU to bioremediate or land farm the contaminated soils. The LTU would be constructed with a clay liner at least five feet deep per Title 27 requirements; monitoring would be used to evaluate liner integrity (see **SOIL AND WATER RESOURCES** section). The applicant anticipates that bioremediation would be used for soils with HTF

levels between 1,000 and 10,000 mg/kg and land farming would be used for soils with HTF levels between 100 mg/kg and 1,000 mg/kg. Soils with HTF levels below 100 mg/kg would be stockpiled on site and used on site for fill as needed (SM 2009a, page 5.16-19 to 20).Soils with an HTF concentration greater than 10,000 mg/kg would be disposed of at a Class I landfill or soil thermal treatment facility (SM 2009a, page 5.16-19 to 20). The nearest soil thermal treatment facility is TPST Soil Recyclers of California in Adelanto, 75 miles south of the site.

The RSPP project owner would develop and implement an Operations Waste Management Plan per Mitigation Measure WM-2, which would include: a discussion of the appropriate frequency for characterizing HTF-contaminated soils; the level of HTF in soil that would be considered hazardous waste; and sampling and testing protocols for HTF-contaminated soils. In addition, the project owner would be required to document the project's actual operational waste stream and obtain approval for the Operations Waste Management Plan prior to the start of construction per proposed Condition of Certification **WASTE-8**. These measures would ensure that HTF-contaminated soils are treated in compliance with all LORS.

The applicant's proposed treatment and disposal methods are generally consistent with and would provide for compliance with the Requirements for Waste Discharge established by the Lahontan RWQCB and presented in the **SOIL AND WATER RESOURCES** section of this document. Commission staff proposes Condition of Certification **WASTE-9** to address the Requirements of Waste Discharge. This would require the applicant to comply with the requirements for accidental discharges of HTF associated with the operation of the project and ensure that hazardous concentrations of contaminated HTF-soil will not be treated in the LTU. With implementation of Condition of Certification **Waste-9** there would be no significant adverse impacts under CEQA due to HTF spills during project operation.

Non-Hazardous Waste

Proposed project operation would generate an estimated 20 cubic yards per week of non-hazardous solid waste. Non-hazardous solid wastes generated during project operations would consist of dirty shop rags, soil contaminated with heat transfer fluid (HTF), spent demineralizer resin, auxiliary cooling tower basin sludge, spent softener resin, damaged parabolic mirrors, used air filters, office paper, newsprint, aluminum cans, plastic and glass containers, and other miscellaneous domestic and office waste. Estimated quantities are: 50 pounds of dirty shop rags (per month); 750 cubic yards of soil contaminated with HTF at less than 10,000 milligrams per kilogram (per year); 250 cubic feet of spent demineralizer resin (once every three years); 1,000 pounds of auxiliary cooling tower basin sludge (per year); 500 cubic feet of spent softener resin (once every three years); and variable amounts of damaged parabolic mirrors and other waste.

Dirty shop rags would be sent to a commercial laundry for cleaning and recycling; spent demineralizer resin would be recycled; auxiliary cooling tower basin sludge would be disposed of at a permitted waste management facility; spent softener resin would be recycled; and damaged parabolic mirrors would be recycled to the extent possible and the remainder disposed of at a Class III facility.

Occasional spills and leaks of HTF are anticipated as a result of unavoidable equipment failures during operation of the proposed project. As discussed above, soil contaminated with HTF at a concentration less than 10,000 milligrams per kilogram (or other threshold value to be determined by DTSC) would be treated on site at one of the project's two land treatment units, stockpiled on site, and used on site as fill material as needed.

The remaining non-hazardous solid wastes would be recycled to the greatest extent possible, and the remainder would be removed on a regular basis for disposal in a Class III landfill.

Non-hazardous liquid wastes would be generated during facility operation and would include reverse osmosis membrane cleaning waste, reverse osmosis system concentrate, sanitary wastewater, and storm water runoff. Quantities would include 3,000 to 6,000 gallons of reverse osmosis membrane cleaning waste per cleaning (up to four times per year) and 2,800 gallons of sanitary wastewater (per day). The quantity of reverse osmosis system concentrate has not yet been determined, but would be classified as either inert or designated waste.

Reverse osmosis membrane cleaning waste would be adjusted to neutralize its pH and used as a dust suppressant on site or disposed of at a permitted waste management facility. Sanitary waste water would be piped to an on-site septic system and leach field. Reverse osmosis system concentrate would be used for dust control if determined to be inert or disposed of at a permitted waste management facility if determined to be designated waste.

Stormwater runoff is discussed in the **SOIL AND WATER RESOURCES** section of this document.

Universal Waste

Project operations would generate universal waste, including: spent batteries (e.g., alkaline dry cell, nickel-cadmium, and lithium ion) and spent fluorescent bulbs or high-intensity discharge lamps. Estimated annual quantities are less than 120 spent batteries and less than 50 spent fluorescent bulbs.

Universal waste would be accumulated for less than one year and recycled off site.

Hazardous Waste

Project operations would generate hazardous wastes including: used hydraulic fluid, oils, and grease associated with the HTF system, turbine, and other hydraulic equipment; effluent from the oily water separation system resulting from plant wash down; oil adsorbent and oil filters; spent carbon from air pollution control of the HTF vent; soil contaminated with HTF as a result of solar array equipment leaks; and spent lead acid batteries. Estimated quantities include: 50,000 gallons of used hydraulic fluid, oils, and grease (per year); 3,000 gallons of effluent from the oily water separation system (per year); five 55-gallon drums of oil adsorbent and oil filters (per month);

60,000 pounds of spent carbon (per year); 10 cubic yards of soil contaminated with HTF at concentrations greater than or equal to 10,000 milligrams per kilogram (per year); and 20 lead acid batteries (every two years).

Used hydraulic fluid, oils, and grease would be recycled; effluent from the oily water separation system would be recycled; oil adsorbent and oil filters would be sent offsite for recovery or disposal at a Class I landfill; spent activated carbon would be sent off site for regeneration at a permitted management facility; HTF-contaminated soil (concentration greater than 10,000 mg/kg) would be sent off site for disposal at a Class I landfill or to a soil thermal treatment facility; and spent lead acid batteries would be recycled (SM 2009a, pages 5.16-16).

The RSPP project owner would be considered the generator of hazardous wastes at the site during facility operations. Therefore, the RSPP project owner's unique hazardous waste generator identification number, obtained prior to construction, would be retained and used for the handling and disposal of hazardous waste generated during facility operation.

Proper hazardous material handling, good housekeeping practices, and personnel training would help keep spill wastes to a minimum. However, to ensure proper cleanup and management of any contaminated soils or waste materials generated from hazardous materials spills, Commission staff proposes Condition of Certification **WASTE-10,** requiring the project operator to document, clean up, and properly manage and dispose of wastes from any hazardous materials spills or releases in accordance with all applicable federal, state, and local requirements. More information related to hazardous materials management is provided in the **HAZARDOUS MATERIALS MANAGEMENT** section of this document.

The hazardous wastes generated during proposed project operations would be temporarily stored on site, transported off site by licensed hazardous waste haulers, and recycled or disposed of at authorized disposal facilities in accordance with established standards applicable to generators of hazardous waste (Title 22, Cal. Code Regs., §66262.10 et seq.). Should any operations waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner would be required by proposed Condition of Certification **WASTE-6** to notify the CPM and AO when advised of any such action.

Proposed Project - Closure and Decommissioning Impacts and Mitigation

The closure or decommissioning of the proposed project would produce both hazardous and non-hazardous solid and liquid waste. Required elements of a facility's closure would be outlined in a facility closure plan as specified in Conditions of Certification **COMPLIANCE 11, 12, and 13** [(see **Section E.1**). To ensure adequate review of a planned project closure, the RSPP project owner shall submit a proposed facility closure plan to the Energy Commission for review and approval at least 12 months (or other period of time agreed to by the CPM and AO) prior to commencement of closure activities. The facility closure plan will document non-hazardous and hazardous waste

management practices including: the inventory, management, and disposal of hazardous materials, contaminated soils and wastes; and permanent disposal of permitted hazardous materials and waste storage units.

Conditions of Certification **WASTE-2**, **-3**, and **-5** through **-10** would continue to apply to the proposed project during closure and decommissioning of the project.

Proposed Project - Impact on Existing Waste Disposal Facilities

Non-Hazardous Waste

Construction of the proposed project would generate 70 cubic yards per week and project operations would generate approximately 20 cubic yards per week of nonhazardous solid waste. The waste would be stored on site in appropriate containers and recycled or disposed of in a Class III landfill on a regular basis.

Table 5.16-4 of the project AFC identifies seven Class III waste disposal facilities in Kern County that could potentially accommodate the non-hazardous construction and operation wastes generated by the proposed project. Table DR-242-3 of the Applicant's responses to Commission staff data requests (SM 2010a) provides further details about which types of project wastes could potentially be handled at the Ridgecrest-Inyokern, Bakersfield Metropolitan, Shafter-Wasco, and Taft Sanitary Landfills. The facility closest to the proposed project site is the Ridgecrest-Inyokern Sanitary Landfill at less than 7 miles away; remaining capacity at this landfill is 5,000,989 cubic yards with an estimated closure date of 2014. All seven landfills have a combined remaining capacity of over 66.6 million cubic yards (SM 2009a page 5.16-9).

The total amount of non-hazardous solid waste generated from project construction is estimated to be 8,500 cubic yards (70 cubic yards per week for 28 months), and the total amount from lifetime operations is estimated to be 31,000 cubic yards or more (20 cubic yards per week for 30 years or more). These quantities include both recyclable and non-recyclable wastes, and the operations waste stream value includes a substantial amount of HTF-contaminated soil that would be treated and reused on site. If reverse osmosis membrane cleaning waste is not combined with dust control water and spread on roads, up to 3,600 cubic yards could require disposal over the project lifetime.

The non-recyclable, non-reusuable component of the waste streams would contribute less than 0.06% of the available Class III landfill capacity in Kern County. Staff finds that disposal of the non-hazardous solid wastes generated by the proposed project could occur without impacting the capacity or remaining life of the seven Class III facilities in Kern County.

Hazardous Waste

Table 5.16-4 of the project AFC identifies two Class I waste disposal facilities that are currently accepting waste and could be used to manage proposed project wastes: the Clean Harbors Buttonwillow Landfill in Kern County and the Chemical Waste Management Kettleman Hills Landfill in Kings County. In total, there is a combined excess of 10 million cubic yards of remaining hazardous waste disposal capacity at

these landfills, with at least 30 years remaining in their operating lifetimes (SM 2009a, page 5.16-10). In addition, the Kettleman Hills facility is in the process of permitting an additional 4.6 to 4.9 million cubic yards of disposal capacity (Waste Management 2009). Table DR-242-2 of the Applicant's responses to Commission staff data requests provides further information about these facilities, along with Filter Recycling Services, Inc. in Rialto (which could accept the project's spent batteries and fluorescent bulbs; aerosol cans; flushing and cleaning wash water; used oils and hydraulic fluid; and oil adsorbent and filters) and Siemen's Water Technology Carbon Regeneration Facility in Parker, Arizona (which accepts spent carbon).

Hazardous wastes generated during construction, operation and closure/decommissioning would be recycled to the extent possible and practical. Those wastes that cannot be recycled would be transported off site to a permitted treatment, storage, or disposal facility. As calculated from waste streams presented in AFC Tables 5.16-5 and 5.16-6 (SM 2009a, pages 5.16-13 through 5.16-17), approximately 135 cubic yards of recyclable and non-recyclable hazardous waste would be generated over the 28-month construction period. Up to 790 cubic yards of non-recyclable hazardous waste would be generated over the 30-year operating lifetime; however a portion of this quantity could be recovered (oil absorbent and oil filters) or treated (HTF contaminated soil) and not require landfill disposal. Thus the quantity of hazardous wastes from the proposed project requiring off-site disposal would be less than 0.001% of the combined remaining capacity of the two Class 1 waste facilities.

C.13.4.3 CEQA LEVEL OF SIGNIFICANCE

Absent any unusual circumstances, staff considers project compliance with LORS and staff's conditions of certification to be sufficient to ensure that no significant impacts would occur as a result of project waste management.

The existing available capacity for the Class III landfills that may be used to manage nonhazardous project waste exceeds 66.6 million cubic yards. The total amount of non-hazardous waste generated from construction, operation and closure/decommissioning of the proposed project would contribute much less than 1% of the projected landfill capacity. Therefore, disposal of project-generated non-hazardous waste would have a less-than-significant adverse impact on Class III landfill capacity.

In addition, the two Class I disposal facilities that could be used for hazardous waste generated by the construction, operation and closure/decommissioning of the proposed project have a combined remaining capacity in excess of 10 million cubic yards, with another 4.6 to 4.9 million cubic yards of proposed capacity. The total amount of hazardous wastes generated by the proposed project would not impact the remaining Class I landfill capacity.

C.13.5 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because (1) it eliminates about 42% of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources

(desert tortoise and Mohave ground squirrel), cultural resources, and recreational uses, and (2) avoids constructing a solar facility in the Mohave Ground Squirrel Conservation Area (MGSCA).

The Northern Unit Alternative would consist of 167 solar collector array loops with a net generating capacity of approximately 146 MW. The total disturbance area would be approximately 1134 acres of land. This alternative would retain 58% of the proposed solar array loops and would affect 58% of the land of the proposed 250 MW project. The boundaries of the Northern Unit Alternative are shown in **Alternatives Figure 1**.

C.13.5.1 SETTING AND EXISTING CONDITIONS

This alternative includes the northern solar field as proposed for the RSPP, but eliminates the southern solar field. The setting for the northern solar field would not change from that for the proposed project. Routes for the water pipeline and transmission interconnection would remain the same, but the relocation of the two existing SCE transmission lines would not be required. The power block would remain in the same place, but its components would be reduced in scale by 42%.

C.13.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Northern Unit alternative would generate similar types of hazardous and non-hazardous wastes from construction, operation and closure/decommissioning of the project. In accordance with the 42% reduction in the number of solar arrays, the quantities of waste would be reduced, for the most part, by 42%. Waste streams which may see less of a reduction include reverse osmosis membrane cleaning waste, reverse osmosis system concentrate, and sanitary wastewater quantities. Under these assumptions, the amount of non-hazardous and hazardous solid wastes generated under a Northern Unit alternative that would require landfill/treatment over the life of the project would thus be reduced to approximately 22,900 cubic yards and 540 cubic yards, respectively. Wastes would comply with LORS, and would not impact the remaining capacity of off-site disposal facilities. Disposal methods would remain the same as for the proposed project and the same Conditions of Certification (**WASTE-1 through -10** and **COMPLIANCE-11 through 13)** would apply. .

C.13.5.3 CEQA LEVEL OF SIGNIFICANCE

Similar to the proposed project, staff considers project compliance with LORS and staff's conditions of certification to be sufficient to ensure that no significant adverse impacts would occur as a result of waste management associated with the Northern Unit alternative.

C.13.6 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would be a 104 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because it eliminates about 58 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources, and cultural resources.

The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of approximately 104 MW. The total disturbance area would be approximately 908 acres of land. This alternative would retain 42 percent of the proposed solar array loops and would affect 42 percent of the land of the proposed 250 MW project.

The boundaries of the Southern Unit Alternative are shown in **Alternatives Figure 2**. This area would avoid a large portion of the El Paso Wash and sensitive biological resources, including areas that were mapped as occupied tortoise and Mohave ground squirrel habitat (live tortoise and/or active burrows and sign).

C.13.6.1 SETTING AND EXISTING CONDITIONS

This alternative includes the southern solar field as proposed for the RSPP, but eliminates the northern solar field. The setting for the southern solar field would not change from that for the proposed project. Routes for the water pipeline and transmission interconnection would remain the same, and the proposed relocation of the two existing SCE transmission lines would take place. The power block would remain in the same place, but components would be reduced in scale by 58 percent.

C.13.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Southern Unit alternative would generate similar types of hazardous and non-hazardous wastes from construction, operation and closure/decommissioning of the project. In accordance with the 58 percent reduction in the number of solar arrays, the quantities of waste would be reduced for the most part by 58 percent. Waste streams which may see less of a reduction include reverse osmosis membrane cleaning waste, reverse osmosis system concentrate, and sanitary wastewater quantities. Under these assumptions, the amount of non-hazardous and hazardous solid wastes generated under a Southern Unit alternative that could require landfill/treatment over the life of the project would thus be reduced to approximately 16,600 cubic yards and 390 cubic yards, respectively. Wastes would comply with applicable LORS and would not impact the remaining capacity of off-site disposal facilities. Disposal methods would remain the same as for the proposed project and the same Conditions of Certification (**WASTE-1 through -10** and **COMPLIANCE-11 through 13)** would apply.

C.13.6.3 CEQA LEVEL OF SIGNIFICANCE

Similar to the proposed project, staff considers project compliance with LORS and staff's conditions of certification to be sufficient to ensure that no significant adverse impacts would occur as a result of waste management associated with the Southern Unit alternative.

C.13.7 ORIGINAL PROPOSED PROJECT ALTERNATIVE

The Original Proposed Project Alternative would be a 250 MW solar facility as originally proposed by Solar Millennium. This alternative is analyzed because it would reduce the amount of land developed within the Mojave Ground Squirrel Conservation Area and it could transmit the full 250 MW of power that Solar Millennium has requested.

The Original Proposed Project Alternative would consist of 278 solar array loops with a net generating capacity of approximately 250 MW. The total disturbance area would be approximately 1,794 acres of land. A shorter transmission interconnection – 1,250 feet as compared to the proposed project interconnection of 3,900 feet – would be needed.

The boundaries of the Original Proposed Project Alternative are shown in **Alternatives Figure 3**. This project footprint contains two desert ephemeral washes that would require redirection and smaller dry desert washes also traverse the site. In addition this site is the location of prime desert tortoise and Mojave ground squirrel habitat.

C.13.7.1 SETTING AND EXISTING CONDITIONS

This alternative includes the southern and northern solar fields and other components as proposed for the RSPP, but with a slightly more compact configuration. The setting would not change from that for the proposed project. Linear routes would be slightly altered (onsite), and the power block would be on the south rather than north side of Brown Road. The power block components would be the same scale as the proposed project.

C.13.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Original Proposed Project alternative would generate similar types and quantities of hazardous and non-hazardous wastes from construction, operation and closure/decommissioning of the project. The amount of non-hazardous and hazardous solid wastes generated under an Original Proposed Project alternative that would require landfill/treatment over the life of the project would be up to approximately 39,500 cubic yards and 925 cubic yards, respectively. Similar to the proposed project, wastes requiring off-site disposal would not impact the remaining capacity of off-site disposal facilities. Disposal methods would remain the same as for the proposed project and the same Conditions of Certification (**WASTE-1 through -10** and **COMPLIANCE-11 through 13)** would apply.

C.13.7.3 CEQA LEVEL OF SIGNIFICANCE

Similar to the proposed project, staff considers project compliance with LORS and staff's conditions of certification to be sufficient to ensure that no significant adverse impacts would occur as a result of waste management associated with the Original Proposed Project alternative.

C.13.8 NO PROJECT/NO ACTION ALTERNATIVES

C.13.8.1 NO PROJECT/NO ACTION ALTERNATIVE #1:

No Action on Ridgecrest Solar Power Project application and on CDCA land use plan amendment

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and

BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, no new wastes would be generated. This No Project/No Action Alternative would not result in impacts to waste management at this location. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations

C.13.8.2 NO PROJECT/NO ACTION ALTERNATIVE #2:

No Action on Ridgecrest Solar Power Project and amend the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with another solar technology. Different solar technologies would create different amounts and types of wastes based on the technology components and requirements; however, it is expected that the construction of all solar technologies at the site would generate waste. As such, impacts to waste management from the solar project would likely be similar to impacts to waste management from the proposed project. Therefore, this No Project/No Action Alternative could result in waste management impacts similar to the impacts under the proposed project.

C.13.8.3 NO PROJECT/NO ACTION ALTERNATIVE #3:

No Action on Ridgecrest Solar Power Project application and amend the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended so no solar projects can be approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, no wastes would be generated from the construction or operation of the

proposed project under this alternative. Therefore, this No Project/No Action Alternative would not result in impacts to waste management. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.13.9 COMPARISON OF ALTERNATIVES AND PROPOSED PROJECT

Waste Management Table 3 provides a comparison of the project alternatives.

Waste Management Table 3
Comparison of Proposed Project and Alternatives

	Proposed Project (250 MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250 MW)	No Project/No Action
Conforms with LORS	Yes	Yes	Yes	Yes	N/A
Exceeds landfill capacity	No	No	No	No	N/A

C.13.10 CUMULATIVE IMPACTS

A project may result in an adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (California Code Regulation, Title 14, section 15130). NEPA states that cumulative effects can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR §1508.7).

There is the potential for substantial future development throughout the southern California desert region. Analysis of cumulative impacts is based on data provided in the following tables and maps (see **Section B.3, CUMULATIVE SCENARIO**):

- Cumulative Impacts Table 1A, Renewable Energy Projects in the BLM California Desert District
- Cumulative Impacts Table 1B, Renewable Energy Projects on State and Private Lands in California Desert District Counties
- Cumulative Impacts Table 2, Existing Projects in the Ridgecrest Area
- Cumulative Impacts Table 3, Future Foreseeable Projects in the Ridgecrest Area
- Cumulative Impacts Figure 1, Renewable Energy Applications in the California Desert District
- Cumulative Impacts Figure 2, Renewable Energy Applications in the Ridgecrest District Area
- Cumulative Impacts Figure 3, Existing and Future/Foreseeable Projects in the Ridgecrest Area.

The analysis in this section first defines the geographic area over which cumulative impacts related to waste management could occur. The cumulative impact analysis itself describes the potential for cumulative impacts to occur as a result of implementation of the RSPP project along with the listed local and regional projects.

C.13.10.1 GEOGRAPHIC EXTENT

Cumulative impacts can occur if implementation of the RSPP Project could combine with those of other local or regional projects. Cumulative impacts could also occur as a result of development of some of the many proposed solar and wind development projects that have been or are expected to be under consideration by local governments, the BLM and the Energy Commission in the near future. Many of these projects are located within the California Desert District.

C.13.10.2 CUMULATIVE IMPACT ANALYSIS

This analysis evaluates the cumulative contribution of RSPP project waste disposal in two categories: (1) future projects in the Ridgecrest area, and (2) future renewable energy projects in the California desert.

Local Projects

The RSPP project waste disposal volumes would combine with the waste volumes from the following proposed projects within an approximate 15-20 mile radius around the project site: China Lake Naval Weapons Air Center Base Realignment and Closure, City of Ridgecrest New Wastewater Treatment Plant, Super Walmart, Caltrans Freeman Gulch and Inyokern highway upgrades, a 600 MW solar photovoltaic plant, and three wind projects (Cumulative Impacts Table 3). Other smaller commercial and residential projects would also likely occur in the area. Although the waste volumes would be greatest during construction, the actual construction schedule of each project would not likely be coincident such that local landfill daily disposal limitations would be exceeded. Routine (operation) waste disposal of all foreseeable commercial, residential, and energy projects in the Ridgecrest area may combine to occasionally exceed the 701 ton per day limit at the Ridgecrest-Inyokern Sanitary Landfill without adversely impacting the 5 million cubic yards of remaining capacity. The Ridgecrest-Inyokern Sanitary Landfill is the nearest Class III disposal site for these Ridgecrest area projects and would likely be the first choice for disposal. However, several other landfills are located within 100 miles of RSPP with much larger daily disposal limits. The total amount of available solid waste landfill capacity in Kern County exceeds 66.6 million cubic yards. Therefore, even if all of the abovementioned reasonably foreseeable projects in the Ridgecrest area were constructed, Commission staff concludes that the waste generated by the RSPP project would not result in adverse cumulative waste management impacts.

Regional Projects

As shown in Cumulative Impacts Figure 1 and Table 1A, solar and wind applications for use of BLM and private land cover approximately 1 million acres of the California Desert District. Additional renewable projects are proposed on private and state lands, including at least 7 solar projects and 6 wind projects in Kern County (Cumulative Impacts Table 1B). Implementation of the multiple solar and wind projects proposed to

be developed in the California Desert, and other planned non-energy projects, would result in an increase in generation of hazardous and non-hazardous solid and liquid waste and would add to the total quantity of waste generated in throughout the desert. However, project wastes would be recycled wherever practical and sufficient capacity is available throughout the region, especially with the addition of the Mesquite Regional Landfill with a capacity of 600 million tons and scheduled to be fully operational in 2011/2012 (Mesquite Regional Landfill 2010). Therefore, impacts of the RSPP project, when combined with impacts of the future solar and wind, and other development projects currently proposed within the California desert, would not result in adverse and unavoidable cumulative impacts, under CEQA, with regard to waste management.

C.13.10.3 CUMULATIVE IMPACT CONCLUSION

Impacts of the RSPP project would combine with impacts of past, present, and reasonably foreseeable projects to result in a contribution to local and regional cumulative impacts related to waste management.

The amount of non-hazardous and hazardous wastes generated during construction, operation and closure/decommissioning of the RSPP project would add to the total quantity of hazardous and non-hazardous waste generated in Kern County. However, sufficient capacity is available at treatment and disposal facilities to handle the volumes of wastes that would be generated by the projects. Therefore, Commission staff concludes that the waste generated by the RSPP project would not result in adverse cumulative waste management impacts, under CEQA, either locally or regionally.

C.13.11 COMPLIANCE WITH LORS

Energy Commission staff concludes that the proposed project would comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during both facility construction and operation. The applicant is required to recycle and/or dispose of hazardous and non-hazardous wastes at facilities licensed or otherwise approved to accept the wastes. Because hazardous wastes would be produced during both project construction and operation, the proposed project would be required to obtain a hazardous waste generator identification number from U.S. EPA. The proposed project would also be required to properly store, package, and label all hazardous waste; use only approved transporters; prepare hazardous waste manifests; keep detailed records; and appropriately train employees in accordance with state and federal hazardous waste management requirements.

C.13.12 NOTEWORTHY PUBLIC BENEFITS

Commission staff has not identified any noteworthy public benefits associated with waste management.

C.13.13 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

As required by CEQA and Energy Commission regulations, Commission staff recommends the following Conditions of Certification:

WASTE-1 The project owner shall prepare a UXO Identification, Training and Reporting Plan to properly train all site workers in the recognition, avoidance and reporting of military waste debris and ordnance. The project owner shall submit the plan to the CPM for review and approval prior to the start of construction. The plan shall contain, at a minimum, the following:

- A description of the training program outline and materials, and the qualifications of the trainers; and
- Identification of available trained experts that will respond to notification of discovery of any ordnance (unexploded or not); and
- Work plan to recover and remove discovered ordnance, and complete additional field screening, possibly including geophysical surveys to investigate adjacent areas for surface, near surface or buried ordnance in all proposed land disturbance areas.

The project owner shall provide documentation of the plan and provide survey results to the CPM and AO.

Verification: The project owner shall submit the UXO Identification, Training and Reporting Plan to the CPM and AO for approval no less than 60 days prior to the initiation of construction activities at the site. The results of geophysical surveys shall be submitted to the CPM and AO within 30 days of completion of the surveys.

WASTE-2 The project owner shall provide the résumé of an experienced and qualified Professional Engineer or Professional Geologist to the CPM and AO for review and approval. The résumé shall show experience in remedial investigation and feasibility studies. This Professional Engineer or Professional Geologist shall be available during site characterization (if needed), excavation, grading, and demolition activities. The Professional Engineer or Professional Geologist shall be given authority by the project owner to oversee any earth-moving activities that have the potential to disturb contaminated soil and impact public health, safety, and the environment.

Verification: At least 30 days prior to the start of site mobilization the project owner shall submit the resume to the CPM and AO for review and approval.

WASTE-3 If potentially contaminated soil is identified during site characterization, excavation, grading, or demolition at either the proposed site or linear facilities—as evidenced by discoloration, odor, detection by handheld instruments, or other signs—the Professional Engineer or Professional Geologist shall inspect the site; determine the need for sampling to confirm the nature and extent of contamination; and provide a written report to the project owner, representatives of Department of Toxic Substances Control

(DTSC) or Regional Water Quality Control Board (RWQCB), and the Compliance Project Manager (CPM) stating the recommended course of action.

Depending on the nature and extent of contamination, the Professional Engineer or Professional Geologist shall have the authority to temporarily suspend construction activity at that location for the protection of workers or the public. If in the opinion of the Professional Engineer or Professional Geologist significant remediation may be required, the project owner shall contact the CPM and representatives of the DTSC or RWQCB for guidance and possible oversight.

Verification: The project owner shall submit any reports filed by the Professional Engineer or Professional Geologist to the CPM within 5 days of their receipt. The project owner shall notify the CPM and AO within 24 hours of any orders issued to halt construction.

WASTE-4 The project owner shall submit a Construction Waste Management Plan to the CPM and AO for review and approval prior to the start of construction. The plan shall contain, at a minimum, the following:

- A description of all construction waste streams, including projections of frequency, amounts generated and hazard classifications;
- A survey of structures to be demolished that identifies the types of waste to be managed; and
- Management methods to be used for each waste stream, including temporary on-site storage, housekeeping and best management practices to be employed, treatment methods, and companies providing treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/reduction plans.

Verification: The project owner shall submit the Construction Waste Management Plan to the CPM and AO for approval no less than 30 days prior to the initiation of construction activities at the site.

WASTE-5 The project owner shall obtain a hazardous waste generator identification number from the United States Environmental Protection Agency (USEPA) prior to generating any hazardous waste during project construction and operations.

Verification: The project owner shall keep a copy of the identification number on file at the project site and provide documentation of the hazardous waste generation and notification and receipt of the number to the CPM and AO in the next scheduled Monthly Compliance Report after receipt of the number. Submittal of the notification and issued number documentation to the CPM and AO is only needed once unless there is a change in ownership, operation, waste generation, or waste characteristics that requires a new notification to USEPA. Documentation of any new or revised hazardous waste generation notifications or changes in identification number shall be provided to the CPM and AO in the next scheduled compliance report.

WASTE-6 Upon notification of any impending waste management-related enforcement action by any local, state, or federal authority, the project owner shall notify the CPM and AO of any such action taken or proposed against the project itself, or against any waste hauler or disposal facility or treatment operator with which the owner contracts, and describe how the violation will be corrected.

Verification: The project owner shall notify the CPM and AO in writing within 10 days of becoming aware of an impending enforcement action. The CPM and AO shall notify the project owner of any changes that will be required in the way project-related wastes are managed.

WASTE-7 The project owner shall prepare and implement a waste diversion plan for at least 50 percent of construction waste and demolition materials prior to any building or demolition. The waste diversion plan shall provide for the means of achieving the recycling, reuse, composting, and/or salvage of a minimum of 50 percent by weight of construction waste and demolition materials generated on site. The project owner shall provide documentation of compliance to the CPM and AO, including a waste diversion summary report, receipts, and records of measurement. Project mobilization and construction shall not proceed until the CPM and AO issue an approval document.

Verification: At least 60 days prior to the start of any construction or demolition activities, the project owner shall submit a waste diversion plan to the CPM and AO for review and approval. The project owner shall ensure that project activities are consistent with the approved waste diversion plan and provide adequate documentation of the types and volumes of wastes generated, how the wastes were managed, and volumes of wastes diverted. Project mobilization and construction shall not proceed until the CPM and AO issues an approval document. Not later than 60 days after completion of project construction, the project owner shall submit documentation of compliance with the diversion program requirements to the CPM and AO. The required documentation shall include a waste diversion summary report along with all necessary receipts and records of measurement from entities receiving project wastes.

WASTE-8 The project owner shall submit the Operation Waste Management Plan to the CPM and AO for review and approval. The plan shall contain, at a minimum, the following:

- A detailed description of all operation and maintenance waste streams, including projections of amounts to be generated, frequency of generation, and waste hazard classifications;
- Management methods to be used for each waste stream, including temporary on-site storage, housekeeping and best management practices to be employed, treatment methods and companies providing treatment services, waste testing methods to ensure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/source reduction plans;
- Information and summary records of conversations with the local Certified Unified Program Agency and the Department of Toxic Substances Control

regarding any waste management requirements necessary for project activities. Copies of all required waste management permits, notices, and/or authorizations shall be included in the plan and updated as necessary;

- A detailed description of how facility wastes will be managed and any contingency plans to be employed, in the event of an unplanned closure or planned temporary facility closure; and
- A detailed description of how facility wastes will be managed and disposed upon closure of the facility.

Verification: The project owner shall submit the Operation Waste Management Plan to the CPM and AO for approval no fewer than 30 days prior to the start of project operation. The project owner shall submit any required revisions to the CPM and AO within 20 days of notification from the CPM that revisions are necessary.

The project owner shall also document in each Annual Compliance Report the actual volume of wastes generated and the waste management methods used during the year, provide a comparison of the actual waste generation and management methods used to those proposed in the original Operation Waste Management Plan, and update the Operation Waste Management Plan as necessary to address current waste generation and management practices.

WASTE-9 The project owner shall submit to the CPM, AO and DTSC for approval the applicant's assessment of whether the HTF-contaminated soil is considered hazardous or non-hazardous under state regulations. HTF-contaminated soil that exceeds the hazardous waste levels must be disposed of in accordance with California Health and Safety Code (HSC) Section 25203. HTF-contaminated soil that does not exceed the hazardous waste levels may be discharged into the land treatment unit (LTU). For discharges into the LTU, the project owner shall comply with the Waste Discharge Requirements contained in the Soil & Water Resources section of this document.

Verification: The project owner shall document all releases and spills of HTF as described in Condition of Certification **WASTE-10** and as required in the Soil & Water Resources section of this document. Cleanup and temporary staging of HTF-contaminated soils shall be conducted in accordance with the approved Operation Waste Management Plan required in Condition of Certification of **WASTE-8**. The project owner shall sample HTF-contaminated soil in accordance with the United States Environmental Protection Agency's (USEPA) current version of "Test Methods for Evaluating Solid Waste" (SW-846). Samples shall be analyzed in accordance with USEPA Method 8015 or other method to be reviewed and approved by DTSC and the CPM.

Within 14 days of an HTF spill the project owner shall provide the results of the analyses and their assessment of whether the HTF-contaminated soil is considered hazardous or non-hazardous to DTSC and the CPM for review and approval.

If DTSC and the CPM determine the HTF-contaminated soil is considered hazardous it shall be disposed of in accordance with California Health and Safety Code (HSC)

Section 25203 and procedures outlined in the approved Operation Waste Management Plan required in Condition of Certification **WASTE-8** and reported to the CPM in accordance with Condition of Certification **WASTE-10**.

If DTSC and the CPM determine the HTF-contaminated soil is considered non-hazardous it shall be retained in the LTU and treated on-site in accordance with the Waste Discharge Requirements contained within in the Soil & Water Resources section of this document.

WASTE-10 The project owner shall ensure that all accidental spills or unauthorized releases of hazardous substances, hazardous materials, and hazardous waste are documented and remediated, and that wastes generated from accidental spills and unauthorized releases are properly managed and disposed of in accordance with all applicable federal, state, and local requirements.

Verification: The project owner shall document management of all accidental spills and unauthorized releases of hazardous substances, hazardous materials, and hazardous wastes that occur on the project property or related linear facilities. The documentation shall include, at a minimum, the following information: location of release; date and time of release; reason for release; volume released; how release was managed and material cleaned up; amount of contaminated soil and/or cleanup wastes generated; if the release was reported; to whom the release was reported; release corrective action and cleanup requirements placed by regulating agencies; level of cleanup achieved and actions taken to prevent a similar release or spill; and disposition of any hazardous wastes and/or contaminated soils and materials that may have been generated by the release. A copy of the accidental spill or unauthorized release documentation shall be provided to the CPM and AO within 30 days of the date the release was discovered.

C.13.14 CONCLUSIONS

Consistent with the three main objectives for Commission staff's waste management analysis (as noted in the Introduction section of this analysis), staff provides the following conclusions:

After review of the applicant's proposed waste management procedures, Commission staff concludes that project wastes would be managed in compliance with all applicable waste management LORS. Staff notes that construction, demolition, and operation wastes would be characterized and managed as either hazardous or non-hazardous waste. All non-hazardous wastes would be recycled or reused to the extent feasible, and non-recyclable wastes would be collected by a licensed hauler and disposed of at a permitted solid waste disposal facility. Hazardous wastes would be accumulated on site in accordance with maximum allowable accumulation times, and then properly manifested, transported to, and disposed of at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies. In addition, disposal of project-generated non-hazardous wastes would not have an adverse impact on Class III landfill capacity, and disposal of project-related hazardous wastes would not have an adverse impact on Class I landfill capacity.

However, to help ensure and facilitate ongoing project compliance with LORS and to minimize impacts on local landfills, Commission staff proposes Conditions of Certification **WASTE-1** through **-10**. These conditions would require the project owner to:

- Ensure the project site is investigated and remediated for any unexploded ordnance that may pose a risk to construction personnel or the environment (**WASTE-1**);
- Ensure the project site is investigated and any contamination identified is remediated as necessary, with appropriate professional and regulatory agency oversight (**WASTE-2** and **-3);**
- Obtain approval for the Construction Waste Management and Operation Waste Management Plans detailing the types and volumes of wastes to be generated and how wastes will be managed, recycled, and/or disposed of after generation (**WASTE-4** and **-8**);
- Obtain a hazardous waste generator identification number from the United States Environmental Protection Agency (**WASTE-5**);
- Report any waste management-related LORS enforcement actions and how violations will be corrected (**WASTE-6**);
- Comply with waste recycling and diversion requirements (**WASTE-7**);
- Comply with stipulations for treatment of HTF-contaminated soils (**WASTE-9**); and
- Ensure that all spills or releases of hazardous substances are reported and cleaned-up in accordance with all applicable federal, state, and local requirements (**WASTE-10**)

Commission staff concludes that management of the waste generated during construction and operation of the proposed project would not result in any adverse impacts, and would comply with applicable LORS, if the waste management practices and mitigation measures proposed in the staff's proposed conditions of certification are implemented.

C.13.15 REFERENCES

AECOM 2009. Phase I Environmental Site Assessment of a Proposed Solar Power Plant Site Located in Kern County, near Ridgecrest, California. Prepared for Solar Millennium, LLC. June 2009.

Cal. Code Regs. 2008 – California Environmental Quality Act (CEQA) Guidelines. Title 14, California Code of Regulations, section 15000 and the following (Cal. Code Regs., tit. 14, §15000 et seq.).

CEC 2009t – California Energy Commission/E. Solorio (tn: 51934). CEC Staff Dialogue with DTSC Regarding HTF, dated 6/9/09. Submitted to CEC/Docket Unit on 6/11/09.

Mesquite Regional Landfill 2010 – Mesquite Regional Landfill Site Information. http://mrlf.org/index.php?pid=5. Accessed February 9, 2010.

SM 2009a - Solar Millennium LLC/J. Eichhammer (tn 53100). AFC for Ridgecrest Solar Power Project, dated 8/31/2009. Submitted to CEC/Docket Unit on 9/1/2009.

SM 2010a - Solar Millennium/A. Harron (tn 55004). Applicant's Responses to Energy Commission Data Request Set 1 & 2, dated 1/25/2010. Submitted to CEC/Docket Unit on 1/25/2010.

Waste Management 2009 – Kettleman Hills Facility Project Update. http://www.kettlemanhillsfacts.com/project_update.html. Accessed March 18, 2009.

C.14 WORKER SAFETY AND FIRE PROTECTION

Testimony of Alvin Greenberg, Ph.D.

C.14.1 SUMMARY OF CONCLUSIONS

U.S. Bureau of Land Management (BLM) and Energy Commission staff (hereafter jointly referred to as staff) concludes that if the applicant for the proposed Ridgecrest Solar Power Project (RSPP) provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program, as required by Energy Commission staff's recommended Conditions of Certification **WORKER SAFETY-1**and **-2** and fulfils the requirements of Conditions of Certification **WORKER SAFETY-3** through **-9**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable laws, ordinances, regulations, and standards. The proposed conditions of certification provide assurance that the Construction Safety and Health Program and the Operations and Maintenance Safety and Health Program proposed by the applicant would be reviewed by the appropriate agencies before implementation. The conditions also require verification that the proposed plans adequately assure worker safety and fire protection and comply with applicable laws, ordinances, regulations, and standards.

The proposed facility would be located in an area that is currently served by the Kern County Fire Department (KCFD). In staff's initial review, staff determined that the ability to respond to fire, hazmat, and Emergency Medical Services (EMS) events at the proposed facility would not pose significant added demands on local fire protection services. In written correspondence, the KCFD did not identify an impact stating that they were unsure of impacts (KCFD 2009). However, the County indicated that in general, services provided by the County which included police, fire, and EMS services may be impacted by this project and in a personal communication at a March 2, 2010 meeting, the KCFD did indicate a cumulative impact would exist and provided verbal substantiation of this impact. Upon consideration of this view, staff concurred that a cumulative impact would exist if the proposed RSPP is built. Therefore, because both the KCFD and Energy Commission staff have identified and substantiated an impact, Energy Commission staff recommends mitigation in the form of proposed Condition of Certification **WORKER SAFETY-7.**

C.14.2 INTRODUCTION

Worker safety and fire protection is regulated through laws, ordinances, regulations, and standards (LORS), at the federal, state, and local levels. Industrial workers at the facility operate equipment and handle hazardous materials daily and may face hazards that can result in accidents and serious injury. Protection measures are employed to eliminate or reduce these hazards or to minimize the risk through special training, protective equipment, and procedural controls.

The purpose of this Staff Assessment/Plan Amendment/Draft Environmental Impact Statement (SA/PA/DEIS) is to assess the worker safety and fire protection measures proposed by the RSPP and to determine whether the applicant has proposed adequate measures to:

- Comply with applicable safety LORS;
- Protect the workers during construction and operation of the facility;
- Protect against fire; and
- Provide adequate emergency response procedures.

C.14.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

Two issues are assessed in Worker Safety-Fire Protection:

1. The potential for impacts on the safety of workers during demolition, construction, and operations activities, and

2. Fire prevention/protection, emergency medical response, and hazardous materials spill response during demolition, construction, and operations.

Worker safety issues are thoroughly addressed by Cal/OSHA regulations. If all LORS are followed, workers will be adequately protected. Thus, the standard for staff's review and determination of significant impacts on workers is whether or not the applicant has demonstrated adequate knowledge about and dedication to implementing all pertinent and relevant Cal/OSHA standards.

Regarding fire prevention matters, staff reviews and evaluates the on-site fire-fighting systems proposed by the applicant and the time needed for off-site local fire departments to respond to a fire, medical, or hazardous material emergency at the proposed power plant site. If on-site systems do not follow established codes and industry standards, staff recommends additional measures. Staff reviews and evaluates the local fire department capabilities and response time in each area and interviews the local fire officials to determine if they feel adequately trained, manned, and equipped to respond to the needs of a power plant. Staff then determines if the presence of the power plant would cause a significant impact on a local fire department. If it does, staff will recommend that the applicant mitigate this impact by providing increased resources to the fire department.

Staff has also established a procedure when a local fire department has identified either a significant incremental project impact to the local agency or a significant incremental cumulative impact to a local agency. Staff first conducts an initial review of the position and either agrees or disagrees with the fire department's determination that a significant impact would exist if the proposed power plant is built and operated. A process then starts whereby the project applicant can either accept the determination made by staff or refute the determination by providing a Fire Needs Assessment and a Risk Assessment. The Fire Needs Assessment would address fire response and equipment/staffing/location needs while the Risk Assessment would be used to

establish that while an impact to the fire department may indeed exist, the risk (chances) of that impact occurring and causing injury or death is less than significant.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Worker Safety and Fire Protection Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Title 29 U.S. Code (USC) section 651 et seq (Occupational Safety and Health Act of 1970)	This act mandates safety requirements in the workplace with the purpose of "[assuring] so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources" (29 USC § 651).
Title 29 Code of Federal Regulation (CFR) sections 1910.1 to 1910.1500 (Occupational Safety and Health Administration Safety and Health Regulations)	These sections define the procedures for promulgating regulations and conducting inspections to implement and enforce safety and health procedures to protect workers, particularly in the industrial sector.
29 CFR sections 1952.170 to 1952.175	These sections provide federal approval of California's plan for enforcement of its own Safety and Health requirements, in lieu of most of the federal requirements found in 29 CFR sections 1910.1 to 1910.1500.
State	
Title 8 California Code of Regulations (Cal Code Regs.) all applicable sections (Cal/OSHA regulations)	These sections require that all employers follow these regulations as they pertain to the work involved. This includes regulations pertaining to safety matters during construction, commissioning, and operations of power plants, as well as safety around electrical components, fire safety, and hazardous materials use, storage, and handling.
24 Cal Code Regs. section 3, et seq.	This section incorporates the current addition of the Uniform Building Code.
Health and Safety Code section 25500, et seq.	This section presents Risk Management Plan requirements for threshold quantity of listed acutely hazardous materials at a facility.
Health and Safety Code sections 25500 to 25541	These sections require a Hazardous Material Business Plan detailing emergency response plans for hazardous materials emergency at a facility.
Local (or locally enforced)	
Kern County Municipal Code, Title 8	Includes specific codes to regulate permits, activities, and administrative penalties.
Kern County Municipal Code, Title 17	Includes specific codes for various building standards, including the fire code.
2007 California Fire Code	Addresses the prevention, control, and mitigation of dangerous conditions that may cause fires. Enforced by the Kern County Fire Department.

C.14.4 PROPOSED PROJECT

C.14.4.1 SETTING AND EXISTING CONDITIONS

The proposed facility would be located in Kern County approximately five miles southwest of the City of Ridgecrest, and would consist of one unit producing a nominal output of 250 MW. The project layout (which has been slightly revised since the original AFC) is described and depicted in Data Response ALT-49 and accompanying figures (SM 2010a). Fire support services to the site would be under the jurisdiction of the Kern County Fire Department (KCFD). The nearest fire stations would be Station #73 and Station #77, both located about 8 miles from the project site with a response time of about 10 minutes. Station #73 is located at 6919 Monache Mtn. Ave. in Inyokern, and Station #77 is located at 815 W. Dolphin Ave. in Ridgecrest. The next closest station would be Station #74, located at 139 E. Las Flores Ave. in Ridgecrest, approximately 9 miles away, with a response time of between 12 to 15 minutes. All three stations are staffed with three personnel per shift and have at least one Engine and one Patrol vehicle. None of the stations in the project vicinity have Ladder Companies. However, as opposed to a natural gas fired power plant which has structures of several stories high, solar power plants contain structures of one or two stories. All KCFD personnel are trained to at least Emergency Medical Technician (EMT) Level-1 and as first responders for hazardous materials incidents. There are currently no paramedics assigned to the fire stations in the project's vicinity (KCFD 2009).

The applicant has stated that certain on-site power plant personnel would be trained as a hazardous materials response team and that one or more spill response kits would be available on-site (SM 2009a, Section 5.6.4.2). In the event of a large incident involving hazardous materials, backup support would be provided by the KCFD which has a hazmat response unit capable of handling any incident at the proposed RSPP. The nearest KCFD Hazmat unit is located at 3000 Landco Dr. in Bakersfield, about 120 miles away, and would respond within 2 hours (KCFD 2009).

Worker Safety and Fire Protection Table 2
Fire and Emergency Response for the RSPP*

KCFD Station	Total Response Time**	Distance to RSPP	EMS/HazMat Capability***
Fire Station #77	10 min	8 miles	Y/Y
Fire Station #73	10 min	8 miles	Y/Y
Fire Station #74	12-15 min	9 miles	Y/Y

*Source: E-mail communications with Captain Bill Brickey, Kern County Fire Department (KCFD 2009)
**Total response times are estimated from the moment a 911 call is made to arrival at the site and are dependent upon traffic conditions and other variables.
***All personnel are trained to EMT-1 level and first responder for hazardous materials incidents.

In addition to construction and operations worker safety issues, the potential exists for exposure to contaminated soil during site preparation. The Phase I Environmental Site Assessment conducted for this site in 2009 found no "Recognized Environmental Conditions" per the American Society for Testing and Materials Standards (ASTM) definition. That is, there was no evidence or record of any use, spillage, or disposal of

hazardous substances on the site, nor was there any other environmental concern that would require remedial action (SM 2009a, Section 5.16.2.3 & Appendix I). To address the unlikely possibility that soil contamination would be encountered during construction of the RSPP, proposed Conditions of Certification **WASTE-1** and **WASTE-2** require a registered professional engineer or geologist to be available during soil excavation and grading to ensure proper handling and disposal of contaminated soil. See the staff assessment section on **WASTE MANAGEMENT** for a more detailed analysis of this topic.

C.14.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Worker Safety

Industrial environments are potentially dangerous during construction and operation of facilities. Workers at the proposed RSPP would be exposed to loud noises, moving equipment, trenches, and confined space entry and egress problems. The workers may experience falls, trips, burns, lacerations, and numerous other injuries. They have the potential to be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, and electrical sparks and electrocution. It is important for the RSPP to have well-defined policies and procedures, training, and hazard recognition and control at its facility to minimize such hazards and protect workers. If the facility complies with all LORS, workers will be adequately protected from health and safety hazards.

A Safety and Health Program would be prepared by the applicant to minimize worker hazards during construction and operation. Staff uses the phrase “Safety and Health Program” to refer to the measures that would be taken to ensure compliance with the applicable LORS during the construction and operational phases of the project.

Construction Safety and Health Program

Workers at the RSPP would be exposed to hazards typical of construction and operation of a solar thermal electric power generating facility.

Construction Safety Orders are published at Title 8 California Code of Regulations sections 1502, et seq. These requirements are promulgated by Cal/OSHA and would be applicable to the construction phase of the project. The Construction Safety and Health Program would include the following:

- Construction Injury and Illness Prevention Program (8 Cal Code Regs. § 1509)
- Construction Fire Prevention Plan (8 Cal Code Regs. § 1920)
- Personal Protective Equipment Program (8 Cal Code Regs. §§ 1514 — 1522)
- Emergency Action Program and Plan

Additional programs under General Industry Safety Orders (8 Cal Code Regs. §§ 3200 to 6184), Electrical Safety Orders (8 Cal Code Regs. §§2299 to 2974) and Unfired Pressure Vessel Safety Orders (8 Cal Code Regs. §§ 450 to 544) would include:

- Electrical Safety Program

- Motor Vehicle and Heavy Equipment Safety Program
- Forklift Operation Program
- Excavation/Trenching Program
- Fall Protection Program
- Scaffolding/Ladder Safety Program
- Articulating Boom Platforms Program
- Crane and Material Handling Program
- Housekeeping and Material Handling and Storage Program
- Respiratory Protection Program
- Employee Exposure Monitoring Program
- Hand and Portable Power Tool Safety Program
- Hearing Conservation Program
- Back Injury Prevention Program
- Ergonomics Program
- Heat and Cold Stress Monitoring and Control Program
- Lock Out/Tag Out Safety Program
- Pressure Vessel and Pipeline Safety Program
- Solar Components Safe Handling Program

The Application for Certification (AFC) includes adequate outlines of each of the above programs (SM 2009a, Section 5.18.3.1). Prior to the start of construction of RSPP, detailed programs and plans would be provided to the California Energy Commission Compliance Project Manager (CPM) and to the KCFD pursuant to the Condition of Certification **WORKER SAFETY-1**.

Operations and Maintenance Safety and Health Program

Prior to the start of operations at RSPP, the Operations and Maintenance Safety and Health Program would be prepared. This operational safety program would include the following programs and plans:

- Injury and Illness Prevention Program (8 Cal Code Regs. § 3203)
- Fire Protection and Prevention Program (8 Cal Code Regs. § 3221)
- Personal Protective Equipment Program (8 Cal Code Regs. §§ 3401 to 3411)
- Emergency Action Plan (8 Cal Code Regs. § 3220)

In addition, the requirements under General Industry Safety Orders (8 Cal Code Regs. §§ 3200 to 6184), Electrical Safety Orders (8 Cal Code Regs. §§2299 to 2974) and Unfired Pressure Vessel Safety Orders (8 Cal Code Regs. §§ 450 to 544) would be

applicable to the project. Written safety programs for RSPP, which the applicant would develop, would ensure compliance with the above-mentioned requirements.

The AFC includes adequate outlines of the Injury and Illness Prevention Program, Emergency Action Plan, Fire Prevention Program, and Personal Protective Equipment Program (SM 2009a, Section 5.18.3). Prior to operation of RSPP, all detailed programs and plans would be provided to the CPM and KCFD pursuant to Condition of Certification **WORKER SAFETY-2**.

Safety and Health Program Elements

As mentioned above, the applicant provided the proposed outlines for both a Construction Safety and Health Program and an Operations Safety and Health Program. The measures in these plans are derived from applicable sections of state and federal law. Both safety and health programs would be comprised of six more specific programs and would require major items detailed in the following paragraphs.

Injury and Illness Prevention Program

The IIPP would include the following components as presented in the AFC (SM 2009a, Section 5.18.3.1):

- Identity of person(s) with authority and responsibility for implementing the program;
- Safety and health policy of the plan;
- Definition of work rules and safe work practices for construction activities;
- System for ensuring that employees comply with safe and healthy work practices;
- System for facilitating employer-employee communications;
- Procedures for identifying and evaluating workplace hazards and developing necessary program(s);
- Methods for correcting unhealthy/unsafe conditions in a timely manner;
- Safety procedures; and
- Training and instruction.

Fire Prevention Plan

California Code of Regulations requires an Operations Fire Prevention Plan (8 Cal Code Regs. § 3221). The AFC outlines a proposed Fire Prevention Plan which is acceptable to staff (SM 2009a, Section 5.18.3.2). The plan would accomplish the following:

- Determine general program requirements (scope, purpose, and applicability);
- Determine potential fire hazards;
- Develop good housekeeping practices and proper handling and materials storage;
- Determine potential ignition sources and control measures for these sources;
- Determine persons responsible for equipment and system maintenance;
- Locate portable and fixed fire-fighting equipment in suitable areas;

- Establish and determine training and instruction requirements; and
- Define recordkeeping requirements.

Commission staff proposes that the applicant submit a final Fire Prevention Plan to the CPM for review and approval and to the KCFD for review and comment to satisfy proposed Conditions of Certification **WORKER SAFETY-1** and **WORKER SAFETY-2**.

Personal Protective Equipment Program

California regulations require Personal Protective Equipment (PPE) and first aid supplies whenever hazards are present that, due to process, environment, chemicals or mechanical irritants, can cause injury or impair bodily function as a result of absorption, inhalation, or physical contact (8 Cal Code Regs. §§ 3380 to 3400). The RSPP operational environment would require PPE.

All safety equipment must meet National Institute of Safety and Health (NIOSH) or American National Standards Institute (ANSI) standards and would carry markings, numbers, or certificates of approval. Respirators must meet NIOSH and Cal/OSHA standards. Each employee must be provided with the following information pertaining to the protective clothing and equipment:

- Proper use, maintenance, and storage;
- When to use the protective clothing and equipment;
- Benefits and limitations; and
- When and how to replace the protective clothing and equipment.

The PPE Program ensures that employers comply with the applicable requirements for PPE and provides employees with the information and training necessary to protect them from potential workplace hazards.

Emergency Action Plan

California regulations require an Emergency Action Plan (8 Cal Code Regs. § 3220). The AFC contains a satisfactory outline for an emergency action plan (SM 2009a, Section 5.18.3.2).

The outline lists plans to accomplish the following:

- Establish scope, ,purpose, and applicability;
- Identify roles and responsibilities;
- Determine emergency incident response training;
- Develop emergency response protocols;
- Specify evacuation protocols;
- Define post emergency response protocols; and
- Determine notification and incident reporting.

Written Safety Program

In addition to the specific plans listed above, additional LORS called *safe work practices* apply to the project. Both the Construction and the Operations Safety Programs would address safe work practices under a variety of programs. The components of these programs include, but are not limited to, the programs found under the heading "Construction Safety and Health Program" in this Worker Safety and Fire Protection section.

Safety Training Programs

Employees would be trained in the safe work practices described in the above-referenced safety programs.

Additional Safety Issues

This solar power plant will present a unique work environment that includes a solar field located in the high desert. The solar field features thousands of mirrors that heat a heat transfer fluid (HTF) to approximately 750°F. The pipe containing the HTF will reach temperatures at the mirror focal point as high as 1100 °F. Experience at existing solar generating stations shows that these mirrors break, the pipes age, and HTF can leak and catch fire from ball joints or frayed flex hoses. The area under the solar arrays must be kept free from weeds and thus herbicides will be applied as necessary. Exposure to workers via inhalation and ingestion of dusts containing herbicides poses a health risk. Finally, workers will inspect the solar array for HTF leaks and broken mirrors at least once each day by driving up and down dirt paths between the rows of mirrors and even under the mirrors. Cleaning the mirrors will also be conducted on a routine schedule. All these activities will take place year-round and especially during the summer months of peak solar power generation, when outside ambient temperatures routinely reach 115 °F and above.

The applicant has indicated that workers will be adequately trained and protected, but has not included precautions against heat stress and exposure to herbicides. Therefore, to ensure that workers are indeed protected, Commission staff has proposed additional requirements to proposed Conditions of Certification **WORKER SAFETY-1** and **2**. These requirements consist of the following provisions:

- A worker heat stress protection plan that implements and expands on existing Cal OSHA regulations (8 CCR 3395) requiring heat illness prevention; and
- The development and implementation of Best Management Practices (BMP) for the storage and application of herbicides used to control weeds beneath and around the solar array.

Staff believes that effective implementation of a Heat Stress Protection Plan will mitigate the potential for significant risks to workers from heat during both construction and operations. A BMP requiring proper herbicide storage and application will mitigate potential risks to workers from exposure to herbicides and reduce the chance that herbicides will contaminate either surface water or groundwater. Staff suggests that a BMP follow either the guidelines established by the U.S. EPA (EPA 1993), or more recent guidelines established by the State of California or U.S. EPA.

Additional Mitigation Measures

Protecting construction workers from injury and disease is among the greatest challenges in occupational safety and health. The following facts are reported by the National Institute for Occupational Safety and Health (NIOSH):

- More than 7 million persons work in the construction industry, representing 6 percent of the labor force. Approximately 1.5 million of these workers are self-employed.
- Of approximately 600,000 construction companies, 90 percent employ fewer than 20 workers. Few have formal safety and health programs.
- From 1980 to 1993, an average of 1,079 construction workers were killed on the job each year—more fatal injuries than in any other industry.
- Falls caused 3,859 construction worker fatalities (25.6 percent) between 1980 and 1993.
- Construction injuries account for 15 percent of workers' compensation costs.
- Assuring safety and health in construction is complex, involving short-term work sites, changing hazards, and multiple operations and crews working in close proximity.
- In 1990, Congress directed NIOSH to undertake research and training to reduce diseases and injuries among construction workers in the United States. Under this mandate, NIOSH funds both intramural and extramural research projects.

The hazards associated with the construction industry are thus well documented. These hazards increase in complexity in the multi-employer worksites typical of large, complex, industrial-type projects such as the construction of solar power plants. In order to reduce and/or eliminate these hazards, it has become standard industry practice to hire a Construction Safety Supervisor to ensure a safe and healthful environment for all personnel. That this standard practice has reduced and/or eliminated hazards has been evident in the audits staff recently conducted of power plants under construction. The federal Occupational Safety and Health Administration (OSHA) has also entered into strategic alliances with several professional and trade organizations to promote and recognize safety professionals trained as Construction Safety Supervisors, Construction Health and Safety Officers, and other professional designations. The goal of these partnerships is to encourage construction subcontractors in four areas:

- To improve their safety and health performance;
- To assist them in striving for the elimination of the four hazards (falls, electrical, caught in/between and struck-by hazards), which account for the majority of fatalities and injuries in this industry and have been the focus of targeted OSHA inspections;
- To prevent serious accidents in the construction industry through implementation of enhanced safety and health programs and increased employee training; and
- To recognize those subcontractors with exemplary safety and health programs.

To date, there are no OSHA or Cal/OSHA requirements that an employer hire or provide for a Construction Safety Officer. OSHA and Cal/OSHA regulations do, however, require that safety be provided by an employer and the term *Competent*

Person is used in many OSHA and Cal/OSHA standards, documents, and directives. A Competent Person is usually defined by OSHA as an individual who, by way of training and/or experience, is knowledgeable of standards, is capable of identifying workplace hazards relating to the specific operations, is designated by the employer, and has authority to take appropriate action. Therefore, in order to meet the intent of the OSHA standard to provide for a safe workplace during power plant construction, Commission staff proposes Condition of Certification **WORKER SAFETY-3,** which would require the applicant/project owner to designate and provide for a power plant site Construction Safety Supervisor.

As discussed above, the hazards associated with the construction industry are well documented. These hazards increase in complexity in the multi-employer worksites typical of large, complex, industrial-type projects such as the construction of solar power plants.

Accidents, fires, and a worker death have occurred at Energy Commission-certified power plants in the recent past due to the failure to recognize and control safety hazards and the inability to adequately supervise compliance with occupational safety and health regulations. Safety problems have been documented by Energy Commission staff in safety audits conducted in 2005 at several power plants under construction. The findings of the audit staff include, but are not limited to, such safety oversights as:

- Lack of posted confined space warning placards/signs;
- Confusing and/or inadequate electrical and machinery lockout/tagout permitting and procedures;
- Confusing and/or inappropriate procedures for handing over lockout/tagout and confined space permits from the construction team to commissioning team and then to operations;
- Dangerous placement of hydraulic elevated platforms under each other;
- Inappropriate placement of fire extinguishers near hotwork;
- Dangerous placement of numerous power cords in standing water on the site, thus increasing the risk of electrocution;
- Construction of an unsafe aqueous ammonia unloading pad;
- Inappropriate and unsecure placement of above-ground natural gas pipelines inside the facility but too close to the perimeter fence; and
- Lack of adequate employee- or contractor-written training programs addressing proper procedures to follow in the event of finding suspicious packages or objects either on or off site.

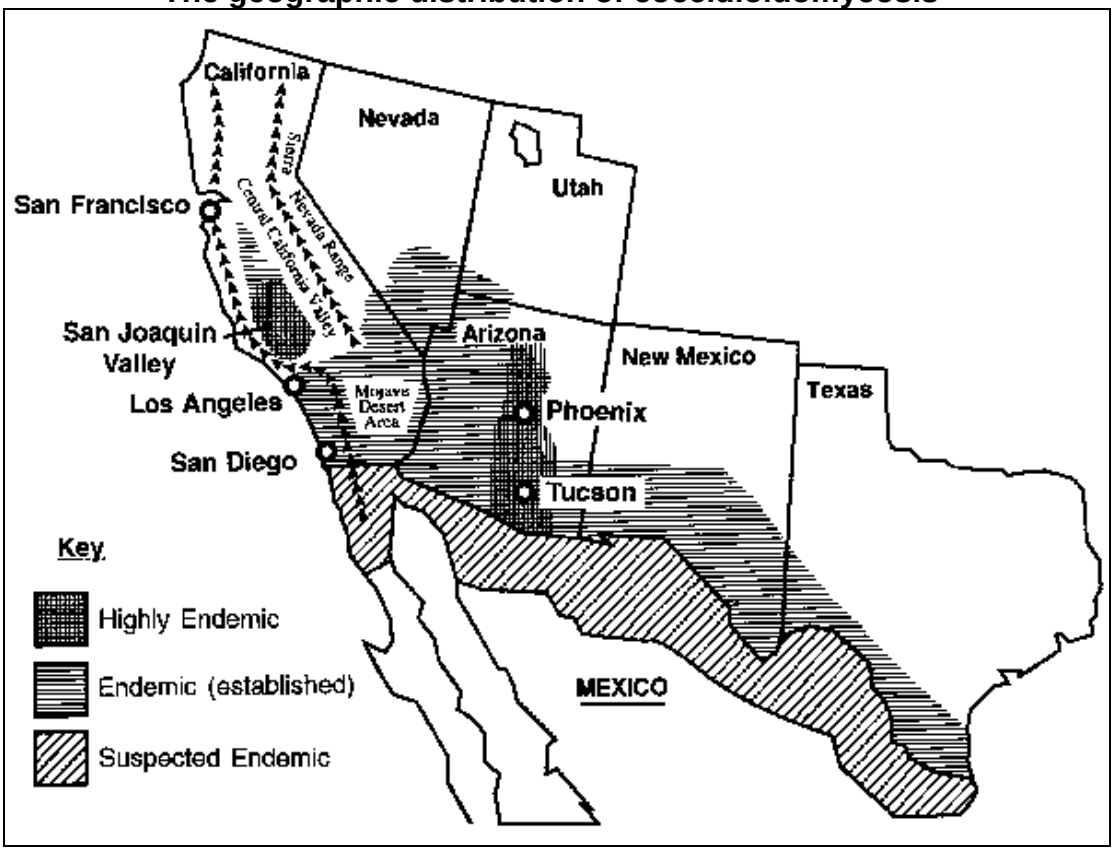
In order to reduce and/or eliminate these hazards, it is necessary for the Energy Commission to have a professional Safety Monitor on site to track compliance with Cal/OSHA regulations and periodically audit safety compliance during construction, commissioning, and the hand-over to operational status. These requirements are outlined in Condition of Certification **WORKER SAFETY-4**. A Safety Monitor, hired by the project owner, yet reporting to the Chief Building Official (CBO) and CPM, will serve

as an “extra set of eyes” to ensure that safety procedures and practices are fully implemented at all power plants certified by the Energy Commission. During the audits conducted by staff, most site safety professionals welcomed the audit team and actively engaged it in questions about the team’s findings and recommendations. These safety professionals recognized that safety requires continuous vigilance and that the presence of an independent audit team provided a fresh perspective of the site.

Valley Fever (Coccidioidomycosis)

Coccidioidomycosis or "Valley Fever" (VF) is primarily encountered in southwestern states, particularly in Arizona and California. It is caused by inhaling the spores of the fungus Coccidioides immitis, which are released from the soil during soil disturbance (e.g., during construction activities) or wind erosion. The disease usually affects the lungs and can have potentially severe consequences, especially in at-risk individuals such as the elderly, pregnant women, and people with compromised immune systems. Trenching, excavation, and construction workers are often the most exposed population. Treatment usually includes rest and antifungal medications. No effective vaccine currently exists for Valley Fever. VF is endemic to the San Joaquin valley in California, which presumably gave this disease its common name. Kern County, located at the southern end of San Joaquin valley, is where valley fever occurs most frequently (Valley Fever Vaccine Project of the Americas 2010; KCDPH 2008). Depending on the particular year, either Tulare or Fresno county have the second highest rates of VF.

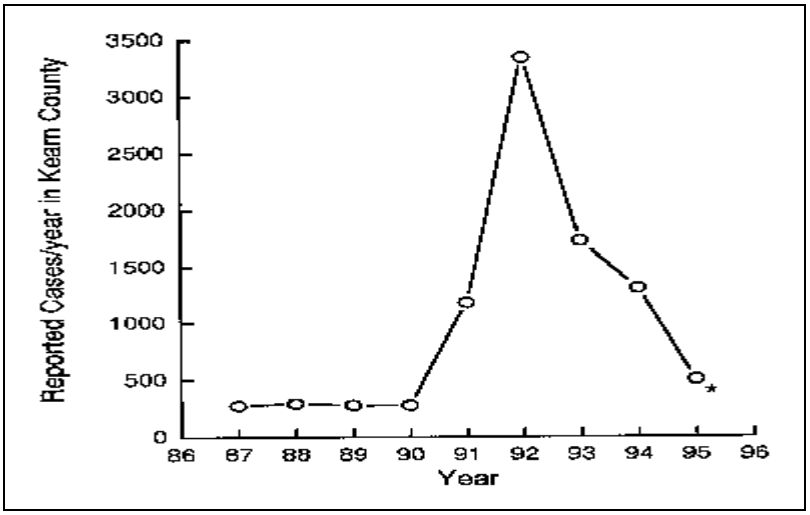
Worker Safety Figure 1
The geographic distribution of coccidioidomycosis*



*Source: CDC 2006, Figure 2

In 1991, 1,200 cases of VF were reported to the California Department of Health Services (CDHS) compared with an annual average of 428 cases per year for the period of 1981 to 1990. In 1992, 4,516 cases were reported in California, and 4,137 cases in 1993. Seventy percent of VF cases were reported from Kern County (CDC 1994; Flaherman 2007; CDHS 2010).

Worker Safety Figure 2
Number of coccidioidomycosis cases identified by serologic Testing at the Kern County Public Health Laboratory between 1986 and 1996*



*Source: CDC 2006, Figure 4

A 2004 CDC report found that the number of reported cases of coccidioidomycosis in the US increased by 32% during 2003-2004, with the majority of these cases occurring in California and Arizona. The report attributed these increases to changes in land use, demographics, and climate in endemic areas, although certain cases might be attributable to increased physician awareness and testing (CDC 2006).

According to the CDC Morbidity and Mortality Weekly Report of February 2009, incidences of valley fever have increased steadily in Arizona and California in the past decade. Cases of coccidioidomycosis averaged about 2.5 per 100,000 population annually from 1995 to 2000 and increased to 8.0 per 100,000 population between 2000 and 2006 (incident rates tripled). In 2007 there was a slight drop in cases, but the rate was still the highest it has been since 1995. The report identified Kern County as having the highest incidence rates (150.0 cases per 100,000 population), and non-Hispanic blacks having the highest hospitalization rates (7.5 per 100,000 population). In addition, between the years 2000 and 2006, the number of valley fever related hospitalizations climbed from 1.8 to 4.3 per 100,000 population (611 cases in 2000 to 1,587 cases in 2006) and then decreased to 1,368 cases in 2007 (3.6 per 100,000 population). Overall in California, during 2000-2007, a total of 752 (8.7%) of the 8,657 persons hospitalized for coccidioidomycosis died (CDC 2009).

A 2007 study published in the Emerging Infectious Diseases journal of the Center for Disease Control and Prevention (CDC), found the frequency of hospitalization for coccidioidomycosis in the entire state of California to be 3.7 per 100,000 residents per year for the period between 1997 and 2002 (see Table 1 below). There were 417

deaths from VF in California in those years, resulting in a mortality rate of 2.1 per 1 million California residents annually. The data shows that Kern County had the highest total number and highest frequency of hospitalizations (Flaherman 2007).

Worker Safety Table 1
Hospitalizations for Coccidioidomycosis, California, 1997–2002*

Category	Total hospitalizations	Total person-years (× 10^6)	Frequency of hospitalization**	Frequency of hospitalization for coccidioidal meningitis**
Total	7,457	203.0	3.67	0.657
Year				
1997	1,269	32.5	3.90	0.706
1998	1,144	32.9	3.50	0.706
1999	1,167	33.4	3.5	0.61
2000	1,100	34.0	3.23	0.62
2001	1,291	34.7	3.7	0.58
2002	1,486	35.3	4.2	0.71
Highest incidence counties				
Kern	1,700	3.97	42.8	
Tulare	479	2.21	21.7	
Kings	133	0.77	17.4	
San Luis Obispo	170	1.48	11.5	

*Source: Flaherman 2007
**Per 100,000 residents per year

A 1996 paper that tried to explain the sudden increase in Coccidioidomycosis cases that began in the early 90s found that the San Joaquin Valley in California has the largest population of C. immitis, which is found to be distributed unevenly in the soil and seems to be concentrated around animal burrows and ancient Indian burial sites. It is usually found 4 to 12 inches below the surface of the soil (CDC 2006). The paper also reported that incidences of coccidioidomycosis vary with the seasons; with highest rates in late summer and early fall when the soil is dry and the crops are harvested. Dust storms are frequently followed by outbreaks of coccidioidomycosis (CDC 2006). A modeling attempt to establish the relationship between fluctuations in VF incident rates and weather conditions in Kern County found that there is only a weak connection between weather and VF cases (weather patterns correlate with up to 4% of outbreaks). The study concluded that the factors that cause fluctuations in VF cases are not weather-related but rather biological and anthropogenic (i.e. human activities, primarily construction on previously undisturbed soil) (Talamantes 2007).

Data from the Kern County Department of Public Health (KCDPH) on the period between 1995 and 2008 shows that VF cases increased in Kern County during the early 1990's, decreased during the late 1990's, increased again between 2000 and 2005, and have been declining slightly in the last several years. The KCDPH data also shows that the particular area of Ridgecrest does not have high incident rates of VF. The majority

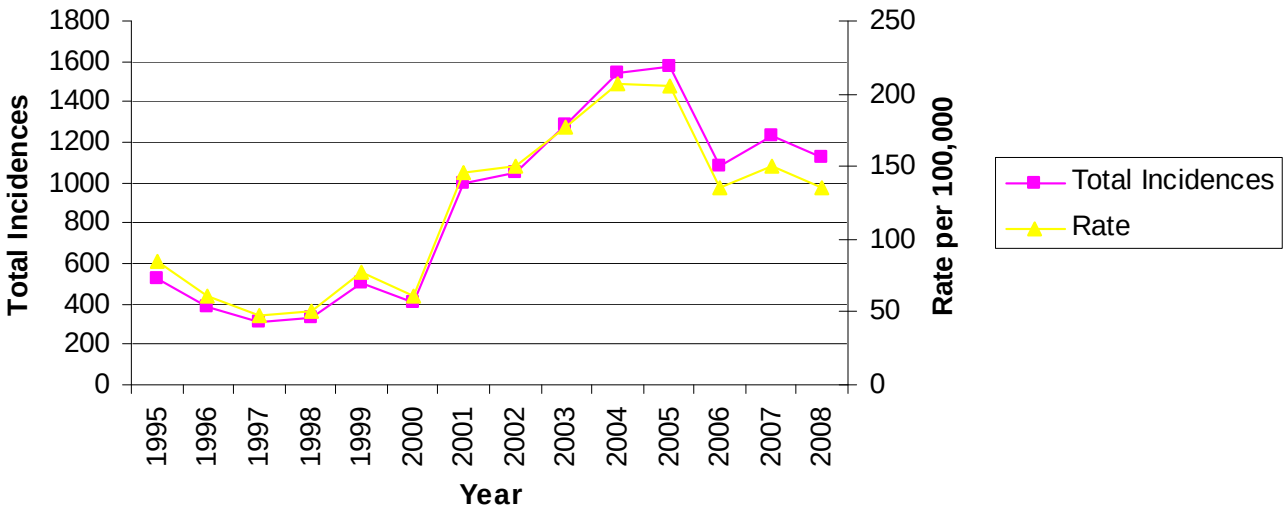
of VF cases are recorded in the Bakersfield area where 50 to 70 percent of all Kern County VF cases occur. Delano, Lamont, and Taft have the next highest recorded incidences of VF. With the exception of the year 2004 when 26 cases of VF were reported in the Ridgecrest area, less than 15 cases have been recorded annually in Ridgecrest since 1995, representing less than 5% of the total cases recorded in Kern County (KCDPH 2008).

Worker Safety Table 2
Valley Fever Cases In Kern County 1995 – 2008*

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Kern County Cases	523	382	307	328	504	406	994	1055	1281	1540	1578	1081	1229	1128
Rate per 100,000	84.5	61	48.3	51.2	77.1	61	145.7	150.9	177.7	206.9	204.9	135.2	150.4	135.1

*Source: KCDPH 2008, Table 1

Figure 3: VF Cases in Kern County 1995 - 2008*



*Source: KCDPH 2008, Figure 2

During a phone conversation with Dr. Michael MacLean of the Kings County Health Department, he noted that according to his experience and of those who study VF, it is very hard to find the fungus in soil that was previously farmed and irrigated, which greatly reduces the risk of infection resulting from disturbance of farmed lands (MacLean 2009). This does not apply to previously undisturbed lands where excavation, grading, and construction may correlate with increases in VF cases. Dr. MacLean feels that with the current state of knowledge, we can only speculate on the causes and trends influencing VF cases and he does not feel that construction activities are necessarily the cause of VF outbreaks (KCEHS 2009).

Valley Fever is spread through the air. If soil containing the fungus is disturbed by construction, natural disasters, or wind, the fungal spores get into the air where people can breathe in the spores. The disease is not spread from person to person.

Occupational or recreational exposure to dust is an important consideration. Agricultural workers, construction workers, or others (such as archeologists) who dig in the soil in the disease-endemic area of the Central Valley are at the highest risk for the disease (CDC 2006; CDHS 2010). The risk for disseminated coccidioidomycosis is much higher among some ethnic groups, particularly African-Americans and Filipinos. In these ethnic groups, the risk for disseminated coccidioidomycosis is tenfold that of the general population (CDC 2006).

A VF website claims that most cases of valley fever do not require treatment. Even though 30-60% of the population in areas where the disease is highly prevalent - such as in the southern San Joaquin Valley of California - have positive skin tests indicating previous infection, most were unaware of ever having had valley fever ("Valley Fever Vaccine Project of the Americas" 2010).

Worker Safety Table 3
Disease Forms

CATEGORIES	NOTES
Asymptomatic	• Occurs in about 50% of patients
Acute Symptomatic	• Pulmonary syndrome that combines cough, chest pain, shortness of breath, fever, and fatigue. • Diffuse pneumonia affects immunosuppressed individuals • Skin manifestations include fine papular rash, erythema nodosum, and erythema multiforme • Occasional migratory arthralgias and fever
Chronic Pulmonary	• Affects between 5 to 10% of infected individuals • Usually presents as pulmonary nodules or peripheral thin-walled cavities
Extrapulmonary/Disseminated Varieties	
Chronic skin disease	• Keratotic and verrucose ulcers or subcutaneous fluctuant abscesses
Joints / Bones	• Severe synovitis and effusion that may affect knees, wrists, feet, ankles, and/or pelvis • Lytic lesions commonly affecting the axial skeleton
Meningeal Disease	• The most feared complication • Presenting with classic meningeal symptoms and signs • Hydrocephalus is a frequent complication
Others	• May affect virtually any organ, including thyroid, GI tract, adrenal glands, genitourinary tract, pericardium, peritoneum

Given the available scientific and medical literature on Valley Fever, it is difficult for staff to assess the potential for VF to impact workers during construction and operation of the proposed RSEP with a reasonable degree of certainty. However, the higher number of cases reported in Kern County indicates that the project site may have an elevated risk for exposure, despite the fact that the Ridgecrest area itself has recorded less than 15 cases per year since 1995. To minimize potential exposure of workers and also the public to coccidioidomycosis during soil excavation and grading, extensive wetting of the soil prior to and during construction activities should be employed and dust masks should be worn at certain times during these activities. The dust (PM10) control measures found in the Air Quality section of this SA/DEIS should be strictly adhered to in order to adequately reduce the risk of contracting VF to less than significant. Towards that, Commission staff proposes Condition of Certification **WORKER SAFETY-9** which would require that the dust control measures found in proposed Conditions **AQ-SC3** and **AQ-SC4** be supplemented with additional requirements.

Fire Hazards

During construction and operation of the proposed RSPP project, there is the potential for both small fires and major structural fires. Electrical sparks, combustion of fuel oil, hydraulic fluid, mineral oil, insulating fluid at the power plant switchyard or flammable liquids, explosions, and over-heated equipment, may cause small fires. Major structural fires in areas without automatic fire detection and suppression systems are unlikely to develop at power plants. Fires of heat transfer fluid such as that proposed for use in the solar panels at RSPP are rare. Compliance with all LORS would be adequate to assure protection from all fire hazards.

Staff reviewed the information provided in the AFC and spoke to representatives of the KCFD to determine if available fire protection services and equipment would adequately protect workers and to determine the project's impact on fire protection services in the area. The project will rely on both on-site fire protection systems and local fire protection services. The on-site fire protection system provides the first line of defense for small fires. In the event of a major fire, fire support services, including trained firefighters and equipment for a sustained response, would be provided by the KCFD (KCFD 2009).

Construction

During construction, the permanent fire protection systems proposed for the RSPP would be installed as soon as practical; until then portable fire extinguishers would be placed throughout the site at appropriate intervals and periodically maintained. Safety procedures and training would be implemented according to the guidelines of the Construction Fire Protection and Prevention Plan (SM 2009a, Section 2.5.7.3).

Operation

The information in the AFC indicates that the project intends to meet the fire protection and suppression requirements of the 2007 California Fire Code, all applicable recommended NFPA standards (including Standard 850 addressing fire protection at electric generating plants), and all Cal/OSHA requirements, with the exception of providing a secondary access point for emergency response vehicles. Both the California Fire Code (24 CCR Part 9, chapter 5, and section 503.1.2) and the Uniform Fire Code (sections 901 and 902) require that access to the site be reviewed and

approved by the fire department. All power plants licensed by the Energy Commission have more than one access point to the power plant site. This is sound fire safety procedure and allows for fire department vehicles and personal to access the site should the main gate be blocked. The proposed RSPP has only one access point, that being through the main gate (via a new road connecting to Brown Road), and the AFC makes no mention of a secondary access point through the perimeter fence (SM 2009a, Section 2.3). Staff finds that a second access point is necessary to ensure fire department access. This access point can be restricted to emergency use only and, if possible, should be equipped with the fire department's Opticom System for remote keyless entry. Therefore, in order to comply with the requirements of LORS, staff proposes a Condition of Certification **WORKER SAFETY-6** that would require the project owner to identify and provide a second access point to the site for emergency vehicles and equip this secondary gate with either the Opticom System or a keypad for fire department personnel to open the gate.

Fire suppression elements in the proposed plant would include both fixed and portable fire extinguishing systems. The fire water would be groundwater supplied from the Indian Wells Valley Water District (IWVWD) and stored in a water storage tank with a dedicated fire protection supply of 360,000 gallons. One electric and one diesel-fueled backup firewater pump would ensure water supply to the fire protection loop, and an electric jockey pump would maintain pressure in the system (SM 2009a, Section 5.18.3.2).

Fire hydrants would be installed throughout the site per NFPA requirements and a sprinkler deluge system would be installed in areas of risk including the transformer, HTF expansion tank, and HTF circulating pump area. A sprinkler system would be installed at the STG and in administrative buildings. In addition to the fixed fire protection system, appropriate classes of service portable extinguishers and fire hydrants/hose stations would be located throughout the facility at code-approved intervals. The solar fields would be protected by isolation valves that would allow only a finite amount of HTF to burn before extinguishing (SM 2009a, Section 5.18.3.2).

According to NFPA standards and UFC requirements, the fire protection system must have fire detection sensors and monitoring equipment that would trigger alarms and automatically actuate the suppression systems. Staff has determined that these systems will ensure adequate fire protection.

The applicant would be required by Conditions of Certification **WORKER SAFETY-1** and**-2** to provide the final Fire Protection and Prevention Program to staff and to the KCFD prior to construction and operation of the project to confirm the adequacy of the proposed fire protection measures.

Liquefied Petroleum Gas (LPG)

Propane would be used at the proposed RSPP to fuel the auxiliary boilers and to prevent HTF from freezing. Up to 18,000 gallons of propane would be stored in a pressurized carbon steel tank equipped with a secondary containment structure. Propane is a flammable gas and poses a risk of fire and/or explosion. The applicant

stated that due to the use of propane as a fuel, a Risk Management Plan (RMP) including an Off Site Consequence Analysis (OCA) is not required (SM 2009a, Section 5.6.3.3). Staff agrees with this determination.

Even though an OCA is not required by regulation, the applicant has modeled the worst-case accidental release scenario of propane from the proposed project. The worst-case release involves the complete failure of the 18,000-gallon propane storage tank, resulting in two scenarios: 1) a vapor cloud explosion which results in a blast wave that can damage structures and cause injuries, and 2) a boiling liquid expanding vapor explosion (BLEVE) which results in thermal exposure that can cause skin injuries. EPA's RMP Offsite Consequence Analysis Guidance was used to prepare the modeling. See Tables 5.6-4 and 5.6-5 for the assumptions and parameters used in the modeling of each scenario (SM 2009a).

The modeling results for the two worst-case scenarios show that blast effects would extend 1640 feet (500 meters) from the point of origin and thermal exposure would extend 1902 feet (580 meters; SM 2009a, Table 5.6-6). The propane tank is proposed to be located about 820 feet (250 meters) from the nearest fenceline, so modeled impacts of the worst-case scenarios would extend off-site. However, the applicant noted that there are no public receptors within this area, making the impacts of a propane release insignificant according to the RMP program which defines impact as occurring at a public receptor (SM 2009a, Section 5.6.3.3). However, the blast impacts would extend to Brown Road which will have public traffic, cyclists, and hikers. Therefore, it is staff's opinion that should a fire start at or near the propane tank, Brown Road would have to be closed.

Staff also evaluated the potential for a fire or explosion of the propane/LPG tank to impact or damage the PSPP and off-site receptors. Staff also assessed the need for additional protective measures such as a water spray system to reduce the chances that a fire at the LPG tank would result in a further spread to the HTF system or in an explosion. In this manner, mitigation would serve to protect critical power plant components from a fire or explosion of LPG. Staff reviewed several models that agencies and the private sector use to assess the potential for explosions of pressurized liquid petroleum gas cylinders to impact structures and people. Staff relied on methodology published by the U.S. Department of Commerce National Institute of Standards and Technology (NIST 2000) to assess the thermal radiation impacts and the model from the U.S. Department of Housing and Urban Development (HUD) standard (49 CFR 51.200 et seq.) to determine an Acceptable Separation Distance from an explosion. Both NIST and HUD utilize an acceptable thermal radiation exposure level of 31.5 kW/m^2 (10,000$Btu/h/f^2$) for structures and 1.4 kW/m^2 (450 $Btu/h/ft^2$) for people. HUD uses an overpressure of 0.5 psi as criteria for impacts from an explosion. The structures protected by this standard are assumed to be wood and thus this standard affords a large safety margin for sturdier power plant equipment.

To assess the risk of a propane/LPG explosion, staff utilized the HUD procedure that specifically assessed as an example a propane tank fire. Based on the volume of a propane tank and using Figure 1 from the HUD standard, staff determined that the minimum acceptable separation distance for structures and people would be 400 feet for an 18,000 gallon propane or LPG tank. And, thermal effects on people would be

significant up to ~950 feet distant. Since the distance from the LPG tanks to the nearest power plant structures are well within the 400-foot range, and workers would be located within 950 feet, staff believes that a fire at the LPG tank presents a significant risk to critical power plant components and to workers.

Given this analysis that shows a potential for significant damage to power plant structures and injury to workers should a fire or explosion occur, staff conducted a further assessment of the factors staff considers in proposing mitigation requirements for propane or LPG storage facilities:

1. Code requirements for mitigation and type of mitigation.

2. Proximity of off-site receptors.

3. Adequacy of the local fire and emergency services (numbers and capability).

4. Response time of local fire and emergency services.

5. Worker safety.

6. Triggering of DHS Top-screen analysis.

7. Likelihood of a BLEVE occurring.

8. Likelihood of on-site fire escalation due to a fire or BLEVE.

9. Likelihood of off-site consequences from a BLEVE.

10. Power Generation Infrastructure protection.

In considering these factors for the PSPP site, staff has determined that Factors 1, 2, 3, 5, 8, and 10 apply and that a water spray system would be appropriate and adequate mitigation. However, while there are no code requirements in the United States for a water spray system to cool an LPG vessel (there is such a requirement in the U.K.), the safety of LPG tanks is addressed in California Fire Code section 3804 which requires compliance with NFPA 58, the *Liquefied Petroleum Gas Code*. Section 6.25 of NFPA 58 also does not require a water spray system but if one is installed, the system shall comply with NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*. It requires that where water spray fixed systems are used, they shall be automatically actuated by fire responsive devices and by manual actuation. Other NFPA codes that address LPG tank safety include NFPA 850A and NFPA 54.

As discussed above, the proximity to Brown Road places the off-site public at risk should a fire or explosion occur at the project site. Also discussed earlier in the staff assessment, the Kern County Fire Department claims it will be impacted by the operation of this solar project and that its equipment may be inadequate to respond effectively. Worker safety is an issue as an LPG fire or a HTF fire that threatens the LPG tank would pose a significant risk of both thermal radiation exposure and of blast effects. A water spray system over the tanks would provide more time for notification and safe evacuation of employees. The amount of LPG stored on-site is less than the threshold quantity for the U.S. Department of Homeland Security regulations on

chemical storage (see the staff assessment section on **SITE SECURITY** in the **HAZARDOUS MATERIALS MANAGEMENT** section of this **Staff Assessment /DEIS** for a more detailed analysis of this topic) and thus would not trigger a "Top-Screen" analysis and federal requirements for security measures. While staff has not quantitatively assessed the likelihood of a BLEVE (Boiling Liquid Expanding Vapor Explosion), staff believes that although it may be a low probability event, the consequences are very high. Additionally, the likelihood of an escalation of an LPG fire or BLEVE to cause fires in the remainder of the solar power plant is also very high, due to the amount (2,100,000 gal) of highly flammable HTF present on-site. Finally, the investment and reliance on renewable power in California's power infrastructure requires that a high level of engineering and administrative controls be implemented to protect power generation. Given all these considerations, staff believes that a simple and effective method of cooling the LPG tanks should a fire occur is required. Staff therefore proposes Condition of Certification **WORKER SAFETY-8** which would require the placement of a water spray system above the LPG tank.

Emergency Medical Services Response

Staff conducted a statewide survey to determine the frequency of Emergency Medical Services (EMS) response for natural gas-fired power plants in California. The purpose of the analysis was to determine what impact, if any, power plants may have on local emergency services. Staff has concluded that incidents at power plants that require EMS response are infrequent and represent an insignificant impact on the local fire departments, except for rare instances where a rural fire department has mostly volunteer fire-fighting staff or the response time is significantly greater than 15 minutes. However, staff has determined that the potential for both work-related and non-work-related heart attacks exists at power plants. In fact, staff's research on the frequency of EMS response to gas-fired power plants shows that many of the responses for cardiac emergencies involved non-work-related incidences, including those involving visitors. The need for prompt response within a few minutes is well documented in the medical literature. Staff believes that the quickest medical intervention can only be achieved with the use of an on-site automatic external defibrillator (AED); the response from an off-site provider would take longer regardless of the provider location. This fact is also well documented and serves as the basis for many private and public locations (e.g., airports, factories, government buildings) maintaining on-site cardiac defibrillation devices. Therefore, staff concludes that, with the advent of modern cost-effective cardiac defibrillation devices, it is proper in a power plant environment to maintain such a device on site in order to treat cardiac arrhythmias resulting from industrial accidents or other non-work related causes.

Commission staff proposes Condition of Certification **WORKER SAFETY-5,** which would require that a portable AED be located on site, that all power plant employees on site during operations be trained in its use, and that a representative number of workers on site during construction and commissioning also be trained in its use.

Closure and Decommissioning Impacts and Mitigation

Closure of the proposed RSPP (temporary or permanent) would follow a facility closure plan prepared by the applicant and designed to minimize public health and environmental impacts. Staff expects that impacts from the closure and

decommissioning process would represent a fraction of the impacts associated with the construction or operation of the proposed RSPP. Therefore based on staff's analysis for the construction and operation phases of this project, staff concludes that hazardous materials-related impacts from closure and decommissioning of the RSPP would be insignificant.

C.15.4.3 CEQA LEVEL OF SIGNIFICANCE

Staff's analysis of Worker Safety and Fire Protection impacts from the proposed RSPP has determined that impacts would be below the level of significance with implementation of recommended mitigation.

C.15.5 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because (1) it eliminates about 42 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources (desert tortoise and Mohave ground squirrel), cultural resources, and recreational uses, and (2) avoids constructing a solar facility in the Mohave Ground Squirrel Conservation Area (MGSCA).

Similar to the proposed project, the Northern Unit Alternative would transmit power to the grid through the planned SCE 230-kV substation to be located near the proposed project site. The power block covering approximately 18 acres, would remain north of Brown Road, as proposed by the project and would include all operational power facilities, structures, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system). The proposed transmission line alignment is 3,900 ft and would connect to the proposed switchyard (3.2 acres) adjacent to the existing SCE 230kV transmission line, west of the proposed project. In addition, the site would require access roads, a parking lot, bio-remediation unit and main office building (3 acres) all of which are proposed north of Brown Road within the proposed project footprint. The proposed 16.3 acre water line would remain at the location as proposed by the project. The Northern Unit Alternative would not require the relocation of the two existing SCE transmission lines.

As stated above, the Northern Unit Alternative is evaluated in this SA/PA/DEIS because it would reduce some impacts of the project. Additionally, the Northern Unit Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals, while minimizing impacts to the desert environment. A limited acreage alternative was suggested in scoping comments.

C.15.5.1 SETTING AND EXISTING CONDITIONS

The Northern Unit Alternative would consist of 167 solar collector array loops with a net generating capacity of approximately 146 MW. The total disturbance area would be approximately 1134 acres of land. This alternative would retain 58 percent of the

proposed solar array loops and would affect 58 percent of the land of the proposed 250 MW project. The boundaries of the Northern Unit Alternative are shown in **Alternatives Figure 1**.

C.15.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Construction of the Northern Unit Alternative is likely to require fewer employees which would not reduce the impacts to worker safety or fire protection because the same level of safety and fire detection and suppression would be required regardless of the size of the solar power plant. Even if this alternative may have slightly smaller amounts of flammable/hazardous materials and potential ignition sources, the level of fire protection would be essentially the same as with other alternatives. Any reduced impacts in the area of Worker Safety and Fire Protection would be so minor so as to be not quantifiable or distinguishable, and staff has determined that the project as proposed would have less than significant impacts (pursuant to CEQA) in the area of Worker Safety and Fire Protection with staff's proposed mitigation.

C.15.5.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA level of significance for Worker Safety and Fire Protection would not change with the Northern Unit Alternative, as both the project as proposed and the Northern Unit Alternative would, with mitigation, have impacts below the level of significance (pursuant to CEQA). The same conditions of certification would be required for the Northern Unit Alternative and the project as proposed.

C.15.6 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would be a 104 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because it eliminates about 58 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources, and cultural resources.

Similar to the proposed project, the Southern Unit Alternative would transmit power to the grid through the planned SCE 230-kV substation to be located near the proposed project site. The power block, spanning approximately 18 acres, would remain north of Brown Road, as proposed by the project and would include all operational power facilities, structures, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system). The proposed transmission line alignment is 3,900 ft and would connect to the proposed switchyard (3.2 acres) adjacent to the existing SCE 230kV transmission line, west of the proposed project. In addition, the site would require access roads, a parking lot, bio-remediation unit and main office building (3 acres) all of which are proposed north of Brown Road. The proposed 16.3 acre water line would remain at the location as proposed by the project. Similar to the proposed project, the Southern Unit Alternative would require the relocation of the two existing SCE transmission lines; this realignment would require approximately 58.2 acres.

As stated above, the Southern Unit Alternative is evaluated in this SA/PA/DEIS because it would reduce some impacts of the project. Additionally, the Southern Unit Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals, while minimizing impacts to the desert environment. A limited acreage alternative was suggested in scoping comments.

C.15.6.1 SETTING AND EXISTING CONDITIONS

The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of approximately 104 MW. The total disturbance area would be approximately 908 acres of land. This alternative would retain 42 percent of the proposed solar array loops and would affect 42 percent of the land of the proposed 250 MW project. The boundaries of the Southern Unit Alternative are shown in **Alternatives Figure 2**. This area was would avoid a large portion of the El Paso Wash and sensitive biological resources, including areas that were mapped as occupied tortoise and Mohave ground squirrel habitat (live tortoise and/or active burrows and sign).

C.15.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Construction of the Southern Unit Alternative is also unlikely to have reduced impacts in the area of Worker Safety and Fire Protection because the same level of safety and fire detection and suppression would be required regardless of the size of the solar power plant. Even if this alternative may have slightly smaller amounts of flammable/hazardous materials and potential ignition sources, the level of fire protection would be essentially the same as with other alternatives. Any reduced impacts in the area of Worker Safety and Fire Protection would be so minor so as to be not quantifiable or distinguishable, and staff has determined that the project as proposed would have less than significant impacts (pursuant to CEQA) in the area of Worker Safety and Fire Protection with staff's proposed mitigation.

C.15.6.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA level of significance for Worker Safety and Fire Protection would not change with the Southern Unit Alternative, as both the project as proposed and the Southern Unit Alternative would have impacts below the level of significance. The same conditions of certification would be required for the Southern Unit Alternative and the project as proposed.

C.15.7 ORIGINAL PROPOSED PROJECT ALTERNATIVE

The Original Proposed Project Alternative would be a 250 MW solar facility as originally proposed by Solar Millennium. This alternative is analyzed because it would reduce the amount of land developed within the Mojave Ground Squirrel Conservation Area and it could transmit the full 250 MW of power that Solar Millennium has requested.

Similar to the proposed project, the Original Proposed Project Alternative would transmit power to the grid through the planned SCE 230-kV substation located near the proposed project site and would require infrastructure including main office building (3 acres), power block, water line, transmission line, switch yard, access roads, parking

area, bio-remediation unit and maintenance building. The 18-acre off-site water line route would follow the same route as the proposed project. The bioremediation unit would be located north of Brown Road, within the proposed project footprint; the power block and ancillary facilities would be located south of Brown Road on approximately 18 acres in addition to the transmission line and switch-yard (5.5 acres). The Original Proposed Project Alternative would require the relocation of the two existing SCE transmission lines.

As stated above, the Original Proposed Alternative is evaluated in this SA/PA/DEIS because it reduces land developed with the MGSCA. Additionally, the Original Proposed Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals.

C.15.7.1 SETTING AND EXISTING CONDITIONS

The Original Proposed Project Alternative would consist of 278 solar array loops with a net generating capacity of approximately 250 MW. The total disturbance area would be approximately 1,794 acres of land A shorter transmission interconnection – 1,250 feet as compared to the proposed project interconnection of 3,900 feet – would be needed. The boundaries of the Original Proposed Project Alternative are shown in **Alternatives Figure 3**. This project footprint contains two desert ephemeral washes that would require redirection and smaller dry desert washes also traverse the site. In addition this site is the location of prime desert tortoise and Mojave ground squirrel habitat.

C.15.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Potential impacts associated with worker safety and fire protection would likely be similar to those estimated for the RSPP as proposed and staff's analysis has determined that some significant impacts may be expected for the RSPP as proposed. As stated above, the same level of safety and fire detection and suppression would be required regardless of the size of the solar power plant. Any reduced impacts in the area of Worker Safety and Fire Protection would be so minor so as to be not quantifiable or distinguishable, and staff has determined that the project as proposed would have less than significant impacts (pursuant to CEQA) in the area of Worker Safety and Fire Protection with staff's proposed mitigation.

C.15.7.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA level of significance for Worker Safety and Fire Protection would not change with the Original Proposed Project Alternative, as both the project as proposed and the Original Proposed Project Alternative would have impacts below the level of significance. The same conditions of certification would be required for the Original Proposed Project Alternative and the project as proposed.

C.15.8 NO PROJECT/NO ACTION ALTERNATIVES

C.15.8.1 NO PROJECT/NO ACTION ALTERNATIVE #1

No Action on Ridgecrest Solar Power Project application and on CDCA land use plan amendment

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, no construction safety and health and project operations and maintenance safety and health programs would be required and no impacts on local fire protection services would be created. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.15.8.2 NO PROJECT/NO ACTION ALTERNATIVE #2

No Action on Ridgecrest Solar Power Project and amend the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site will be developed with another solar technology. Construction and operation requirements for solar technologies vary. However, it is expected that construction safety and health and project operations and maintenance safety and health programs would be required for all solar technologies and impacts to local fire protection services would be potentially generated. As such, it is expected that the impacts to worker safety and fire protection from a different solar technology would likely be similar to impacts from the proposed project.

C.15.8.3 NO PROJECT/NO ACTION ALTERNATIVE #3

No Action on Ridgecrest Solar Power Project application and amend the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended so no solar projects can be approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no construction or operation of a solar facility. No construction safety and health and no maintenance safety and health programs would be required and no demands on local fire protection services would be made. Therefore, this No Project/No Action Alternative would not result in impacts to worker safety and fire protection. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.15.9 COMPARISON OF ALTERNATIVES AND PROPOSED PROJECT

Worker Safety Table 4
Comparison of Proposed Project and Alternatives

	Proposed Project (250 MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250 MW)	No Project/No Action*
Risk of potential fire causing severe damage, injury, or loss of life	Less than significant	Less than significant (same level of worker safety, fire detection, and fire suppression would be required. Differences would, not be quantifiable or distinguishable	Less than significant (same level of worker safety, fire detection, and fire suppression would be required. Differences would, not be quantifiable or distinguishable	Less than significant (same level of worker safety, fire detection, and fire suppression would be required. Differences would, not be quantifiable or distinguishable	Less than significant

*All No Project/No Action alternatives assume that the RSPP project would not be built on the proposed site

C.15.10 CUMULATIVE IMPACTS ANALYSIS

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (California Code Regulation, Title 14, section 15130). NEPA states that cumulative effects can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR §1508.7).

C.15.10.1 GEOGRAPHIC EXTENT

The geographic areas considered for cumulative impacts on Worker Safety/Fire Protection are within the project boundaries and the regional area within the jurisdiction of the local fire department.

C.5.10.2 EFFECTS OF PAST AND PRESENT PROJECTS

For this analysis, there is one project in the area or region that may require the response from off-site fire departments for fire, HazMat, or EMS emergencies. That is the existing China Lake Naval Weapons Center. However, this facility is not considered by staff to have had an impact on the area because of the on-site emergency response capability of the U.S. Navy.

Staff has analyzed the potential for Worker Safety/Fire Protection cumulative impacts at many other power plant projects in California. A significant cumulative Worker Safety/Fire Protection impact is defined as the simultaneous need for a fire department to respond to multiple locations such that its resources and those of the mutual aid fire departments (which routinely respond in every-day situations to emergencies at residences, commercial buildings, and heavy industry) are over-whelmed and cannot effectively respond. Staff believes that, for most power plants, while cumulative impacts are theoretically possible, they are not probable because of the many safeguards implemented to both prevent and control fires, HazMat releases, and injuries/accidents and the location of existing facilities which are not distant from KCFD fire stations such that the response times are adequate. Staff therefore believes the impacts of past and present projects on the local fire department are insignificant (pursuant to CEQA).

C.5.10.3 EFFECTS OF REASONABLY FORESEEABLE FUTURE PROJECTS

Foreseeable Projects in the Project Area

Worker Safety/Fire Protection at the proposed project may also be affected by reasonably foreseeable future projects, including the proposed Super Wal-Mart, a waste water treatment plant, one solar project, and three wind projects.

The construction of the RSPP is expected to result in short term adverse impacts related to Worker Safety/Fire Protection during construction activities. It is expected that some of the cumulative projects described above which are not yet built may be under

construction the same time as the RSPP and therefore short term impacts related to Worker Safety/Fire Protection during construction of those cumulative projects may occur.

The operation of the RSPP is also expected to result in long term adverse impacts during operation of the project related to Worker Safety/Fire Protection. Staff has analyzed the potential for Worker Safety/Fire Protection cumulative impacts at many other power plant projects in California. A significant cumulative Worker Safety/Fire Protection impact is defined as the simultaneous need for a fire department to respond to multiple locations such that its resources and those of the mutual aid fire departments (which routinely respond in every-day situations to emergencies at residences, commercial buildings, and heavy industry) are over-whelmed and cannot effectively respond.

The KCFD stated that the potential impacts of this project on their ability to serve their jurisdiction are unknown at the time staff contacted the KCFD in early December 2009. The KCFD noted that several engine companies are 10 - 15 minutes away, which in staff's opinion would not be expected to impact the surrounding communities with extended response times if a significant event happened at the project site. However, the County indicated that in general, services provided by the County which included police, fire, and EMS services may be impacted by this project and in a personal communication at a March 2, 2010 meeting, the KCFD did indicate a cumulative impact would exist and provided verbal substantiation of this impact. Upon consideration of this view, staff concurred that a cumulative impact would exist if the proposed RSPP is built.

Although the applicant will develop and implement a fire prevention program for the RSPP independent of any other projects considered for potential cumulative impacts, staff believes that mitigation will be required because of the added demands and great distances that response teams would travel. With the additional mitigation measures proposed by Commission staff, any impact on fire, HazMat, or EMS response will be reduced to a less than significant level (pursuant to CEQA).

Foreseeable Renewable Projects in the California Desert

As noted above, cumulative impacts in the area of Worker Safety and Fire Protection can only occur in the general vicinity of the project and therefore impacts to the greater region are not feasible.

C.5.10.4 OVERALL CONCLUSIONS

Commission staff finds that this project will have a significant cumulative burden on the KCFD's ability to respond to a fire, HazMat spill, or medical emergency and recommends mitigation in the form or proposed Condition of Certification **WORKER SAFETY-7** to reduce this impact to less than significance (pursuant to CEQA).

C.15.11 COMPLIANCE WITH LORS

Staff concludes that construction and operation of the RSPP project would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS) regarding long-term and short-term project impacts in the area of worker safety and fire protection.

C.15.12 NOTEWORTHY PUBLIC BENEFITS

In regards to Worker Safety and Fire protection, staff has not identified any noteworthy public benefits.

C.15.13 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

As required under CEQA and Energy Commission regulations, Commission staff proposes the following Conditions of Certification:

WORKER SAFETY-1 The project owner shall submit to the Compliance Project Manager (CPM) a copy of the Project Construction Safety and Health Program containing the following:

- A Construction Personal Protective Equipment Program;
- A Construction Exposure Monitoring Program;
- A Construction Injury and Illness Prevention Program;
- A Construction heat stress protection plan that implements and expands on existing Cal OSHA regulations as found in 8 CCR 3395;
- A Construction Emergency Action Plan; and
- A Construction Fire Prevention Plan.

The Personal Protective Equipment Program, the Exposure Monitoring Program, the Heat Stress Protection Plan, and the Injury and Illness Prevention Program shall be submitted to the CPM for review and approval concerning compliance of the program with all applicable safety orders. The Construction Emergency Action Plan and the Fire Prevention Plan shall be submitted to the Kern County Fire Department for review and comment prior to submittal to the CPM for approval.

Verification: At least 30 days prior to the start of construction, the project owner shall submit to the CPM for review and approval a copy of the Project Construction Safety and Health Program. The project owner shall provide a copy of a letter to the CPM from the Kern County Fire Department stating the fire department's comments on the Construction Fire Prevention Plan and Emergency Action Plan.

WORKER SAFETY-2 The project owner shall submit to the CPM a copy of the Project Operations and Maintenance Safety and Health Program containing the following:

- An Operation Injury and Illness Prevention Plan;
- An Operation heat stress protection plan that implements and expands on existing Cal OSHA regulations (8 CCR 3395);
- A Best Management Practices (BMP) for the storage and application of herbicides;
- An Emergency Action Plan;
- Hazardous Materials Management Program;
- Fire Prevention Plan (8 Cal Code Regs. § 3221); and
- Personal Protective Equipment Program (8 Cal Code Regs, §§ 3401—3411).

The Operation Injury and Illness Prevention Plan, Emergency Action Plan, Heat Stress Protection Plan, BMP for Herbicides, and Personal Protective Equipment Program shall be submitted to the CPM for review and comment concerning compliance of the programs with all applicable safety orders. The Fire Prevention Plan and the Emergency Action Plan shall also be submitted to the Kern County Fire Department for review and comment.

Verification: At least 30 days prior to the start of first-fire or commissioning, the project owner shall submit to the CPM for approval a copy of the Project Operations and Maintenance Safety and Health Program. The project owner shall provide a copy of a letter to the CPM from the Kern County Fire Department stating the fire department's comments on the Operations Fire Prevention Plan and Emergency Action Plan.

WORKER SAFETY-3 The project owner shall provide a site Construction Safety Supervisor (CSS) who, by way of training and/or experience, is knowledgeable of power plant construction activities and relevant laws, ordinances, regulations, and standards; is capable of identifying workplace hazards relating to the construction activities; and has authority to take appropriate action to assure compliance and mitigate hazards. The CSS shall:

- Have overall authority for coordination and implementation of all occupational safety and health practices, policies, and programs;
- Assure that the safety program for the project complies with Cal/OSHA and federal regulations related to power plant projects;
- Assure that all construction and commissioning workers and supervisors receive adequate safety training;
- Complete accident and safety-related incident investigations and emergency response reports for injuries and inform the CPM of safety-related incidents; and

- Assure that all the plans identified in Conditions of Certification Worker Safety-1 and -2 are implemented.

Verification: At least 60 days prior to the start of site mobilization, the project owner shall submit to the CPM the name and contact information for the Construction Safety Supervisor (CSS). The contact information of any replacement CSS shall be submitted to the CPM within one business day.

The CSS shall submit in the Monthly Compliance Report a monthly safety inspection report to include:

- Record of all employees trained for that month (all records shall be kept on site for the duration of the project);
- Summary report of safety management actions and safety-related incidents that occurred during the month;
- Report of any continuing or unresolved situations and incidents that may pose danger to life or health; and
- Report of accidents and injuries that occurred during the month.

WORKER SAFETY-4 The project owner shall make payments to the Chief Building Official (CBO) for the services of a Safety Monitor based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. Those services shall be in addition to other work performed by the CBO. The Safety Monitor shall be selected by and report directly to the CBO and will be responsible for verifying that the Construction Safety Supervisor, as required in Condition of Certification Worker Safety-3, and for implementing all appropriate Cal/OSHA and Energy Commission safety requirements. The Safety Monitor shall conduct on-site (including linear facilities) safety inspections at intervals necessary to fulfill those responsibilities.

Verification: At least 60 days prior to the start of construction, the project owner shall provide proof of its agreement to fund the Safety Monitor services to the CPM for review and approval.

WORKER SAFETY-5 The project owner shall ensure that a portable automatic external defibrillator (AED) is located on site during construction and operations and shall implement a program to ensure that workers are properly trained in its use and that the equipment is properly maintained and functioning at all times. During construction and commissioning, the following persons shall be trained in its use and shall be on site whenever the workers that they supervise are on site: the Construction Project Manager or delegate, the Construction Safety Supervisor or delegate, and all shift foremen. During operations, all power plant employees shall be trained in its use. The training program shall be submitted to the CPM for review and approval.

Verification: At least 60 days prior to the start of site mobilization, the project owner shall submit to the CPM proof that a portable automatic external defibrillator (AED) exists on site and a copy of the training and maintenance program for review and approval.

WORKER SAFETY-6 The project owner shall identify and provide a second access point for emergency personnel to enter the site. This access point and the method of gate operation shall be submitted to the Kern County Fire Department for review and comment and to the CPM for review and approval.

Verification: At least sixty (60) days prior to the start of site mobilization, the project owner shall submit to the Kern County Fire Department and the CPM preliminary plans showing the location of a second access point to the site and a description of how the gate will be opened by the fire department. At least thirty (30) days prior to the start of site mobilization, the project owner shall submit final plans to the CPM review and approval. The final plan submittal shall also include a letter containing comments from the Kern County Fire Department or a statement that no comments were received.

WORKER SAFETY-7 The project owner shall either (1) reach an agreement with the Kern County Fire Department regarding funding of its project-related share of capital costs to provide appropriate equipment as mitigation of project-related impacts on fire protection, HazMat, and/or EMS services along with an annual payment to maintain and provide these services, **or**, if no agreement can be reached shall (2) fund its share of the capital costs in the amount of $350,000 plus provide an annual payment of $100,000 to the KCFD for the support of additional fire department staff commencing with the date of site mobilization and continuing annually thereafter on the anniversary until the final date of power plant decommissioning.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall provide to the CPM either a copy of the agreement or documentation that the $350,000 payment and the first annual payment has been made.

In the annual compliance report submitted to the CPM, the project owner shall provide documentation that the annual payment has been made unless an agreement is reached with the KCFD that an annual payment is not required.

WORKER SAFETY-8 The project owner shall place a water spray system on the two LPG storage tanks. The engineering design plans shall comply with NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection* and be provided to the CPM for review and approval prior to commencing construction of the water spray system.

Verification: At least thirty (30) days prior to site mobilization, the project owner shall provide the engineering design plans to the CPM for review and approval.

At least thirty (30) days prior to the delivery of any LPG to the facility, the project owner shall provide a written statement to the CPM that the LPG tank water spray system has been built and successfully tested.

WORKER SAFETY-9 The project owner shall develop and implement an enhanced Dust Control Plan that includes the requirements described in **AQ-SC3** and additionally requires:

i) site worker use of dust masks (NIOSH N-95 or better) whenever visible dust is present;

ii) site monitoring for the presence of Coccidioides immitis in soil before site mobilization and monthly thereafter; and

iii) Implementation of enhanced dust control methods (increased frequency of watering, use of dust suppression chemicals, etc. consistent with **AQ-SC4**) immediately whenever visible dust comes from or onto the site.

After three consecutive months of not finding significant soil levels of Coccidioides immitis, the project owner may ask the CPM to re-evaluate and revise this testing requirement.

Verification: At least 60 days prior to the commencement of site mobilization, the enhanced Dust Control Plan shall be provided to the CPM for review and approval.

C.15.14 CONCLUSIONS

Commission staff concludes that if the applicant for the proposed RSPP project provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program as required by Conditions of Certification **WORKER SAFETY-1**, and **-2** and fulfils the requirements of Condition of Certification **WORKER SAFETY-3** through**-9**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable LORS. Staff also concludes that the operation of this power plant with mitigation will not significantly impact the local fire department either individually or cumulatively.

C.15.15 REFERENCES

California Department of Health Services (CDHS)2010 “Coccidiodomycosis (Valley Fever)” information page.http://www.cdph.ca.gov/HealthInfo/discond/Pages/Coccidioidomycosis.aspx

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D. ENGINEERING ANALYSIS

D.1 FACILITY DESIGN

Testimony of Shahab Khoshmashrab

D.1.1 SUMMARY OF CONCLUSIONS

The California Energy Commission staff concludes that the design, construction, and eventual closure of the project and its linear facilities would likely comply with applicable engineering laws, ordinances, regulations and standards. The proposed conditions of certification, below, would ensure compliance with these laws, ordinances, regulations and standards.

D.1.2 INTRODUCTION

Facility design encompasses the civil, structural, mechanical, and electrical engineering design of the Ridgecrest Solar Power Project (Ridgecrest Solar) and is not intended as a California Environmental Quality (CEQA) or National Environmental Policy Act (NEPA) analysis. The purpose of this analysis is solely to:

- Verify that the laws, ordinances, regulations and standards (LORS) that apply to the engineering design and construction of the project have been identified;
- Verify that both the project and its ancillary facilities are sufficiently described, including proposed design criteria and analysis methods, in order to provide reasonable assurance that the project would be designed and constructed in accordance with all applicable engineering LORS, in a manner that also ensures the public health and safety;
- Determine whether special design features should be considered during final design to address conditions unique to the site which could influence public health and safety; and
- Describe the design review and construction inspection process and establish the conditions of certification used to monitor and ensure compliance with the engineering LORS, in addition to any special design requirements.

Subjects discussed in this analysis include:

- Identification of the engineering LORS that apply to facility design;
- Evaluation of the applicant's proposed design criteria, including identification of criteria essential to public health and safety;
- Proposed modifications and additions to the application for certification (AFC) necessary for compliance with applicable engineering LORS; and
- Conditions of certification proposed by staff to ensure that the project would be designed and constructed to ensure public health and safety and comply with all applicable engineering LORS.

D.1.3 LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Lists of LORS applicable to each engineering discipline (civil, structural, mechanical, and electrical) are described in the AFC (Solar Millennium 2009a, Appendix C). Key LORS are listed in **Facility Design Table 1,** below:

Facility Design Table 1
Key Engineering Laws, Ordinances, Regulations and Standards (LORS)

Applicable LORS	Description
Federal	Title 29 Code of Federal Regulations (CFR), Part 1910, Occupational Safety and Health standards
State	2007 (or latest edition) California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations)
Local	Kern County regulations and ordinances
General	American National Standards Institute (ANSI) American Society of Mechanical Engineers (ASME) American Welding Society (AWS) American Society for Testing and Materials (ASTM)

D.1.4 PROPOSED PROJECT

D.1.4.1 SETTING AND EXISTING CONDITIONS

The Ridgecrest Solar would be built on a site located in Kern County, California. For more information on the site and its related project description, please see the **PROJECT DESCRIPTION** section of this document. Additional engineering design details are contained in the AFC, Appendix C (Solar Millennium 2009a).

D.1.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The purpose of this analysis is to ensure that the project would be built to applicable engineering codes and ensure public health and life safety. This analysis further verifies that applicable engineering LORS have been identified and that the project and its ancillary facilities have been described in adequate detail. It also evaluates the applicant's proposed design criteria, describes the design review and construction inspection process, and establishes conditions of certification that would monitor and ensure compliance with engineering LORS and any other special design requirements. These conditions allow both the California Energy Commission (Energy Commission) compliance project manager (CPM) and the applicant to adopt a compliance monitoring scheme that would verify compliance with these LORS.

SITE PREPARATION AND DEVELOPMENT

Staff has evaluated the proposed design criteria for grading, flood protection, erosion control, site drainage, and site access, in addition to the criteria for designing and constructing linear support facilities such as natural gas and electric transmission interconnections. The applicant proposes the use of accepted industry standards (see

Solar Millennium 2009a, Appendix C, for a representative list of applicable industry standards), design practices, and construction methods in preparing and developing the site. Staff concludes that this project, including its linear facilities, would most likely comply with all applicable site preparation LORS, and proposes conditions of certification (see below and the **GEOLOGY AND PALEONTOLOGY** section of this document) to ensure that compliance.

MAJOR STRUCTURES, SYSTEMS, AND EQUIPMENT

Major structures, systems, and equipment are structures and their associated components or equipment that are necessary for power production, costly or time consuming to repair or replace, are used for the storage, containment, or handling of hazardous or toxic materials, or could become potential health and safety hazards if not constructed according to applicable engineering LORS. Major structures and equipment are identified in the proposed Condition of Certification **GEN-2**, below. Typically, **Facility Design Table 2** in Condition of Certification **GEN-2** lists the major structures and equipment identified in the AFC and other project related information available before project licensing; this list is based on the preliminary design of the project. The master drawing and master specifications lists described in Condition of Certification **GEN-2**, however, include the project-related documents based on the project's detailed design and may include additional documents for structures and equipment not identified in **Facility Design Table 2**. (Detailed project design typically occurs after project licensing and is not available at this time.)

Ridgecrest Solar shall be designed and constructed to the 2007 California Building Standards Code (CBSC), also known as Title 24, California Code of Regulations, which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and other applicable codes and standards in effect when the design and construction of the project actually begin. If the initial designs are submitted to the chief building official (CBO) for review and approval after the update to the 2007 CBSC takes effect, the 2007 CBSC provisions shall be replaced with the updated provisions.

Certain structures in a power plant may be required, under the CBC, to undergo dynamic lateral force (structural) analysis; others may be designed using the simpler static analysis procedure. In order to ensure that structures are analyzed according to their appropriate lateral force procedure, staff has included condition of certification **STRUC-1**, below, which, in part, requires the project CBO's review and approval of the owner's proposed lateral force procedures before construction begins.

PROJECT QUALITY PROCEDURES

The project's AFC (Solar Millennium 2009a, Appendix C) describes a quality program intended to inspire confidence that its systems and components will be designed, fabricated, stored, transported, installed, and tested in accordance with all appropriate power plant technical codes and standards. Compliance with design requirements will be verified through specific inspections and audits. Implementation of this quality

assurance/quality control (QA/QC) program will ensure that Ridgecrest Solar is actually designed, procured, fabricated, and installed as described in this analysis.

COMPLIANCE MONITORING

Under Section 104.2 of the CBC, the CBO is authorized and directed to enforce all provisions of the CBC. The Energy Commission itself serves as the building official, and has the responsibility to enforce the code, for all of the energy facilities it certifies. In addition, the Energy Commission has the power to interpret the CBC and adopt and enforce both rules and supplemental regulations that clarify application of the CBC's provisions.

The Energy Commission's design review and construction inspection process conforms to CBC requirements and ensures that all facility design conditions of certification are met. As provided by Section 104.2.2 of the CBC, the Energy Commission appoints experts to perform design review and construction inspections and act as delegate CBOs on behalf of the Energy Commission. These delegates typically include the local building official and/or independent consultants hired to provide technical expertise that is not provided by the local official alone. The applicant, through permit fees provided by the CBC, pays the cost of these reviews and inspections. While building permits in addition to Energy Commission certification are not required for this project, the applicant pays in lieu of CBC permit fees to cover the costs of these reviews and inspections.

Engineering and compliance staff will invite Kern County or a third-party engineering consultant to act as CBO for this project. When an entity has been assigned CBO duties, Energy Commission staff will complete a memorandum of understanding (MOU) with that entity to outline both its roles and responsibilities and those of its subcontractors and delegates.

Staff has developed proposed conditions of certification to ensure public health and safety and compliance with engineering design LORS. Some of these conditions address the roles, responsibilities, and qualifications of the engineers who will design and build the proposed project (conditions of certification **GEN-1** through **GEN-8**). These engineers must be registered in California and sign and stamp every submittal of design plans, calculations, and specifications submitted to the CBO. These conditions require that every element of the project's construction (subject to CBO review and approval) be approved by the CBO before it is performed. They also require that qualified special inspectors perform or oversee special inspections required by all applicable LORS.

While the Energy Commission and delegate CBO have the authority to allow some flexibility in scheduling construction activities, these conditions are written so that no element of construction (of permanent facilities subject to CBO review and approval) which could be difficult to reverse or correct can proceed without prior CBO approval. Elements of construction that are not difficult to reverse may proceed without approval of the plans. The applicant bears the responsibility to fully modify construction elements in order to comply with all design changes resulting from the CBO's subsequent plan review and approval process.

D.1.4.3 CEQA LEVEL OF SIGNIFICANCE

As described in the **INTRODUCTION** above, the Facility Design section addresses LORS consistency and provides the agencies a vehicle for verifying compliance with these LORS during construction and operation of power generating facilities. This section is not intended to address environmental impacts under either CEQA or NEPA.

D.1.5 RECONFIGURED ALTERNATIVE

The Facility Design section is not intended to address environmental impacts under either CEQA or NEPA.

D.1.6 REDUCED ACREAGE ALTERNATIVE

The Facility Design section is not intended to address environmental impacts under either CEQA or NEPA.

D.1.7 No Project / No Action Alternative

The Facility Design section is not intended to address environmental impacts under either CEQA or NEPA.

D.1.8 CUMULATIVE IMPACT ANALYSIS

The Facility Design section is not intended to address environmental impacts under either CEQA or NEPA.

D.1.9 COMPLIANCE WITH LORS

A detailed discussion of the proposed project's compliance with LORS applicable to facility design is provided above in subsection D.1.4.2.

D.1.10 NOTEWORTHY PUBLIC BENEFITS

Staff has not identified any noteworthy public benefits associated with this Facility Design section.

D.1.11 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

GEN-1 The project owner shall design, construct, and inspect the project in accordance with the 2007 California Building Standards Code (CBSC), also known as Title 24, California Code of Regulations, which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and

all other applicable engineering LORS in effect at the time initial design plans are submitted to the CBO for review and approval (the CBSC in effect is the edition that has been adopted by the California Building Standards Commission and published at least 180 days previously). The project owner shall ensure that all the provisions of the above applicable codes are enforced during the construction, addition, alteration, moving, demolition, repair, or maintenance of the completed facility. All transmission facilities (lines, switchyards, switching stations and substations) are covered in the conditions of certification in the **TRANSMISSION SYSTEM ENGINEERING** section of this document.

In the event that the initial engineering designs are submitted to the CBO when the successor to the 2007 CBSC is in effect, the 2007 CBSC provisions shall be replaced with the applicable successor provisions. Where, in any specific case, different sections of the code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

The project owner shall ensure that all contracts with contractors, subcontractors, and suppliers clearly specify that all work performed and materials supplied comply with the codes listed above.

Verification: Within 30 days following receipt of the certificate of occupancy, the project owner shall submit to the CPM a statement of verification, signed by the responsible design engineer, attesting that all designs, construction, installation, and inspection requirements of the applicable LORS and the Energy Commission's decision have been met in the area of facility design. The project owner shall provide the CPM a copy of the certificate of occupancy within 30 days of receipt from the CBO.

Once the certificate of occupancy has been issued, the project owner shall inform the CPM at least 30 days prior to any construction, addition, alteration, moving, demolition, repair, or maintenance to be performed on any portion(s) of the completed facility that requires CBO approval for compliance with the above codes. The CPM will then determine if the CBO needs to approve the work.

GEN-2 Before submitting the initial engineering designs for CBO review, the project owner shall furnish the CPM and the CBO with a schedule of facility design submittals, and master drawing and master specifications lists. The schedule shall contain a list of proposed submittal packages of designs, calculations, and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide specific packages to the CPM upon request.

Verification: At least 60 days (or a project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO and to the CPM the schedule, the master drawing and master specifications lists of documents to be submitted to the CBO for review and approval. These documents shall be the pertinent design documents for the major structures and equipment listed in **Facility Design Table 2**, below. Major structures and equipment shall be added to or

deleted from the table only with CPM approval. The project owner shall provide schedule updates in the monthly compliance report.

Facility Design Table 2
Major Structures and Equipment List

Equipment/System	Quantity (Plant)
Steam Turbine Generator Foundation and Connections	1
Start-up Boilers Foundations and Connections	1
Generator Step-up Transformer Foundation and Connections	1
Overflow Vessel Foundation and Connections	1
Expansion Vessel Foundation and Connections	1
Weather Station Building Structure, Foundation and Connections	1
HTF Pumps Lube Oil Unit Foundation and Connections	2
Balance of Plant Electrical Building Structure, Foundation and Connections	1
Ullage Coolers and Vessel	1
Reheaters Foundation and Connections	2
MCC Cooling Tower Foundation and Connections	1
Gland Condenser Foundation and Connections	1
Lube Oil Console	1
Deaerator Foundation and Connections	1
LP/HP Pre-Heaters	1
Main Auxiliary Transformers Foundations and Connections	1
Air-cooled Condenser Structure, Foundation and Connections	1
Oil/Water Separator Foundation and Connections	1
Compressed Air System Foundation and Connections	1
Generator Circuit Breaker Foundation and Connections	1
Warehouse Building Structure, Foundation and Connections	1
Chemical Injection Skid Foundation and Connections	1
Cooling Tower Foundation and Connections	1
Water Tank Structure, Foundation and Connections	1
Take Off Tower Structure, Foundation and Connections	1
Blowdown Tanks Structure, Foundation and Connections	2
Sample Panel and Lab Building Structure, Foundation and Connections	1
Demineralized Water Tank Structure, Foundation and Connections	1
Administration Building Structure, Foundation and Connections	1
Control Building Structure, Foundation and Connections	1
Pipe Racks	1 Lot
Treated Water Tank Structure, Foundation and Connections	1
Pumps Foundation and Connections	1 Lot
Solar Field Reflectors and Receivers Foundations and Connections	1 Lot
Drainage Systems (including sanitary drain and waste)	1 Lot

Equipment/System	Quantity (Plant)
High Pressure and Large Diameter Piping and Pipe Racks	1 Lot
HVAC and Refrigeration Systems	1 Lot
Temperature Control and Ventilation Systems (including water and sewer connections)	1 Lot
Building Energy Conservation Systems	1 Lot
Substation, Switchboards, Transformers, Buses and Towers	1 Lot
Electrical Cables/Duct Banks	1 Lot
Prefabricated Assemblies	1 Lot

GEN-3 The project owner shall make payments to the CBO for design review, plan checks, and construction inspections, based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. These fees may be consistent with the fees listed in the 2007 CBC, adjusted for inflation and other appropriate adjustments; may be based on the value of the facilities reviewed; may be based on hourly rates; or may be otherwise agreed upon by the project owner and the CBO.

Verification: The project owner shall make the required payments to the CBO in accordance with the agreement between the project owner and the CBO. The project owner shall send a copy of the CBO's receipt of payment to the CPM in the next monthly compliance report indicating that applicable fees have been paid.

GEN-4 Prior to the start of rough grading, the project owner shall assign a California-registered architect, or a structural or civil engineer, as the resident engineer (RE) in charge of the project. All transmission facilities (lines, switchyards, switching stations, and substations) are addressed in the conditions of certification in the **TRANSMISSION SYSTEM ENGINEERING** section of this document.

The RE may delegate responsibility for portions of the project to other registered engineers. Registered mechanical and electrical engineers may be delegated responsibility for mechanical and electrical portions of the project, respectively. A project may be divided into parts, provided that each part is clearly defined as a distinct unit. Separate assignments of general responsibility may be made for each designated part.

The RE shall:

1. Monitor progress of construction work requiring CBO design review and inspection to ensure compliance with LORS;

2. Ensure that construction of all facilities subject to CBO design review and inspection conforms in every material respect to applicable LORS, these conditions of certification, approved plans, and specifications;

3. Prepare documents to initiate changes in approved drawings and specifications when either directed by the project owner or as required by the conditions of the project;

4. Be responsible for providing project inspectors and testing agencies with complete and up-to-date sets of stamped drawings, plans, specifications, and any other required documents;

5. Be responsible for the timely submittal of construction progress reports to the CBO from the project inspectors, the contractor, and other engineers who have been delegated responsibility for portions of the project; and

6. Be responsible for notifying the CBO of corrective action or the disposition of items noted on laboratory reports or other tests when they do not conform to approved plans and specifications.

The resident engineer (or his delegate) must be located at the project site, or be available at the project site within a reasonable period of time, during any hours in which construction takes place.

The RE shall have the authority to halt construction and to require changes or remedial work if the work does not meet requirements.

If the RE or the delegated engineers are reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the resume and registration number of the RE and any other delegated engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the RE and other delegated engineer(s) within five days of the approval.

If the RE or the delegated engineer(s) is subsequently reassigned or replaced, the project owner has five days to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-5 Prior to the start of rough grading, the project owner shall assign at least one of each of the following California registered engineers to the project: a civil engineer; a soils, geotechnical, or civil engineer experienced and knowledgeable in the practice of soils engineering; and an engineering geologist. Prior to the start of construction, the project owner shall assign at least one of each of the following California registered engineers to the project: a design engineer who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; a mechanical engineer; and an electrical engineer. (California Business and Professions Code section 6704 et seq., and sections 6730, 6731 and 6736 require state registration to practice as a civil engineer or structural engineer in California). All transmission facilities (lines,

switchyards, switching stations, and substations) are handled in the conditions of certification in the **TRANSMISSION SYSTEM ENGINEERING** section of this document.

The tasks performed by the civil, mechanical, electrical, or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (for example, proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer.

The project owner shall submit, to the CBO for review and approval, the names, qualifications, and registration numbers of all responsible engineers assigned to the project.

If any one of the designated responsible engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned responsible engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

A. The civil engineer shall:

   1. Review the foundation investigations, geotechnical, or soils reports prepared by the soils engineer, the geotechnical engineer, or by a civil engineer experienced and knowledgeable in the practice of soils engineering;

   2. Design (or be responsible for the design of), stamp, and sign all plans, calculations, and specifications for proposed site work, civil works, and related facilities requiring design review and inspection by the CBO. At a minimum, these include: grading, site preparation, excavation, compaction, construction of secondary containment, foundations, erosion and sedimentation control structures, drainage facilities, underground utilities, culverts, site access roads and sanitary sewer systems; and

   3. Provide consultation to the RE during the construction phase of the project and recommend changes in the design of the civil works facilities and changes to the construction procedures.

B. The soils engineer, geotechnical engineer, or civil engineer experienced and knowledgeable in the practice of soils engineering, shall:

   1. Review all the engineering geology reports;

2. Prepare the foundation investigations, geotechnical, or soils reports containing field exploration reports, laboratory tests, and engineering analysis detailing the nature and extent of the soils that could be susceptible to liquefaction, rapid settlement or collapse when saturated under load;

3. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with requirements set forth in the 2007 CBC (depending on the site conditions, this may be the responsibility of either the soils engineer, the engineering geologist, or both); and

4. Recommend field changes to the civil engineer and RE.

This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform to the predicted conditions used as the basis for design of earthwork or foundations.

C. The engineering geologist shall:

1. Review all the engineering geology reports and prepare a final soils grading report; and

2. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the 2007 CBC (depending on the site conditions, this may be the responsibility of either the soils engineer, the engineering geologist, or both).

D. The design engineer shall:

1. Be directly responsible for the design of the proposed structures and equipment supports;

2. Provide consultation to the RE during design and construction of the project;

3. Monitor construction progress to ensure compliance with engineering LORS;

4. Evaluate and recommend necessary changes in design; and

5. Prepare and sign all major building plans, specifications, and calculations.

E. The mechanical engineer shall be responsible for, and sign and stamp a statement with, each mechanical submittal to the CBO, stating that the proposed final design plans, specifications, and calculations conform to all of the mechanical engineering design requirements set forth in the Energy Commission's decision.

F. The electrical engineer shall:

1. Be responsible for the electrical design of the project; and

2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible civil engineer, soils (geotechnical) engineer and engineering geologist assigned to the project.

At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of construction, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible design engineer, mechanical engineer, and electrical engineer assigned to the project.

The project owner shall notify the CPM of the CBO's approvals of the responsible engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-6 Prior to the start of an activity requiring special inspection, including prefabricated assemblies, the project owner shall assign to the project, qualified and certified special inspector(s) who shall be responsible for the special inspections required by the 2007 CBC. All transmission facilities (lines, switchyards, switching stations, and substations) are handled in conditions of certification in the **TRANSMISSION SYSTEM ENGINEERING** section of this document.

A certified weld inspector, certified by the American Welding Society (AWS), and/or American Society of Mechanical Engineers (ASME) as applicable, shall inspect welding performed on-site requiring special inspection (including structural, piping, tanks and pressure vessels).

The special inspector shall:

1. Be a qualified person who shall demonstrate competence, to the satisfaction of the CBO, for inspection of the particular type of construction requiring special or continuous inspection;

2. Inspect the work assigned for conformance with the approved design drawings and specifications;

3. Furnish inspection reports to the CBO and RE. All discrepancies shall be brought to the immediate attention of the RE for correction, then, if uncorrected, to the CBO and the CPM for corrective action; and

4. Submit a final signed report to the RE, CBO, and CPM, stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance with the approved plans, specifications, and other provisions of the applicable edition of the CBC.

Verification: At least 15 days (or project owner- and CBO-approved alternative time frame) prior to the start of an activity requiring special inspection, the project owner shall submit to the CBO for review and approval, with a copy to the CPM, the name(s) and qualifications of the certified weld inspector(s), or other certified special inspector(s) assigned to the project to perform one or more of the duties set forth above. The project owner shall also submit to the CPM a copy of the CBO's approval of the qualifications of all special inspectors in the next monthly compliance report.

If the special inspector is subsequently reassigned or replaced, the project owner has five days in which to submit the name and qualifications of the newly assigned special inspector to the CBO for approval. The project owner shall notify the CPM of the CBO's approval of the newly assigned inspector within five days of the approval.

GEN-7 If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend required corrective actions. The discrepancy documentation shall be submitted to the CBO for review and approval. The discrepancy documentation shall reference this condition of certification and, if appropriate, applicable sections of the CBC and/or other LORS.

Verification: The project owner shall transmit a copy of the CBO's approval of any corrective action taken to resolve a discrepancy to the CPM in the next monthly compliance report. If any corrective action is disapproved, the project owner shall advise the CPM, within five days, of the reason for disapproval and the revised corrective action to obtain CBO's approval.

GEN-8 The project owner shall obtain the CBO's final approval of all completed work that has undergone CBO design review and approval. The project owner shall request the CBO to inspect the completed structure and review the submitted documents. The project owner shall notify the CPM after obtaining the CBO's final approval. The project owner shall retain one set of approved engineering plans, specifications, and calculations (including all approved changes) at the project site or at another accessible location during the operating life of the project. Electronic copies of the approved plans, specifications, calculations, and marked-up as-builts shall be provided to the CBO for retention by the CPM.

Verification: Within 15 days of the completion of any work, the project owner shall submit to the CBO, with a copy to the CPM, in the next monthly compliance report, (a) a written notice that the completed work is ready for final inspection, and (b) a signed statement that the work conforms to the final approved plans. After storing the final

approved engineering plans, specifications, and calculations described above, the project owner shall submit to the CPM a letter stating both that the above documents have been stored and the storage location of those documents.

Within 90 days of the completion of construction, the project owner shall provide to the CBO three sets of electronic copies of the above documents at the project owner's expense. These are to be provided in the form of "read only" (Adobe .pdf 6.0) files, with restricted (password-protected) printing privileges, on archive quality compact discs.

CIVIL-1 The project owner shall submit to the CBO for review and approval the following:

1. Design of the proposed drainage structures and the grading plan;

2. An erosion and sedimentation control plan;

3. Related calculations and specifications, signed and stamped by the responsible civil engineer; and

4. Soils, geotechnical, or foundation investigations reports required by the 2007 CBC.

Verification: At least 15 days (or project owner- and CBO-approved alternative time frame) prior to the start of site grading the project owner shall submit the documents described above to the CBO for design review and approval. In the next monthly compliance report following the CBO's approval, the project owner shall submit a written statement certifying that the documents have been approved by the CBO.

CIVIL-2 The resident engineer shall, if appropriate, stop all earthwork and construction in the affected areas when the responsible soils engineer, geotechnical engineer, or the civil engineer experienced and knowledgeable in the practice of soils engineering identifies unforeseen adverse soil or geologic conditions. The project owner shall submit modified plans, specifications, and calculations to the CBO based on these new conditions. The project owner shall obtain approval from the CBO before resuming earthwork and construction in the affected area.

Verification: The project owner shall notify the CPM within 24 hours, when earthwork and construction is stopped as a result of unforeseen adverse geologic/soil conditions. Within 24 hours of the CBO's approval to resume earthwork and construction in the affected areas, the project owner shall provide to the CPM a copy of the CBO's approval.

CIVIL-3 The project owner shall perform inspections in accordance with the 2007 CBC. All plant site-grading operations, for which a grading permit is required, shall be subject to inspection by the CBO.

If, in the course of inspection, it is discovered that the work is not being performed in accordance with the approved plans, the discrepancies shall be reported immediately to the resident engineer, the CBO, and the CPM. The

project owner shall prepare a written report, with copies to the CBO and the CPM, detailing all discrepancies, non-compliance items, and the proposed corrective action.

Verification: Within five days of the discovery of any discrepancies, the resident engineer shall transmit to the CBO and the CPM a non-conformance report (NCR), and the proposed corrective action for review and approval. Within five days of resolution of the NCR, the project owner shall submit the details of the corrective action to the CBO and the CPM. A list of NCRs, for the reporting month, shall also be included in the following monthly compliance report.

CIVIL-4 After completion of finished grading and erosion and sedimentation control and drainage work, the project owner shall obtain the CBO's approval of the final grading plans (including final changes) for the erosion and sedimentation control work. The civil engineer shall state that the work within his/her area of responsibility was done in accordance with the final approved plans.

Verification: Within 30 days (or project owner- and CBO-approved alternative time frame) of the completion of the erosion and sediment control mitigation and drainage work, the project owner shall submit to the CBO, for review and approval, the final grading plans (including final changes) and the responsible civil engineer's signed statement that the installation of the facilities and all erosion control measures were completed in accordance with the final approved combined grading plans, and that the facilities are adequate for their intended purposes, along with a copy of the transmittal letter to the CPM. The project owner shall submit a copy of the CBO's approval to the CPM in the next monthly compliance report.

STRUC-1 Prior to the start of any increment of construction of any major structure or component listed in **Facility Design Table 2** of condition of certification **GEN-2**, above, the project owner shall submit to the CBO for design review and approval the proposed lateral force procedures for project structures and the applicable designs, plans and drawings for project structures. Proposed lateral force procedures, designs, plans and drawings shall be those for the following items (from **Table 2**, above):

1. Major project structures;

2. Major foundations, equipment supports, and anchorage; and

3. Large field-fabricated tanks.

Construction of any structure or component shall not begin until the CBO has approved the lateral force procedures to be employed in designing that structure or component.

The project owner shall:

1. Obtain approval from the CBO of lateral force procedures proposed for project structures;

2. Obtain approval from the CBO for the final design plans, specifications, calculations, soils reports, and applicable quality control procedures. If

there are conflicting requirements, the more stringent shall govern (for example, highest loads, or lowest allowable stresses shall govern). All plans, calculations, and specifications for foundations that support structures shall be filed concurrently with the structure plans, calculations, and specifications;

3. Submit to the CBO the required number of copies of the structural plans, specifications, calculations, and other required documents of the designated major structures prior to the start of on-site fabrication and installation of each structure, equipment support, or foundation;

4. Ensure that the final plans, calculations, and specifications clearly reflect the inclusion of approved criteria, assumptions, and methods used to develop the design. The final designs, plans, calculations, and specifications shall be signed and stamped by the responsible design engineer; and

5. Submit to the CBO the responsible design engineer's signed statement that the final design plans conform to applicable LORS.

Verification: At least 60 days (or project owner- and CBO-approved alternative time frame) prior to the start of any increment of construction of any structure or component listed in **Facility Design Table 2** of condition of certification **GEN-2**,above, the project owner shall submit to the CBO the above final design plans, specifications and calculations, with a copy of the transmittal letter to the CPM.

The project owner shall submit to the CPM, in the next monthly compliance report, a copy of a statement from the CBO that the proposed structural plans, specifications, and calculations have been approved and comply with the requirements set forth in applicable engineering LORS.

STRUC-2 The project owner shall submit to the CBO the required number of sets of the following documents related to work that has undergone CBO design review and approval:

1. Concrete cylinder strength test reports (including date of testing, date sample taken, design concrete strength, tested cylinder strength, age of test, type and size of sample, location and quantity of concrete placement from which sample was taken, and mix design designation and parameters);

2. Concrete pour sign-off sheets;

3. Bolt torque inspection reports (including location of test, date, bolt size, and recorded torques);

4. Field weld inspection reports (including type of weld, location of weld, inspection of non-destructive testing (NDT) procedure and results, welder qualifications, certifications, qualified procedure description or number (ref: AWS); and

5. Reports covering other structural activities requiring special inspections shall be in accordance with the 2007 CBC.

Verification: If a discrepancy is discovered in any of the above data, the project owner shall, within five days, prepare and submit an NCR describing the nature of the discrepancies and the proposed corrective action to the CBO, with a copy of the transmittal letter to the CPM. The NCR shall reference the condition(s) of certification and the applicable CBC chapter and section. Within five days of resolution of the NCR, the project owner shall submit a copy of the corrective action to the CBO and the CPM.

The project owner shall transmit a copy of the CBO's approval or disapproval of the corrective action to the CPM within 15 days. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action to obtain CBO's approval.

STRUC-3 The project owner shall submit to the CBO design changes to the final plans required by the 2007 CBC, including the revised drawings, specifications, calculations, and a complete description of, and supporting rationale for, the proposed changes, and shall give to the CBO prior notice of the intended filing.

Verification: On a schedule suitable to the CBO, the project owner shall notify the CBO of the intended filing of design changes, and shall submit the required number of sets of revised drawings and the required number of copies of the other above-mentioned documents to the CBO, with a copy of the transmittal letter to the CPM. The project owner shall notify the CPM, via the monthly compliance report, when the CBO has approved the revised plans.

STRUC-4 Tanks and vessels containing quantities of toxic or hazardous materials exceeding amounts specified in the 2007 CBC shall, at a minimum, be designed to comply with the requirements of that chapter.

Verification: At least 30 days (or project owner- and CBO-approved alternate time frame) prior to the start of installation of the tanks or vessels containing the above specified quantities of toxic or hazardous materials, the project owner shall submit to the CBO for design review and approval final design plans, specifications, and calculations, including a copy of the signed and stamped engineer's certification.

The project owner shall send copies of the CBO approvals of plan checks to the CPM in the following monthly compliance report. The project owner shall also transmit a copy of the CBO's inspection approvals to the CPM in the monthly compliance report following completion of any inspection.

MECH-1 The project owner shall submit, for CBO design review and approval, the proposed final design, specifications and calculations for each plant major piping and plumbing system listed in **Facility Design Table 2**, condition of certification **GEN-2**, above. Physical layout drawings and drawings not related to code compliance and life safety need not be submitted. The submittal shall also include the applicable QA/QC procedures. Upon completion of construction of any such major piping or plumbing system, the project owner shall request the CBO's inspection approval of that construction.

The responsible mechanical engineer shall stamp and sign all plans, drawings, and calculations for the major piping and plumbing systems, subject to CBO design review and approval, and submit a signed statement to the CBO when the proposed piping and plumbing systems have been designed, fabricated, and installed in accordance with all of the applicable laws, ordinances, regulations and industry standards, which may include, but are not limited to:

- American National Standards Institute (ANSI) B31.1 (Power Piping Code);
- ANSI B31.2 (Fuel Gas Piping Code);
- ANSI B31.3 (Chemical Plant and Petroleum Refinery Piping Code);
- ANSI B31.8 (Gas Transmission and Distribution Piping Code);
- Title 24, California Code of Regulations, Part 5 (California Plumbing Code);
- Title 24, California Code of Regulations, Part 6 (California Energy Code, for building energy conservation systems and temperature control and ventilation systems);
- Title 24, California Code of Regulations, Part 2 (California Building Code); and
- Kern County codes.

The CBO may deputize inspectors to carry out the functions of the code enforcement agency.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of any increment of major piping or plumbing construction listed in **Facility Design Table 2**, condition of certification **GEN-2,** above, the project owner shall submit to the CBO for design review and approval the final plans, specifications, and calculations, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with applicable LORS, and shall send the CPM a copy of the transmittal letter in the next monthly compliance report.

The project owner shall transmit to the CPM, in the monthly compliance report following completion of any inspection, a copy of the transmittal letter conveying the CBO's inspection approvals.

MECH-2 For all pressure vessels installed in the plant, the project owner shall submit to the CBO and California Occupational Safety and Health Administration (Cal-OSHA), prior to operation, the code certification papers and other documents required by applicable LORS. Upon completion of the installation of any pressure vessel, the project owner shall request the appropriate CBO and/or Cal-OSHA inspection of that installation.

The project owner shall:

1. Ensure that all boilers and fired and unfired pressure vessels are designed, fabricated, and installed in accordance with the appropriate

section of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, or other applicable code. Vendor certification, with identification of applicable code, shall be submitted for prefabricated vessels and tanks; and

2. Have the responsible design engineer submit a statement to the CBO that the proposed final design plans, specifications, and calculations conform to all of the requirements set forth in the appropriate ASME Boiler and Pressure Vessel Code or other applicable codes.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of on-site fabrication or installation of any pressure vessel, the project owner shall submit to the CBO for design review and approval, the above listed documents, including a copy of the signed and stamped engineer's certification, with a copy of the transmittal letter to the CPM.

The project owner shall transmit to the CPM, in the monthly compliance report following completion of any inspection, a copy of the transmittal letter conveying the CBO's and/or Cal-OSHA inspection approvals.

MECH-3 The project owner shall submit to the CBO for design review and approval the design plans, specifications, calculations, and quality control procedures for any heating, ventilating, air conditioning (HVAC) or refrigeration system. Packaged HVAC systems, where used, shall be identified with the appropriate manufacturer's data sheets.

The project owner shall design and install all HVAC and refrigeration systems within buildings and related structures in accordance with the CBC and other applicable codes. Upon completion of any increment of construction, the project owner shall request the CBO's inspection and approval of that construction. The final plans, specifications and calculations shall include approved criteria, assumptions, and methods used to develop the design. In addition, the responsible mechanical engineer shall sign and stamp all plans, drawings and calculations and submit a signed statement to the CBO that the proposed final design plans, specifications and calculations conform with the applicable LORS.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of construction of any HVAC or refrigeration system, the project owner shall submit to the CBO the required HVAC and refrigeration calculations, plans, and specifications, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the CBC and other applicable codes, with a copy of the transmittal letter to the CPM.

ELEC-1 Prior to the start of any increment of electrical construction for all electrical equipment and systems 480 Volts or higher (see a representative list, below), with the exception of underground duct work and any physical layout drawings and drawings not related to code compliance and life safety, the project owner shall submit, for CBO design review and approval, the proposed final design, specifications, and calculations. Upon approval, the

above listed plans, together with design changes and design change notices, shall remain on the site or at another accessible location for the operating life of the project. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS. All transmission facilities (lines, switchyards, switching stations, and substations) are handled in conditions of certification in the **TRANSMISSION SYSTEM ENGINEERING** section of this document.

A. Final plant design plans shall include:

1. One-line diagrams for the 13.8 kV, 4.16 kV and 480 V systems; and

2. System grounding drawings.

B. Final plant calculations must establish:

1. Short-circuit ratings of plant equipment;

2. Ampacity of feeder cables;

3. Voltage drop in feeder cables;

4. System grounding requirements;

5. Coordination study calculations for fuses, circuit breakers and protective relay settings for the 13.8 kV, 4.16 kV and 480 V systems;

6. System grounding requirements; and

7. Lighting energy calculations.

C. The following activities shall be reported to the CPM in the monthly compliance report:

1. Receipt or delay of major electrical equipment;

2. Testing or energization of major electrical equipment; and

3. A signed statement by the registered electrical engineer certifying that the proposed final design plans and specifications conform to requirements set forth in the Energy Commission decision.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of each increment of electrical construction, the project owner shall submit to the CBO for design review and approval the above listed documents. The project owner shall include in this submittal a copy of the signed and stamped statement from the responsible electrical engineer attesting compliance with the applicable LORS, and shall send the CPM a copy of the transmittal letter in the next monthly compliance report.

D.1.13 CONCLUSIONS

1. The laws, ordinances, regulations and standards (LORS) identified in the AFC and supporting documents directly apply to the project.

2. Staff has evaluated the proposed engineering LORS, design criteria, and design methods in the record, and concludes that the design, construction, and eventual closure of the project will likely comply with applicable engineering LORS.

3. The proposed conditions of certification will ensure that Ridgecrest Solar is designed and constructed in accordance with applicable engineering LORS. This will be accomplished through design review, plan checking, and field inspections that will be performed by the CBO or other Energy Commission delegate. Staff will audit the CBO to ensure satisfactory performance.

4. Though future conditions that could affect decommissioning are largely unknown at this time, it can reasonably be concluded that if, the project owner submits a decommissioning plan as required in the **General Conditions** portion of this document prior to decommissioning, decommissioning procedures will comply with all applicable engineering LORS.

Energy Commission staff recommends that:

1. The proposed conditions of certification be adopted to ensure that the project is designed and constructed in a manner that protects the public health and safety and complies with all applicable engineering LORS;

2. The project be designed and built to the 2007 CBSC (or successor standards, if in effect when initial project engineering designs are submitted for review); and

3. The CBO reviews the final designs, checks plans, and performs field inspections during construction. Energy Commission staff shall audit and monitor the CBO to ensure satisfactory performance.

D.1.14 REFERENCES

Solar Millennium2009a- Solar Millennium (tn: 52939). Application for Certification Vol 1 & 2, dated 8/24/2009.

D.2 GEOLOGY, PALEONTOLOGY AND MINERALS

Testimony of Dal Hunter, Ph.D., C.E.G.

D.2.1 SUMMARY OF CONCLUSIONS

The proposed Ridgecrest Solar Power Project is located in southern Indian Wells Valley in a geologically active area of the southwestern Basin and Range Geomorphic Province, northeastern Kern County, California. Because of its geological setting, the main geologic hazards at this site include strong ground shaking, potential hydrocompaction, and corrosive soils. These potential hazards can be effectively mitigated through facility design by incorporating recommendations contained in a design-level geotechnical report as required by the California Building Code (CBC 2007) and Condition of Certification **GEO-1.** Conditions of Certification **GEN-1, GEN-5,** and **CIVIL-1** in the **FACILITY DESIGN** section, should also mitigate these impacts to a less than significant level (pursuant CEQA).

No significant impact (pursuant CEQA) to mineral resources is expected to result from approval of this action. Several mining claims exist outside the perimeter of the Ridgecrest Solar Power Project, but no active mining claims are presently recorded within the actual site. Four abandoned mine prospects are recorded at the hill within Section 25 of the project area, but little or no surface expression is evident. In Staff opinion the Project area has a low potential for the occurrence of minerals locatable under the Mining Law of 1872. An oil & gas lease (CACA-15765) was issued for an area three miles west of the RSPP project area in 1984, but that lease has since been relinquished and has no known production. In Staff opinion the Ridgecrest Solar Power Project area is not prospectively valuable for any leasable minerals. In 1987 the Bureau of Land Management issued a permit for disposal of mineral materials (sand, gravel, common stone) from a site within Section 35 of the project area. The site was closed in 1987 and no other disposal sites are known within the RSPP project area. In Staff opinion the Ridgecrest Solar Power Project site has a moderate potential for the occurrence of mineral materials such as fill dirt, sand and common stone. Approval of this proposed project would result in making the RSPP area unavailable for usage as a source of construction material. However, these materials are so common that this would have negligible impact to the total mineral material resources of Indian Wells Valley.

Paleontological resources have been documented within Quaternary Lake deposits associated with China Lake approximately six miles to the northeast (see **Soil and Water Resources Figure 4).** The high shoreline elevation of that prehistoric lake was at 2,240 feet (Davis 1975), while the Ridgecrest Solar Power Project is above 2,600+ feet in elevation. No important fossils were found during field explorations at the plant site, and the alluvial sediments disturbed by this proposed action are expected to have a low (surface) to high (at depth) potential for occurrence of significant fossils. If encountered, potential impacts to paleontological resources contained in these materials due to construction activities will be mitigated through worker training and monitoring by qualified paleontologists, as required by Conditions of Certification **PAL-1** through **PAL-7.**

Based on its independent research and review, the California Energy Commission believes that the potential is low for impacts to the proposed project from geological hazards during its design life and to potential geological, mineralogical, and paleontological resources from the construction, operation, and closure of the proposed project. It is staff's opinion that the Ridgecrest Solar Power Project could be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards and in a manner that would both protect environmental quality and assures public safety.

D.2.2 INTRODUCTION

In this section, California Energy Commission (CEC) staff (staff) discusses the potential impacts of geological hazards on the proposed Ridgecrest Solar Power Project (RSPP) site as well as the project's potential impacts on geological, mineralogical, and paleontological resources. Staff's objective is to ensure that there will be no consequential adverse impacts to Important geological and paleontological resources during the project construction, operation, and closure and that operation of the plant will not expose occupants to high-probability geological hazards. A brief geological and paleontological overview is provided. The section concludes with staff's proposed monitoring and mitigation measures for geological hazards and geological, mineralogical, and paleontological resources, with proposed conditions of certification.

D.2. METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

Federal agencies are required to review major federal actions such as the RSPP project under the National Environmental Policy Act (NEPA). This document has been prepared in consultation and coordination with the U.S. Bureau of Land Management (BLM) to also address federal environmental issues. The BLM and CEC have conducted a joint environmental review of the project in a single NEPA/California Environmental Quality Act (CEQA) process. The Federal Land Policy and Management Act of 1976 (FLPMA) establishes the agency's multiple-use mandate to serve present and future generations.

The CEQA Guidelines, Appendix G, provide a checklist of questions that lead agencies typically address.

- Section (V) (c) includes guidelines that determine if a project will either directly or indirectly destroy a unique paleontological resource or site or a unique geological feature.
- Sections (VI) (a), (b), (c), (d), and (e) focus on whether or not the project would expose persons or structures to geological hazards.
- Sections (X) (a) and (b) concern the project's effects on mineral resources.

The California Building Standards Code (CBSC) and CBC (2007) provide geotechnical and geological investigation and design guidelines, which engineers must follow when designing a facility. As a result, the criteria used to assess the significance of a geological hazard include evaluating each hazard's potential impact on the design and

construction of the proposed facility. Geological hazards include faulting and seismicity, volcanic eruptions, liquefaction, dynamic compaction, hydrocompaction, subsidence, expansive soils, landslides, tsunamis, and seiches. Of these, dynamic compaction, hydrocompaction, subsidence, and expansive soils are geotechnical engineering issues but are not normally associated with concerns for public safety.

Staff has reviewed geological and mineral resource maps for the surrounding area, as well as site-specific information provided by the applicant, to determine if any geological and mineralogical resources exist in the area and to determine if operations could adversely affect such geological and mineralogical resources.

To evaluate whether the proposed project and alternatives would generate a potentially significant impact as defined by CEQA on mineral resources, the staff evaluated them against checklist questions posed in the 2006 CEQA Guidelines, Appendix G, Environmental Checklist established for Mineral Resources. These questions are:

A. Would the project result in the loss of availability of a known mineral resource that would be of value to the region and residents of the state?

B. Would the project result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?

Under NEPA, the impact of the proposed project and alternatives on mineral resources would be considered important if they would directly or indirectly interfere with active mining claims or operations, or would result in reducing or eliminating the availability of important mineral resources. The staff's evaluation of the significance of the impact of the proposed project on mineral resources includes an assessment of the context and intensity of the impacts, as defined in the NEPA implementing regulations 40 CFR Part 1508.27.

The Antiquities Act of 1906 (16 United States Code [USC]) requires that objects of antiquity be taken into consideration for federal projects and the California Environmental Quality Act, Appendix G, also requires the consideration of paleontological resources. The Paleontological Resources Preservation Act of 2009 requires the Secretaries of the United States Department of the Interior and Agriculture to manage and protect paleontological resources on Federal land using scientific principles and expertise. The potential for discovery of important paleontological resources or the impact of surface disturbing activities to such resources is assessed using the Potential Fossil Yield Classification (PFYC) system contained within BLM Instruction Memorandum No. 2009-011. This system includes three conditions (Condition 1 [areas known to contain vertebrate fossils]; Condition 2 [areas with exposures of geological units or settings that have high potential to contain vertebrate fossils]; and Condition 3 [areas that are very unlikely to produce vertebrate fossils]). The PFYC class ranges from Class 5 (very high) to Class 1 (very low) (USDI 2007).

Staff reviewed existing paleontological information and requested a records search from the Natural History Museum of Los Angeles County (NHMLA) for the site area. Site-specific information generated by the applicant for the RSPP was also reviewed. All research was conducted in accordance with accepted assessment protocol (SVP 1995)

to determine whether any known paleontological resources exist in the general area. If present or likely to be present, conditions of certification which outline required procedures to mitigate impacts to potential resources, are proposed as part of the project's approval.

The proposed conditions of certification allow BLM's Authorized Officer, the Energy Commission's compliance project manager (CPM) and the applicant to adopt a compliance monitoring scheme ensuring compliance with laws, ordinances, regulations, and standards (LORS) applicable to geological hazards and the protection of geological, mineralogical, and paleontological resources.

Based on the information below, it is staff's opinion that the potential for significant adverse impacts (pursuant CEQA) to the project from geological hazards, and to potential geological, mineralogical, and paleontological resources from the proposed project, is low.

D.2.3.1LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Applicable LORS are listed in the application for certification (AFC) (SM 2009a). The following briefly describes the current LORS for both geological hazards and resources and mineralogical and paleontological resources.

Geology and Paleontology Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Antiquities Act of 1906 (16 United States Code [USC], 431-433)	The proposed RSPP facility site is located entirely on land currently administered by the Bureau of Land Management (BLM). Although there is no specific mention of natural or paleontological resources in the Act itself, or in the Act's uniform rules and regulations (Title 43 Part 3, Code of Federal Regulations [43 CFR Part 3], 'objects of antiquity' has been interpreted to include fossils by the Federal Highways Act of 1956, the National Park Service (NPS), the BLM, the Forest Service (USFS), and other Federal agencies.
National Environmental Policy Act (NEPA) of 1970 (42 USC 4321, et. seq.)	Established the Council on Environmental Quality (CEQ), which is charged with preserving 'important historic, cultural, and natural aspects of our national heritage'.
Federal Land Policy and Management Act (FLPMA) of 1976 (43 USC 1701-1784)	Authorizes the BLM to manage public lands to protect the quality scientific, scenic, historical, archeological, and other values, and to develop 'regulations and plans for the protection of public land areas of critical environmental concern', which include 'important historic, cultural or scenic values'. Also charged with the protection of 'life and safety from natural hazards'.
Paleontological Resources Preservation Act (PRPA) (Public Law [PL] 111-011)	Authorizes Departments of Interior and Agriculture Secretaries to manage the protection of paleontological resources on Federal lands.
National Historic Preservation Act of 1966 (NHPA) (16 USC 470)	Establishes policies for the 'preservation of the prehistoric and historic resources of the United States', under the direction of the Secretary of the Interior and the BLM.
General Mining Law of 1872	Declares all valuable mineral deposits in lands belonging to the United States to be free and open to exploration and purchase.
Mineral Leasing Act of 1920	Authorizes the leasing of coal, oil & gas, phosphate, sodium and oil shale from public lands in return for payment of a royalty rate on production.
Materials Act of July 31, 1947	Authorizes the sale of certain materials from the public lands including sand, stone, gravel, and common clay.
State	
California Building Code (CBC), 2007	The CBC (2007) includes a series of standards that are used in project investigation, design, and construction (including grading and erosion control).

Applicable Law	Description
Alquist-Priolo Earthquake Fault Zoning Act, Public Resources Code (PRC), section 2621–2630	Mitigates against surface fault rupture of known active faults beneath occupied structures. Requires disclosure to potential buyers of existing real estate and a 50-foot setback for new occupied buildings. Portions of the site and proposed ancillary facilities are located within designated Alquist-Priolo Fault Zones. The proposed site layout places occupied structures outside of the 50-foot setback zone.
The Seismic Hazards Mapping Act, PRC Section 2690–2699	Areas are identified that are subject to the effects of strong ground shaking, such as liquefaction, landslides, tsunamis, and seiches.
PRC, Chapter 1.7, sections 5097.5 and 30244	Regulates removal of paleontological resources from state lands, defines unauthorized removal of fossil resources as a misdemeanor, and requires mitigation of disturbed sites.
Warren-Alquist Act, PRC, sections 25527 and 25550.5(i)	The Warren-Alquist Act requires the Energy Commission to "give the greatest consideration to the need for protecting areas of critical environmental concern, including, but not limited to, unique and irreplaceable scientific, scenic, and educational wildlife habitats; unique historical, archaeological, and cultural sites." With respect to paleontological resources, the Energy Commission relies on guidelines from the Society for Vertebrate Paleontology, indicated below.
California Environmental Quality Act (CEQA), PRC sections 15000 et seq., Appendix G	Mandates that public and private entities identify the potential impacts on the environment during proposed activities. Appendix G outlines the requirements for compliance with CEQA and provides a definition of significant impacts on a fossil site.
Society for Vertebrate Paleontology (SVP), 1995	The "Measures for Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontological Resources: Standard Procedures" is a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources. The measures were adopted in October 1995 by the SVP, a national organization of professional scientists.
Local	
Kern County Grading Code, (Ord. 17.28.040, 2008)	Kern County grading permit is required for earth moving activities in excess of 50 cubic yards.
Kern County Floodplain Management Ordinance, (Ord. 17.48.140, 2008)	A Kern County development permit is required prior to construction or development within an area of special flood hazards, areas of flood related erosion hazards, or areas of potential mudslides.

D.2.4 PROPOSED PROJECT

D.2.4.1 SETTING AND EXISTING CONDITIONS

The proposed RSPP project would be constructed on 1,760 acres within a 3,920-acre parcel south of U.S. Highway 395 and approximately 5 miles southwest of the city of Ridgecrest, Kern County, California. The finished facility footprint would occupy approximately 1,440 acres. Access is obtained from South Brown Road which crosses the approximate middle of the proposed site from southeast to northwest. The site is relatively flat with elevations ranging from approximately 2,820 in the southeast to 2,620 feet at the northwestern boundary. Storm water runoff flows from the south and southeast across the proposed site to the north in several shallow drainage channels.

Indian Wells Valley is an enclosed drainage basin in the southwest portion of the Basin and Range Geomorphic Province. Drainage within the enclosed basin occurs along ephemeral streams which flow toward the normally dry lakebed of China Lake at the eastern margin of the valley approximately 10 miles northeast of the site. The site is located on undeveloped land which is managed by the BLM. An SCE power line crosses the site from north to south along the proposed sites western boundary.

The proposed site is located in the south-central portion of Indian Wells Valley, an enclosed drainage basin located in the southwest corner of the Basin and Range physiographic province in Southern California. The Basin and Range province occupies most of the west-central portion of the United States. Stretching from the Sierra Nevada Mountains in eastern California to the Wasatch Front in eastern Utah and from Idaho in the north to northern Mexico in the south, the province is characterized by extensional horst and graben structure formed by north to northwest-trending subparallel normal faulting which has resulted in steep-sided mountain ranges separating deep alluvium filled valleys. The proposed RSPP site lies near the extreme southwest corner of the Basin and Range province where it is bounded on the west by the Southern Sierra Nevada Fault system which separates it from the Sierra Nevada geomorphic province, and on the south by the Garlock Fault which separates the Basin and Range province from the Mojave Desert province.

Indian Wells Valley is a fluvially isolated intermontane basin approximately 22 miles long and 18 miles wide. The valley is bounded on the north by the Coso Range, on the east by the Argus Range, on the west by the Sierra Nevada mountains, and on the south by the El Paso Mountains and the relatively low relief Spangler and Rademacher Hills (Dutcher and Moyle Jr. 1974). The surrounding mountains are composed primarily of Mesozoic plutonic basement rocks typical of the Sierra Nevada although the Coso Range has a significant Pleistocene volcanic cap of basaltic and rhyolitic flows and pyroclastic rocks. The valley floor is composed of recent alluvium of fluvial and lacustrine origin with sediments derived primarily from the Sierra Nevada to the west and the Argus Range to the east. Scattered eolian deposits in the form of dune sand are also present. The depth of valley fill alluvium is not well constrained in the proposed project area, however, deep drilling north of Ridgecrest has shown valley fill sediments are highly variable in thickness, ranging from approximately 2,300 feet to more than

7,200 feet thick. Seismic, stratigraphic, and gravimetric correlation suggest the variations in valley fill thickness are most closely related to offset along high angle north to northeast-striking subsurface structures (Monastero et al. 2002).

Most of the surface of Indian Wells Valley is Quaternary alluvium which is composed of Holocene alluvial fan, fluvial, and lacustrine deposits, and Pleistocene Older Alluvium deposits of similar origin. Valley fill alluvial deposits are made up of unconsolidated gravel, sand, and silt mixtures, as well as lacustrine silts and clays, eroded primarily from the Sierra Nevada and Argus Mountain Ranges. Where present, the Holocene deposits grade vertically into Pleistocene age alluvium and/or lakebed deposits. In the southernmost portion of the valley, Quaternary alluvium is underlain at an unknown depth by intrusive and extrusive flows of the Plio-Pleistocene Black Mountain Basalt. The Black Mountain Basalt is an olivine-rich vesicular unit which is often more than 100 feet thick and originally covered at least 50 square miles including the proposed project area. Subsequent erosion has removed most of the Black Mountain Basalt from the area and it now outcrops only to the southwest of the proposed RSPP site (Kunkel and Chase 1969).

In the central part of the valley, Black Mountain Basalt and Quaternary older alluvium unconformably overly Tertiary (Paleocene to Pliocene) continental deposits of the Ricardo Group. The Ricardo Group is up to 7,000 feet thick and is composed of an upper unit of terrestrial and lacustrine deposits known as the White Hills Sequence. The upper unit overlies an interbedded middle unit made up of clastic terrestrial rocks, lava flows, volcanic conglomerate, and pyroclastic sedimentary rocks referred to as the Dove Spring Formation. The Dove Spring Formation overlies a lower unit of arkosic conglomerate known as the Cudahy Camp Formation. The Dove Spring and Cudahy Camp Formations are very thin or absent along the western margin of the valley where coarse sediments eroded from the adjacent Sierra Nevada range dominate the depositional history of the basin.

The Ricardo Group unconformably overlies up to approximately 6,500 feet of Tertiary Goler Formation. The Goler Formation is divided into upper and lower members. The upper member is made up of approximately 4,000 feet of interbedded sand, clay, and gravel overlying 2,000 feet of clay and sand. The lower member is composed of approximately 500 feet of unsorted fanglomerate made up of well rounded boulders and cobbles up to 2 feet in diameter derived from granitic, sedimentary, and porphyritic sources. The Goler Formation unconformably overlies the granitic basement complex (Monastero et al. 2002).

D.2.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section considers two types of impacts. The first is geological hazards, which could impact the proper functioning of the proposed facility and create life/safety concerns. The second is the potential impacts the proposed facility could have on existing geological, mineralogical, and paleontological resources in the area.

D.2.4.2.1 Direct/Indirect Impacts and Mitigation

Ground shaking, potential hydrocompation, and corrosive soils represent the main geologic hazards at the proposed site. These potential hazards could be effectively

mitigated through facility design by incorporating recommendations contained in the project geotechnical evaluation as required by **GEO-1**. Proposed Conditions of Certification **GEN-1, GEN-5,** and **CIVIL-1** in the **Facility Design** section should also mitigate these impacts to a less than significant level (pursuant CEQA)

The proposed RSPP site is not located within an established Mineral Resource Zone (MRZ) and no economically viable mineral deposits are known to be present at the site.

The proposed site is in close proximity to the southern margin of Indian Wells Valley. Most of the proposed project site surface has been mapped as Quaternary older alluvium composed of Pleistocene alluvial fan and colluvium deposits with recent (Holocene) alluvial deposits occurring as channel fill in the bottom of shallow drainages (Dibblee 2008). A small bedrock outcrop is present near the southeast corner of the proposed RSPP site and is shown on regional geological maps as Jurassic granite (CDMG 1962a) and on the larger scale geological map as quartz monzonite porphyry (Dibblee 2008). The presence of plutonic outcrop within the proposed project boundaries indicates that crystalline basement rock is present at a shallow depth in, at least, that portion of the proposed site and may be present at relatively shallow depths beneath most or all of the site. Plio-Pleistocene Black Mountain Basalt outcrops at the southwest border of the proposed site and may also be present at a shallow depth beneath some or all of the site. Continental deposits of the Ricardo Group and Goler Formation may be very thin or absent beneath the proposed site footprint.

The site surface is composed primarily of Pleistocene-age Older Alluvium. Although no fossils were discovered during the paleontological resource assessment, Older Alluvium has yielded significant fossil remains elsewhere in the valley. Therefore, staff considers the probability for significant paleontological resources to be encountered during site construction activities to be high. A high paleontological sensitivity roughly corresponds to PFYC Condition 2, Class 4a at this site. If construction includes significant amounts of grading or deep foundation excavation and utility trenching the potential for exposure of paleontological resources will increase with depth of the excavations. This assessment is based on SVP criteria and the paleontological report appended to the AFC (SWCA 2009). Proposed Conditions of Certification **PAL-1** to **PAL-7** are designed to mitigate paleontological resource impacts, as discussed above, to less than significant levels (pursuant CEQA). These conditions essentially require a worker education program in conjunction with the monitoring of earthwork activities by a qualified professional paleontologist (a paleontological resource specialist [PRS]).

The proposed conditions of certification allow the Energy Commission's CPM and the applicant to adopt a compliance monitoring scheme ensuring compliance with LORS applicable to geological hazards and the protection of geological, mineralogical, and paleontological resources.

Based on the information below, it is staff's opinion that the potential for significant adverse, direct or indirect impacts (pursuant CEQA) of the project, from geological hazards, and to potential geological, mineralogical, and paleontological resources is low.

Geological Hazards

The AFC provides documentation of potential geological hazards at the proposed RSPP plant site, including limited site-specific subsurface information (SM 2009a). Review of the AFC, coupled with staff's independent research, indicates that the potential for geological hazards to impact the proposed plant site during its practical design life is low if recommendations for mitigation of seismic shaking are followed. Geological hazards related to seismic shaking are addressed in the project geotechnical report per CBC (2007) requirements (Kleinfelder 2009).

Staff's independent research included the review of available geological maps, reports, and related data of the RSPP plant site. Geological information was available from the California Geological Survey (CGS), California Division of Mines and Geology (CDMG, now know as CGS), the U.S. Geological Survey (USGS), the American Geophysical Union, the Geological Society of America, and other organizations.

Faulting and Seismicity

Energy Commission staff reviewed numerous CDMG and USGS publications as well as informational websites in order to gather data on the location, recency, and type of faulting in the project area. Type A and B faults within 75 miles of the proposed RSPP site are listed in **Geology and Paleontology Table 2**. Type A faults have slip-rates of $\geq$5 mm per year and are capable of producing an earthquake of magnitude 7.0 or greater. Type B faults have slip-rates of 2 to 5 mm per year and are capable of producing an earthquake of magnitude 6.5 to 7.0. The fault type, potential magnitude, and distance from the site are summarized in **Geology and Paleontology Table 2**.

Geology and Paleontology Table 2
Active Faults Relative to the Proposed RSPP Site

Fault Name	Distance From Site (miles)	Maximum Earthquake Magnitude (Mw)	Estimated Peak Site Acceleration (g)	Movement and Strike	Slip Rate mm/yr	Fault Type
Southern Sierra Nevada	5.3	7.5	0.550	Normal (North to Northeast)	0.1	B
Garlock – Central Strand (Includes El Paso Fault)	8.8	7.5	0.368	Left-Lateral Strike Slip (West-Southwest)	5 - 7	A
Little Lake	9.1	6.9	0.262	Right-Lateral Strike Slip (Northwest)	0.7	B
Blackwater	19.9	7.1	0.164	Right-Lateral Strike Slip (Northwest)	0.6	B
Lenwood-Lockhart-Old Woman Springs	23.5	7.5	0.179	Right-Lateral Strike Slip (Northwest)	0.6	B
Garlock - West Strand (Also known as the Cantil Fault)	25.0	7.3	0.154	Left-Lateral Strike Slip (Southwest)	6	B
Tank Canyon	25.2	6.4	0.116	Normal (Northwest)	1.0	B
Gravel Hills – Harper Lake	26.5	7.1	0.133	Right-Lateral Strike Slip (Northwest)	0.6	B
Helendale – South Lockhart	37.0	7.3	0.114	Right-Lateral Strike Slip (Northwest)	0.6	B
Panamint Valley	37.3	7.4	0.119	Right-Lateral Normal Oblique Slip (Northwest)	2.5	A
White Wolf	39.6	7.3	0.131	Left-Lateral Reverse/Oblique Slip (West)	2.0	B
Garlock – East Strand	40	7.5		Left-Lateral Strike Slip (West)	7	B
Owens Valley	45.8	7.6	0.113	Right-Lateral Strike Slip (Northwest)	1.5	B
Owl Lake	48.7	6.5	0.060	Left-Lateral Strike Slip	2.0	B
Calico – Hidalgo	60.4	7.3	0.078	Right-Lateral Strike Slip (Northwest)	0.6	B
Death Valley (graben)	61.8	7.1	0.084	Normal (North)	4.0	B
Death Valley (south)	63.7	7.1	0.067	Right-Lateral Strike Slip (Northwest)	4.0	B
Hunter Mtn. – Saline Valley	65.6	7.2	0.069	Right-Lateral, Normal, Oblique Slip (Northwest)	2.5	B
Independence	68.0	7.1	0.078	Normal (North)	0.2	B
San Andreas – Whole M-1a	72.1	8.0	0.098	Right-Lateral Strike Slip (Northwest)	34.0	A
San Andreas – Mojave M-1c-3	72.1	7.4	0.072	Right-Lateral Strike Slip (Northwest)	30.0	A
San Andreas – Cholame-Mojave M-1b-1	72.1	7.8	0.088	Right-Lateral Strike Slip (Northwest)	34.0	A
Landers	73.4	7.3	0.067	Right-Lateral Strike Slip (Northwest)	0.6	B
San Andreas – Carrizo M-1c-2	73.5	7.4	0.071	Right-Lateral Strike Slip (Northwest)	34.0	A

Type C and otherwise undifferentiated faults which are more than 20 miles from the site are not discussed here because they are unlikely to undergo movement or generate seismicity which could affect the project.

Twenty three Type A and B faults and fault segments were identified within 75 miles of the potential RSPP site (**Geology and Paleontology Table 2).** In addition the Airport Fault is within close proximity to the site, and an unnamed fault which shows no surface expression or apparent active seismicity, may be present at depth beneath the proposed site (CDMG 1962a). The Airport Fault is a north-trending active seismic zone approximately 12 miles northeast of the proposed RSPP site. The zone is approximately 9 miles wide and 22 miles long, extending from the Little Lake fault zone in central Indian Wells Valley north to the northern end of the valley. The southern end of the Airport fault intersects complexly with the northwest-striking Little Lake fault zone and has been the site of several earthquake swarms since 1980. The most notable swarm began on August 17, 1995 when a magnitude 5.4 earthquake with an epicenter approximately 10 miles north of Ridgecrest shook the valley and spawned thousands of aftershocks including a magnitude 5.8 on September 20, 1995. Several thousand more aftershocks have been recorded in the area since the 1995 swarm (SCEC 2006).

One Type A and 2 Type B faults are known to exist close enough to the proposed RSPP site to be capable of causing substantial ground shaking. These are the Southern Sierra Nevada fault zone, the aforementioned Little Lake fault zone, and the central strand of the Garlock Fault. The Southern Sierra Nevada fault is comprised of several high-angle normal and right-lateral dip-slip faults that form the eastern front of the Sierra Nevada and, in the proposed project area, define the separation between the Basin and Range geomorphic province and the Sierra Nevada province. No detailed studies of the fault have been conducted. However, the fault is marked by prominent scarps, some approaching 6,000 feet in relief. The most recent movement on the Southern Sierra Nevada fault zone is thought to have been in the late Pleistocene (Sawyer 1995).

The Little Lake fault zone is located approximately 7 miles north of the proposed project site. This fault zone is a northwest-striking right-lateral fault zone with a lesser normal-slip component which may be accommodating a major part of the right-slip motion of the Sierra Nevada fault zone in Indian Wells Valley area (Bhattacharyya and Lees 2002). Like the Airport fault zone the Little Lake fault zone is seismically active and subject to periodic earthquake swarms.

The proposed RSPP site is located approximately 9 miles north of the central strand of the regional Garlock Fault system. The Garlock fault is one of the most active fault systems in southern California. South of the proposed project area it marks the boundary between the Basin and Range geomorphic province and the Mojave Desert province. Regionally the Garlock Fault is unique in that it is perhaps the only major fault system in the eastern California shear zone which exhibits northeast to east-striking left-lateral displacement versus the right-lateral northwest-trending nature of major faults within the Mojave Desert province and the north-trending normal faulting which predominates Basin and Range extensional faulting. Tectonically the Garlock Fault appears to be an intracontinental transform structure accommodating shear between

two crustal blocks, one hosting Basin and Range extensional faulting and the other hosting right-lateral shear related to San Andreas fault plate margin movement (Davis and Burchfiel 1973).

The USGS and other agencies have divided the Garlock fault into 3 segments based on geographic setting and frequency of fault activity. The central strand of the Garlock fault is closest to the site and recent studies indicate it is the only segment of the Garlock Fault which shows Holocene movement although the western segment may be undergoing aseismic creep (Pampeyan, Holzer, and Clark 1988). Staff has assigned the central segment classification Type A based of its reported slip rate of 5 to 7 mm per year, (McGill and Sieh 1993), and potential to produce a magnitude 7.0 or greater earthquake (McGill and Rockwell, 1998). If the western and eastern segments of the Garlock Fault have the slip rates and maximum magnitudes assigned them by the CGS (2002b), they too could be considered to be Type A faults.

The western segment of the Garlock fault extends northeast from the San Andreas Fault at the base of the Transverse Ranges to the eastern side of Koehn Lake in Fremont Valley, approximately 14 miles southwest of the proposed site. Within Fremont Valley, the Garlock Fault offsets to the west across the width of the valley to form the southwestern end of the central segment. This means much of the Fremont Valley, including Koehn Lake, lies in an approximately 2-mile-wide, down-to-the-north block formed by the extensional step-over between the western and central segments (McGill and Rockwell 1998). The central segment of the Garlock fault originates on the west side of Fremont Valley near the base of the El Paso Mountains and arcs northeast approximately 65 miles to a splayed en-echelon hinge zone at the southern end of the Quail Mountains which defines the northeastern end of the central fault segment (Zellmer, Roquemore, and Blackerby 1985). South of the Quail Mountains the Garlock Fault bends 15 degrees to the east and the eastern segment strikes nearly east-west for 34 miles to terminate in the Avawatz Mountains at the southern end of Death Valley (McGill and Rockwell 1998).

Although the fault has not produced any large historic earthquakes, geomorphic and stratigraphic evidence indicates it has done so in the past and approximately 30 to 40 miles of left lateral offset has been documented along the fault since its activation during the late Miocene approximately 7 million years (My) ago (Dawson, McGill, and Rockwell 2003). The most recent documented fault movement occurred along the Central Garlock Fault segment south of the proposed project site between approximately 200 to 550 years before present (McGill and Rockwell 1998).

Holocene movement has been demonstrated on the central segment of the Garlock fault (Dawson, McGill, and Rockwell 2003, and McGill and Sieh 1991). In the area of Koehn Lake at least 5 and possibly as many as 8 surface ruptures have been documented on the central Garlock fault in the last 5,000 years. The average recurrence rate is apparently irregular but is believed to be in the range of 700 to 1,200 years (McGill and Rockwell 1998).

All of the faults listed in **Geology and Paleontology Table 2** could generate some level of ground shaking at this site. Since there are no known faults of any age through the site, the potential for actual seismic ground surface rupture is negligible.

Based on previous geotechnical investigation and on the soil profile generated for this site by the geotechnical investigation, the site soil class is assumed to be seismic Class D. The estimated peak horizontal ground acceleration for the power plant is 0.55 times the acceleration of gravity (0.55g) for bedrock acceleration based on 2 percent probability of exceedence in 50 years under 2007 CBC criteria. For a Class D site, the soils profile amplifies the peak horizontal acceleration at the ground surface to 0.877g (USGS 2008).

The effects of ground shaking, which would most likely include aesthetic damage and slight damage to structural connections, would need to be mitigated, to the extent practical, through structural designs required by the CBC (2007) and the site-specific project geotechnical report required by the CBC and Condition of Certification **GEO-1**.

Liquefaction

Liquefaction is a condition in which a saturated cohesionless soil may lose shear strength because of sudden increase in pore water pressure caused by an earthquake. However, the potential for liquefaction of strata deeper than approximately 40 feet below surface is considered negligible due to the increased confining pressure and because geological strata at this depth are generally too compact to liquefy. The reported deep ground water table (greater than 50 feet) would indicate no potential for liquefaction. Standard penetration testing (blowcounts) reported in the project-specific geotechnical report (Kleinfelder 2009) indicate strata beneath the proposed site are also generally too dense to liquefy. Liquefaction potential on the proposed RSPP site was addressed in the preliminary project geotechnical report per CBC (2007) and proposed Condition of Certification **GEN-1** requirements.

Lateral Spreading

Lateral spreading of the ground surface can occur within liquefiable beds during seismic events. Lateral spreading generally requires an abrupt change in slope—that is, a nearby steep hillside or deeply eroded stream bank, etc.—but can also occur on gentle slopes such as are present at the project site. Other factors such as distance from the epicenter, magnitude of the seismic event, and thickness and depth of liquefiable layers also affect the amount of lateral spreading. Because the proposed RSPP site is not subject to substantial liquefaction, there is no potential for lateral spreading at the site surface during seismic events.

Dynamic Compaction

Dynamic compaction of soils results when relatively unconsolidated granular materials experience vibration associated with seismic events. The vibration causes a decrease in soil volume, as the soil grains tend to rearrange into a more dense state (an increase is soil density). The decrease in volume can result in settlement of overlying structural improvements. Site specific geotechnical investigation indicates the alluvial deposits in the site subsurface are generally too dense to undergo substantial dynamic compaction (Kleinfelder 2009).

Hydrocompaction

Hydrocompaction (also known as hydro-collapse) is generally limited to young soils that were deposited rapidly in a saturated state, most commonly by a flash flood. The soils dry quickly, leaving an unconsolidated, low density deposit with a high percentage of voids. Foundations built on these types of compressible materials can settle excessively, particularly when landscaping irrigation dissolves the weak cementation that is preventing the immediate collapse of the soil structure. Site specific geotechnical investigation indicates the subsurface alluvial deposits which underlie the site are generally too dense to experience significant hydrocompaction (Kleinfelder 2009), although the preliminary geotechnical report for this project recommendations additional analysis during final design. The potential for and mitigation of the effects of hydrocompaction of site soils should be addressed in a project-specific geotechnical report as required by the CBC (2007) and proposed Condition of Certification **GEO-1**. Typical mitigation measures would include over-excavation/replacement, mat foundations or deep foundations depending on severity and foundation loads.

Subsidence

Local subsidence or settlement may occur when areas containing compressible soils are subjected to foundation or fill loads. Site-specific geotechnical investigation indicates the alluvial deposits which underlie the proposed site are generally at a medium-dense to very dense consistency and therefore are considered unlikely to support site-wide subsidence due to foundation loading.

Regional ground subsidence is typically caused by petroleum or ground water withdrawal that increases the effective unit weight of the soil profile, which in turn increases the effective stress on the deeper soils. This results in consolidation or settlement of the underlying soils. No petroleum or natural gas withdrawals are taking place in the site vicinity and no ground water would be pumped at the site. Therefore, negative impacts to the proposed project due to subsidence from tectonism or from future petroleum, natural gas, or water extraction is considered very unlikely.

Expansive Soils

Soil expansion occurs when clay-rich soils with an affinity for water exist in place at a moisture content below their plastic limit. The addition of moisture from irrigation, precipitation, capillary tension, water line breaks, etc. causes the clay minerals to absorb water molecules into their structure, which results in an increase in the overall volume of the soil. This increase in volume can cause excessive movement (heave) of overlying structural improvements. Soils encountered during the initial site geotechnical investigation do not appear to be prone to significant expansion (Kleinfelder 2009). An inspector experienced in recognition of clay-rich soils should be available during excavation of building foundations to implement routine mitigation measures in areas of clay-rich soils, if they are encountered.

Corrosive Soils

Fine grain soils with high in-situ moisture contents that contain sulfides can be corrosive to buried metal pipe, which can lead to premature pipe failure and leaking. Such soils are present at this site, and the preliminary geotechnical investigation (Kleinfelder 2009)

indicates that site soils could be potentially corrosive to metal pipe. The effects of corrosive soils can be effectively mitigated through final design by incorporating the recommendations of the site-specific project geotechnical report required by the CBC and Condition of Certification **GEO-1**. Mitigation of corrosive soils with respect to metal pipe typically involves cathodic protection or polyethylene encasement of the pipe.

Landslides

The proposed RSPP site slopes gently to the north at a gradient of less than 1 percent. Due to the low site gradient and the absence of topographically high ground in the site vicinity the potential for landslide impacts to the site is considered to be negligible.

Flooding

The Federal Emergency Management Agency (FEMA) has identified the majority of the proposed RSPP site and ancillary facilities areas as lying in Unshaded Zone X, or "Areas determined to be outside the 0.2 percent annual chance floodplain". However, the channels and surrounding banks of ephemeral drainages which cross the site are designated special flood hazard areas subject to inundation by the 1 percent annual chance flood (FEMA 2008). Civil engineering design can minimize the potential for flash floods damage to this project to a (CEQA) less than significant level. Additional discussion of flash flooding and associated mitigation is presented under the **SOIL AND WATER RESOURCES** section C.9 of this document.

Tsunamis and Seiches

The proposed RSPP and associated linear facilities are not located near any substantial surface water bodies and therefore there are no potential impacts due to tsunamis and seiches.

Volcanic Hazards

The proposed RSPP project site is located approximately 26 miles southeast of the Volcano Peak volcanic vent area. Volcano Peak is an area in the southern part of the Coso Range where explosive and extrusive rhyolitic, andesitic, and basaltic eruptions occurred as recently as the late Pleistocene. No recurrence interval for eruptions in the Volcano Peak area has been determined and it is not known if it conducive to further eruptive activity in the future (Miller 1989). Due to its distance from the project site the impact of eruptive activity in the Volcano Peak area would likely be limited to ashfall which would have a minor, short-lived affect on the proposed project. This would involve having to shut down and probably cover the generators to prevent damage from the abrasive ash and having to clean the mirrors once the eruption was over. Mirrors will need to be cleaned periodically as part of normal plant operation and maintenance.

Due to the distance of the site from known Holocene volcanic areas and the likely long recurrence intervals between eruptions the potential for volcanic eruptions to cause long term or catastrophic damage to the RSPP project is considered low.

Geological, Mineralogical and Paleontological Resources

Geological and Mineralogical Resources

Energy Commission staff has reviewed applicable geological maps, reports, and on-line resources for this area (Blake 2006; CDMG 1962a and b; CDMG 1990; CDMG 1994; CDMG 1999; CDMG 2003; CGS 2002a and b; CGS 2007; Jennings and Saucedo 2002; SCEC 2006; and USGS 2006).

Staff did not identify any geological or mineralogical resources at the proposed energy facility location. The Rademacher Gold District is present within the Mesozoic granitic outcrop immediately southeast of the proposed site (CDMG 1998). This district includes at least 25 former gold mines; however, none are active at this time. The USGS topographic map for the Ridgecrest South quadrangle (USGS 1973) indicates four former mining prospects are present near the granitic outcrop present in the southeast corner of the proposed RSPP site but no production is known to have occurred on the site.

Four mining claims are currently located within1/2 mile of the boundaries of the RSPP. The owner of a valid mining claim is entitled to an enforceable right to enter public lands and develop valuable minerals under the Mining Law of 1872. Those, subject to regulation by the BLM under the Surface Management regulations in Title 43, Subpart 3809 of the Code of Federal Regulations. The BLM has received no application to develop any mining claim adjacent to the RSPP project area. No mining claims are registered within the RSPP as of this writing. Most of the lands described by this proposal are covered by Quaternary alluvium generally having a low potential for the occurrence of gold, silver or other valuable minerals.

While this project area has a low potential for gold or silver, it has at least a moderate potential for the occurrence of construction materials subject to the Materials Act of 1947. That Act governs the disposal of common mineral materials from the public lands such as sand, fill materials and building stone. Records show that one sale or disposal was made from the southeast portion of the project area in 1987 (CACA-19764). No sale or permit has been issued from the project area since that time. Substantially identical materials are available in large supply from other nearby public lands. For that reason, Staff feels that the amount of mineral material in this project area is negligible compared to the total amount contained in Indian Wells Valley.

In 1984 a lease for oil & gas was issued within this same township three miles west of the RSPP project area (Oil&Gas lease CACA-15765). It was relinquished in 1992 with no known history of production. No mineral leases have been issued in the nearby area since that time. No formations containing oil, gas, coal, sodium or other leasable minerals are presently known to occur within the project area. In Staff's opinion these Federal lands are not prospectively valuable for any leasable minerals.

Paleontological Resources

Energy Commission staff reviewed the paleontological resources assessment in Section 5.9 and Appendix H of the AFC (SM 2009a) and the paleontological resources assessment (SWCA 2009). Staff has also reviewed paleontological literature and

records searches conducted by the NHMLA (McLeod 2009). These studies indicate the Quaternary alluvium and colluvium within and near the proposed project site does not contain abundant fossils. However, the Quaternary older alluvium at depth below the surface may contain vertebrate and plant remains. Numerous vertebrate fossil localities have been documented in lake bed deposits adjacent to China Lake (see deposits labeled Ql in **Soil and Water Resources Figure 4**). The shoreline of the ancient China Lake reached an elevation of 2,240 feet (Davis 1975), while the RSPP is at an elevation of 2,600 feet and greater. The field survey of the affected area states that "Older lake deposits may or may not be present at depth within the RSPP site and it should be noted that the China Lake localities were discovered at a much lower elevation." Therefore, the paleontological sensitivity of alluvium at the surface within the proposed project boundaries is considered to be low. Sensitivity of alluvial deposits at depth (greater than 10 feet) is considered to be high (SWCA 2009). Highly sensitive roughly corresponds to PFYC Condition 2, Class 4a at this site.

This assessment is based on SVP criteria, the paleontological report appended to the AFC (SWCA 2009), and the independent paleontological assessment of McLeod (2009). Proposed Conditions of Certification **PAL-1** to **PAL-7** are designed to mitigate paleontological resource impacts, as discussed above, to less than significant levels (pursuant CEQA). These conditions essentially require that potential impacts to paleontological resource-bearing sediments be mitigated through worker training and monitoring by qualified paleontologists per Conditions of Certification **PAL-1** through **PAL-7.**

The proposed conditions of certification allow the BLM Authorized Office and the Energy Commission's CPM and the applicant to adopt a compliance monitoring scheme ensuring compliance with LORS applicable to geological hazards and the protection of geological, mineralogical, and paleontological resources.

D.2.4.2.2 Construction Impacts and Mitigation

The design-level geotechnical investigation, required for the project by the CBC (2007) and proposed Condition of Certification **GEO-1** should provide standard engineering design recommendations for mitigation of earthquake ground shaking, potential hydrocompaction, and corrosive soils.

As noted above, no viable geological or mineralogical resources are known to exist in the vicinity of the proposed RSPP construction site. However the Quaternary older alluvium which underlies the proposed project site is considered to have moderate to high paleontological sensitivity with the degree of sensitivity increasing with the depth of excavation. Construction of the proposed project will include grading, foundation excavation, and utility trenching. Based on the soils profile, SVP assessment criteria, and the shallow depth of the potentially fossiliferous geological units, staff considers the probability of encountering paleontological resources to be high.

Proposed Conditions of Certification **PAL-1** to **PAL-7** are designed to mitigate any paleontological resource impacts, as discussed above, to a less than significant level (pursuant CEQA). Essentially, Conditions of Certification **PAL-1** to **PAL-7** require a worker education program in conjunction with monitoring of earthwork activities by qualified professional paleontologists (PRS). Earthwork is halted any time potential

fossils are recognized by either the paleontologist or the worker. When properly implemented, the conditions of certification yield a net gain to the science of paleontology since fossils that would not otherwise have been discovered can be collected, identified, studied, and properly curated. A paleontological resource specialist is retained, for the project by the applicant, to produce a monitoring and mitigation plan, conduct the worker training, and provide the monitoring. During the monitoring, the PRS can and often does petition the Energy Commission for a change in the monitoring protocol. Most commonly, this is a request for lesser monitoring after sufficient monitoring has been performed to ascertain that there is little chance of finding significant fossils. In other cases, the PRS can propose increased monitoring due to unexpected fossil discoveries or in response to repeated out-of-compliance incidents by the earthwork contractor.

Based upon the literature and archives search, field surveys, and compliance documentation for the proposed RSPP project, the applicant has proposed monitoring and mitigation measures to be followed during the construction of the project. Energy Commission staff believes that the facility can be designed and constructed to minimize the effect of geological hazards and impacts to potential paleontological resources at the site during project design life.

D.2.4.2.3 Operation Impacts and Mitigation

Operation of the proposed new solar energy generating facility should not have any adverse impact on geological, mineralogical, or paleontological resources.

D.2.4.2.4 Project Closure and Decommissioning

The future decommissioning and closure of the project should not negatively affect geological, mineralogical, or paleontological resources since the ground disturbed during plant decommissioning and closure would have been already disturbed, and mitigated as required, during construction and operation of the project.

D.2.4.3 CEQA LEVEL OF SIGNIFICANCE

California Environmental Quality Act guidelines strive to assure projects on public lands will not:

- Block access to a geological or mineralogical resource, a source of industrial minerals, or construction aggregates.
- Damage, destroy or block access to a natural geological feature with aesthetic and/or scientific value.
- Damage, destroy, or block access to a significant paleontological resource (primarily but not always, vertebrate fossils).
- Increase or initiate regional ground subsidence through extraction of ground water, petroleum, or natural gas.
- Construct structures that would be dangerous to workers or the general public as the result of natural geological hazards of the site.

Independent research conducted by CEC staff geologists verifies that there are no known geological or mineralogical resources or unusual geological features near or within the boundary of the proposed RSPP site. The CEQA level of significant from these areas of concern is “no impact.” Since major ground water withdrawal is not anticipated and regional subsidence is not a known geological hazard in this area, CEC staff concludes that ground water withdrawal for this project would result in an impact of “less than significant.”

All structures on this site must be constructed to the standards of the current CBC (2007), as specified in proposed Condition of Certification **GEN-1** under **FACILITY DESIGN**. The building code standards are based on both theoretical design and observation of component failures over many years. The intent of the building code is to minimize the risk to human life from natural hazards, including those inherent in the geological environment (earthquake-related, landslides, tsunamis/seiches, volcanic eruptions) and those from other sources, primarily high wind loading. Implementation of these design standards, per **GEN-1**, should result in geological hazards being “less than significant (pursuant CEQA) with mitigation” (mitigation being proper design for the site-specific hazards).

Energy Commission staff concludes that the RSPP site is situated in a geological environmental with a high potential to encounter significant paleontological resources, particularly in deeper excavations required for the large structures. Potential impacts to paleontological resources, within the proposed project, can be mitigated to a (CEQA) less than significant level by adopting and enforcing the proposed Conditions of Certification **PAL-1** through **PAL-7.**

D.2.5 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because (1) it eliminates about 42 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources (desert tortoise and Mohave ground squirrel), cultural resources, and recreational uses, and (2) avoids constructing a solar facility in the Mohave Ground Squirrel Conservation Area (MGSCA).

The Northern Unit Alternative would consist of 167 solar collector array loops with a net generating capacity of approximately 146 MW. The total disturbance area would be approximately 1,134 acres of land. This alternative would retain 58 percent of the proposed solar array loops and would affect 58 percent of the land of the proposed 250 MW project. The boundaries of the Northern Unit Alternative are shown in **Alternatives Figure 1**.

D.2.5.1 SETTING AND EXISTING CONDITIONS

This alternative is located entirely within the ROW boundaries of the proposed project. It eliminates about 42 percent of the proposed project area and reduces the net output to

146 MW. As a result, the environmental setting consists of the northern portion of the proposed project, as well as an unchanged area affected by the project linear components.

D.2.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The discussion of impacts to the proposed project, discussed in **Section D.2.4.2**, applies also to the Northern Unit Alternative. As with the proposed project, two types of impacts are considered. The first is geological hazards, which could impact the proper functioning of the proposed facility and create life/safety concerns. The second is the potential impacts the proposed facility could have on existing geological, mineralogical, and paleontological resources in the area.

Because the overall geological setting is the same as that of the proposed project, and the same types of facilities would be constructed in this alternative, the impacts would be the same as for the proposed project. The active geological setting means that the site could be subject to intense levels of earthquake-related ground shaking. The effects of strong ground shaking would need to be mitigated through structural designs required by the CBC (2007) and the project geotechnical report. The CBC (2007) requires that structures be designed to resist seismic stresses from ground acceleration. The project geotechnical investigation has identified no additional hazards on this site.

There are no known viable geological or mineralogical resources at the proposed RSPP site, so none exist in the Northern Unit Alternative. Because the alternative site overlies geological formations with high paleontological sensitivity (PFYC Condition 2, Class 4a, 4b), there is the potential for impacts to paleontological resources to occur, but these would be mitigated through worker training and monitoring by qualified paleontologists, as required by Conditions of Certification, **PAL-1** through **PAL-7**.

Overall, this alternative could be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards and in a manner that both protects environmental quality and assures public safety.

D.2.5.3 CEQA LEVEL OF SIGNIFICANCE

Like the proposed project, the potential is low for significant adverse impacts (pursuant CEQA) to Northern Unit Alternative from geological hazards during its design life and to potential geological, mineralogical, and paleontological resources from the construction, operation, and closure of the proposed project. It is CEC staff's conclusion that this alternative can be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards and in a manner that both protects environmental quality and assures public safety. The CEQA level of significance would remain unchanged from the proposed project.

D.2.6 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would be a 104 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is

analyzed because it eliminates about 58 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources, and cultural resources.

The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of approximately 104 MW. The total disturbance area would be approximately 908 acres of land. This alternative would retain 42 percent of the proposed solar array loops and would affect 42 percent of the land of the proposed 250 MW project.

The boundaries of the Southern Unit Alternative are shown in **Alternatives Figure 2**. This area was would avoid a large portion of the El Paso Wash and sensitive biological resources, including areas that were mapped as occupied tortoise and Mohave ground squirrel habitat (live tortoise and/or active burrows and sign).

D.2.6.1 SETTING AND EXISTING CONDITIONS

This alternative is located entirely within the ROW boundaries of the proposed project. It eliminates about 58 percent of the proposed project area and reduces the net output to 104 MW. As a result, the environmental setting consists of the southern portion of the proposed project, as well as the unchanged area affected by the project linear components.

D.2.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The discussion of impacts to the proposed project, discussed in **Section D.2.4.2**, applies also to the Southern Unit Alternative. As with the proposed project, two types of impacts are considered. The first is geological hazards, which could impact the proper functioning of the proposed facility and create life/safety concerns. The second is the potential impacts the proposed facility could have on existing geological, mineralogical, and paleontological resources in the area.

Because the overall geological setting is the same as that of the proposed project, and the same types of facilities would be constructed in this alternative, the impacts would be the same as for the proposed project. The active geological setting means that the site could be subject to intense levels of earthquake-related ground shaking. The effects of strong ground shaking would need to be mitigated through structural design required by the CBC (2007) and the project geotechnical report. The CBC (2007) requires that structures be designed to resist seismic stresses from ground acceleration. The project geotechnical investigation has identified no additional hazards on this site.

There are no known viable geological or mineralogical resources at the proposed RSPP site, so none exist on the Southern Unit Alternative. Because the alternative is also located in geological formations with moderate to high paleontological sensitivity (PFYC Condition 2, Class 4a, 4b), there is the potential for impacts to paleontological resources to occur, but these would be mitigated through worker training and monitoring by qualified paleontologists, as required by Conditions of Certification, **PAL-1** through **PAL-7**.

Overall, this alternative could be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards and in a manner that both protects environmental quality and assures public safety.

D.2.6.3 CEQA LEVEL OF SIGNIFICANCE

Like the proposed project, the potential is low for significant adverse impacts (pursuant CEQA) to Southern Unit Alternative from geological hazards during its design life and to potential geological, mineralogical, and paleontological resources from the construction, operation, and closure of the proposed project. It is staff's conclusion that this alternative can be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards and in a manner that both protects environmental quality and assures public safety. The CEQA level of significance would remain unchanged from the proposed project.

D.2.7 ORIGINAL PROPOSED PROJECT ALTERNATIVE

The Original Proposed Project Alternative would be a 250 MW solar facility as originally proposed by Solar Millennium. This alternative is analyzed because it would reduce the amount of land developed within the Mojave Ground Squirrel Conservation Area and it could transmit the full 250 MW of power that Solar Millennium has requested.

The Original Proposed Project Alternative would consist of 278 solar array loops with a net generating capacity of approximately 250 MW. The total disturbance area would be approximately 1,794 acres of land A shorter transmission interconnection – 1,250 feet as compared to the proposed project interconnection of 3,900 feet – would be needed.

The boundaries of the Original Proposed Project Alternative are shown in **Alternatives Figure 3**. This project footprint contains two desert ephemeral washes that would require redirection and smaller dry desert washes also traverse the site. In addition this site is the location of prime desert tortoise and Mojave ground squirrel habitat.

D.2.7.1 SETTING AND EXISTING CONDITIONS

This alternative extends slightly north of the boundaries of the proposed project but still lies within the same geologic units. From the standpoint of geological hazards, geological, mineralogical, and paleontological resources, the environmental setting of the originally proposed project is unchanged from the proposed project. Although a shorter (by 2,650 feet) transmission interconnection would be required, this benefit would be, at least partially, offset by the need to relocate two existing SCE transmission lines.

D.2.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The discussion of impacts to the proposed project, discussed in **Section D.2.4.2**, applies also to the Original Proposed Project Alternative. As with the proposed project, two types of impacts are considered. The first is geological hazards, which could impact the proper functioning of the proposed facility and create life/safety concerns. The second is the potential impacts the proposed facility could have on existing geological, mineralogical, and paleontological resources in the area.

D.2.7.3 CEQA LEVEL OF SIGNIFICANCE

Like the proposed project, the potential is low for significant adverse impacts (pursuant CEQA) to the Original Proposed Project Alternative from geological hazards during its design life and moderate to high paleontological resources from the construction, operation, and closure of the proposed project. It is staff's conclusion that this alternative can be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards and in a manner that both protects environmental quality and assures public safety. The CEQA level of significance would remain unchanged from the proposed project.

D.2.8 NO PROJECT/NO ACTION ALTERNATIVES

D.2.8.1 1: NO ACTION ON RIDGECREST SOLAR POWER PROJECT APPLICATION AND ON CDCA LAND USE PLAN AMENDMENT

Under this alternative, the proposed RSPP would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site and no ground disturbance. As a result, impacts caused by the effects of earthquake related ground shaking would not occur. Because no ground disturbance would occur, impacts to potential geological, mineralogical, and paleontological resources from the construction, operation, and closure of the proposed project would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations

D.2.8.2 2: NO ACTION ON RIDGECREST SOLAR POWER PROJECT AND AMEND THE CDCA LAND USE PLAN TO MAKE THE AREA AVAILABLE FOR FUTURE SOLAR DEVELOPMENT

Under this alternative, the proposed RSPP would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site will be developed with another solar technology. Construction and operation requirements for solar technologies vary; however, it is expected that all solar technologies require some grading and some infrastructure. The effects of strong ground shaking on the project structures would need to be mitigated, to the extent practical, through structural designs

required by the CBC as with the proposed project. Because it is expected that all solar technologies would require ground disturbance, the impacts to potential geological, mineralogical, and paleontological resources from the construction, operation, and closure of the alternative would likely be similar to under the proposed project.

D.2.8.3 3: NO ACTION ON RIDGECREST SOLAR POWER PROJECT APPLICATION AND AMEND THE CDCA LAND USE PLAN TO MAKE THE AREA UNAVAILABLE FOR FUTURE SOLAR DEVELOPMENT

Under this alternative, the proposed RSPP would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended so no solar projects can be approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no construction of a solar facility. Therefore, this No Project/No Action Alternative would not impact potential geological, mineralogical, and paleontological resources from the construction, operation, and closure of the proposed project. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

D.2.9 COMPARISON OF ALTERNATIVES AND PROPOSED PROJECT

Geology and Paleontology Table 3
Comparison of Proposed Project and Alternatives

Impact	Proposed Project (250 MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250 MW)	No Project/No Action*
No. of Acres	1,760	1,134	908	1,794	0
Geological Hazards	Ground Shaking, Hydrocompaction, Corrosive Soils – Less than significant with mitigation	Ground Shaking, Hydrocompaction, Corrosive Soils – Less than significant with mitigation	Ground Shaking, Hydrocompaction, Corrosive Soils – Less than significant with mitigation	Ground Shaking, Hydrocompaction, Corrosive Soils – Less than significant with mitigation	Not Applicable (N/A)
Geological Resources	None identified – No impact	None identified – No impact	None identified – No impact	None identified – No impact	N/A
Mineralogical Resources	None identified – No impact	None identified – No impact	None identified – No impact	None identified – No impact	N/A
Paleontological Resources	High sensitivity – No impact with mitigation	High sensitivity – No impact with mitigation	High sensitivity – No impact with mitigation	High sensitivity – No impact with mitigation	N/A

*All No Project/No Action alternatives assume that the RSPP would not be built on the proposed site.

D.2.10 CUMULATIVE IMPACTS

Section B.3, Cumulative Scenario, provides detailed information on the potential cumulative solar and other development projects in the project area. Together, these projects comprise the cumulative scenario which forms the basis of the cumulative impact analysis for the proposed project. In summary, these projects are:

- Renewable energy projects on BLM, State, and private lands, as shown on **Cumulative Figures 1 and 2** and in **Cumulative Tables 1A and 1B.** Although not all of those projects are expected to complete the environmental review processes, or be funded and constructed, the list is indicative of the large number of renewable projects currently proposed in California.
- Foreseeable future projects in the immediate project area, as shown on **Cumulative Impacts Figure 3, Existing and Future/Foreseeable Projects in the Ridgecrest Area, and Cumulative Tables 2 and 3**. **Table 2** presents existing projects in this area and **Table 3** presents future foreseeable projects in the project. Both tables indicate project name and project type, its location and its status.

These projects are defined within a geographic area that has been identified by the CEC and BLM as covering an area large enough to provide a reasonable basis for evaluating cumulative impacts for all resource elements or environmental parameters. Most of these projects have, are, or will be required to undergo their own independent environmental review under CEQA and/or NEPA. Even if the cumulative projects described in **Section B.3** have not yet completed the required environmental processes, they were considered in the cumulative impacts analyses in this SA/Draft EIS.

D.2.10.1 GEOGRAPHIC SCOPE OF ANALYSIS

The geographic area considered for cumulative impacts on geology and paleontology is the entire Indian Wells Valley in the southwestern corner of the Basin and Range geomorphic province. The potential impacts are limited to those involving paleontological resources since no geological or mineralogical resources have been identified within the boundaries of the proposed project. There are no geological hazards with potential cumulative effects, other than regional subsidence from ground water withdrawal. No ground water withdrawal is required for the proposed project or any of its alternatives.

D.2.10.2 EFFECTS OF PAST AND PRESENT PROJECTS

Any previously completed project involving subsurface excavation without paleontological monitoring might already have had a detrimental effect on paleontological resources in the area defined above under **GEOGRAPHIC SCOPE OF ANALYSIS**. Given the general scarcity of fossils, even within known fossil bearing strata, the possibility of prior damage is real but modest, unknown, and unavoidable, after the fact.

D.2.10.3 EFFECTS OF REASONABLY FORESEEABLE FUTURE PROJECTS

D.2.10.3.1 Foreseeable Projects in the Project Area

Many future foreseeable projects identified in **Cumulative Tables 2 and 3 (Section B.3)** are located within the Indian Wells Valley. Such projects could include ground disturbance to sufficient depth to encounter potential fossil-bearing strata. All projects on BLM land would be subject to paleontological monitoring and mitigation during construction. When properly implemented and enforced, these safeguards would provide adequate protection of paleontological resources, reducing potential impacts to a (CEQA) less than significant level.

D.2.10.3.2 Foreseeable Renewable Projects in the California Desert

As shown in **Section B.3, Cumulative Scenario Table 1A**, the Ridgecrest field office of the BLM is aware of 5 solar energy and 16 wind energy potential projects totaling 155,842 acres of land under their jurisdiction. All energy projects on BLM land would be subject to paleontological monitoring and mitigation during construction. When properly implemented and enforced, these safeguards would provide adequate protection of paleontological resources, reducing potential impacts to a (CEQA) less than significant level.

In addition to potential renewable energy projects on BLM land, a large number of renewable energy projects are proposed for the Basin and Range, Mojave and Colorado Desert regions of Southern California on State and private lands. These projects are summarized in **Table 1B** and **Table 3** of **Section B.3, Cumulative Scenario**. Of all the possible renewable energy projects within the geographic scope of this analysis, the following, by virtue of size and location, have the greatest potential to affect paleontological resources:

- First Solar Power Project (7,183 acres)
- Brewer Energy Wind Project (3,200 acres)
- Renew Energy Wind Project (14,209 acres)

These projects would be subject to CEC and/or NEPA/CEQA environmental review which would include requirements for construction monitoring and mitigation of potential paleontological resources. When properly implemented and enforced, these safeguards should provide adequate protection of paleontological resources, reducing potential impacts to a (CEQA) less than significant level.

D.2.10.3.3 Contribution of the Ridgecrest Solar Power Project to Cumulative Impacts

Construction

Construction of the project would require localized excavation over a very large area. Because the project area lies predominantly within geological units with high paleontological sensitivity, the required excavation could, potentially, damage paleontological resources. Any damage could be cumulative to damage from other

projects within the same geological formations. Implementation and enforcement of a properly designed Paleontological Resource Monitoring and Mitigation Plan (PRMMP) at this RSPP site should result in a net gain to the science of paleontology by allowing fossils that would not otherwise have been found, to be recovered, identified, studied, and preserved. Cumulative impacts from RSPP, in consideration with other nearby similar projects, should therefore be either neutral (no fossils encountered) or positive (fossils encountered, preserved, and identified).

Operation

The operation of the RSPP Project would not present additional risk to geological resources (none identified) or paleontological resources. Once ground disturbing activity is complete plant operation has no real potential to further affect paleontological resources. Therefore, routine plant operation would not increase potential cumulative affects on paleontological resources. The longer the plant operates, however, the more likely it is to be damaged by geological hazards, primarily earthquake-related ground shaking. Construction and operation of the plant does not increase the potential of geological hazards at the site, just their potential to damage civil improvements.

Decommissioning

The decommissioning of the Ridgecrest Solar Project is expected to result in no adverse impacts related to geology or paleontology. Any potential impact to geological resources (none identified) or paleontological resources would have occurred and been mitigated during the ground disturbing phase of project construction.

D.2.10.4 OVERALL CONCLUSION

Paleontological resources have been documented in the general area of the project. As the value of paleontological resources is associated with their discovery within a specific geological host unit, the potential impacts to paleontological resources due to construction activities will be mitigated as required by proposed Conditions of Certification **PAL-1** through **PAL-7**. Implementation of these conditions should result in a net gain to the science of paleontology by allowing fossils that would not otherwise have been found to be recovered, identified, studied, and preserved. Cumulative impacts, in consideration with other nearby similar projects, should be either neutral (no fossils encountered) or positive (fossils encountered, preserved, and identified).

Based on the above discussion, staff believes that the potential for significant adverse cumulative impacts (pursuant CEQA) to the proposed project from geological hazards during the project's design life is negligible and that the potential for impacts to geological, mineralogical, and paleontological resources is low.

The proposed conditions of certification allow the BLM Authorized Office and the Energy Commission CPM and the applicant to adopt a compliance monitoring scheme ensuring compliance with applicable LORS for geological hazards and geological, mineralogical, and paleontological resources.

D.2.11 COMPLIANCE WITH LORS

Federal, state, or local/county LORS applicable to this project or alternatives other than the No Action alternative, were detailed in **Geology and Paleontology Table 1**. Staff anticipates that the project will comply with applicable LORS.

D.2.12 NOTEWORTHY PUBLIC BENEFITS

The science of paleontology is advanced by the discovery, study and curation of new fossils. These fossils can be significant if they represent a new species, verify a known species in a new location and/or if they include structures of similar specimens that had not previously been found preserved. In general, most fossil discoveries are the result of excavations, either purposeful in known or suspected fossil localities or as the result of excavations made during earthwork for civil improvements or mineral extraction. Proper monitoring of excavations at the proposed RSPP facility, in accordance with an approved Paleontological Monitoring and Mitigation Plan, could result in fossil discoveries which would enhance our understanding of the prehistoric climate, geology, and geographic setting of the region for the benefit of current and future generations.

D.2.13 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

The proposed RSPP is situated in an active geologic environment. Strong ground shaking potential must be mitigated through foundation and structural design as required by the CBC (2007). The potential for hydrocompaction, as well as impacts caused by corrosive soils, must be evaluated and mitigated, as appropriate, in accordance with a design-level geotechnical investigation as required by the CBC (2007), proposed Condition of Certification **GEO-1**, and proposed Conditions of Certification **GEN-1, GEN-5,** and **CIVIL-1** under **FACILITY DESIgn**. Paleontological resources have been documented in the general area of the project and in materials similar to those that are present at the site. The potential impacts to paleontological resources due to construction activities will be mitigated as required by proposed Conditions of Certification **PAL-1** to **PAL-7**.

The proposed conditions of certification allow BLM's Authorized Officer, the Energy Commission CPM, and the applicant to adopt a compliance monitoring scheme ensuring compliance with applicable LORS for geologic hazards and geologic, mineralogic, and paleontological resources.

GEO-1 The Soils Engineering Report required by Section 1802A of the 2007 CBC should specifically include laboratory test data, associated geotechnical engineering analyses, and a thorough discussion of the site soils' potential for hydrocompaction and the presence of corrosive soils. The report should also include recommendations necessary to mitigate these potential geologic hazards.

Verification: The project owner shall include in the application for a grading permit a copy of the Soils Engineering Report which addresses the presence of soils prone to

hydrocompaction and corrosive soils, and a summary of how the results of the analyses were incorporated into the project foundation and grading plan design for review and comment by the Chief Building Official (CBO). A copy of the Soils Engineering Report, application for grading permit and any comments by the CBO are to be provided to BLM's Authorized Officer and the CPM at least 30 days prior to grading.

PAL-1 The project owner shall provide BLM's Authorized Officer and the CPM with the resume and qualifications of its PRS for review and approval. If the approved PRS is replaced prior to completion of project mitigation and submittal of the Paleontological Resources Report, the project owner shall obtain BLM's Authorized Officer and CPM approval of the replacement PRS. The project owner shall keep resumes on file for qualified PRMs. If a PRM is replaced, the resume of the replacement PRM shall also be provided to BLM's Authorized Officer and the CPM.

The PRS resume shall include the names and phone numbers of references. The resume shall also demonstrate to the satisfaction of BLM's Authorized Officer and the CPM the appropriate education and experience to accomplish the required paleontological resource tasks.

As determined by BLM's Authorized Officer and the CPM, the PRS shall meet the minimum qualifications for a vertebrate paleontologist as described in the SVP guidelines of 1995. The experience of the PRS shall include the following:

1. Institutional affiliations, appropriate credentials, and college degree;

2. Ability to recognize and collect fossils in the field;

3. Local geological and biostratigraphic expertise;

4. Proficiency in identifying vertebrate and invertebrate fossils; and

5. At least three years of paleontological resource mitigation and field experience in California and at least one year of experience leading paleontological resource mitigation and field activities.

The project owner shall ensure that the PRS obtains qualified paleontological resource monitors to monitor as he or she deems necessary on the project. PRMs shall have the equivalent of the following qualifications:

- BS or BA degree in geology or paleontology and one year of experience monitoring in California; or
- AS or AA in geology, paleontology, or biology and four years' experience monitoring in California; or
- Enrollment in upper division classes pursuing a degree in the fields of geology or paleontology and two years of monitoring experience in California.

Verification:

(1) At least 60 days prior to the start of ground disturbance, the project owner shall submit a resume and statement of availability of its designated PRS for on-site work.

(2) At least 20 days prior to ground disturbance, the PRS or project owner shall provide a letter with resumes naming anticipated monitors for the project, stating that the identified monitors meet the minimum qualifications for paleontological resource monitoring required by the condition. If additional monitors are obtained during the project, the PRS shall provide additional letters and resumes to BLM's Authorized Officer and the CPM. The letter shall be provided to BLM's Authorized Officer and the CPM no later than one week prior to the monitor's beginning on-site duties.

(3) Prior to the termination or release of a PRS, the project owner shall submit the resume of the proposed new PRS to BLM's Authorized Officer and the CPM for review and approval.

PAL-2 The project owner shall provide to the PRS, BLM's Authorized Officer and the CPM, for approval, maps and drawings showing the footprint of the power plants, construction lay down areas, and all related facilities. Maps shall identify all areas of the project where ground disturbance is anticipated. If the PRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the PRS, BLM's Authorized Officer and CPM. The site grading plan and plan and profile drawings for the utility lines would be acceptable for this purpose. The plan drawings should show the location, depth, and extent of all ground disturbances and be at a scale of 1 inch = 40 feet to 1 inch = 100 feet range. If the footprint of the project or its linear facilities change, the project owner shall provide maps and drawings reflecting those changes to the PRS, BLM's Authorized Officer and CPM.

If construction of the RSPP project proceeds in phases, maps and drawings may be submitted prior to the start of each power plant. A letter identifying the proposed schedule of each project power plant shall be provided to the PRS, BLM's Authorized Officer and CPM. Before work commences on affected power plants, the project owner shall notify the PRS, BLM's Authorized Officer and CPM of any construction phase scheduling changes.

At a minimum, the project owner shall ensure that the PRS or PRM consults weekly with the project superintendent or construction field manager to confirm area(s) to be worked the following week, and until ground disturbance is completed.

Verification:

(1) At least 30 days prior to the start of ground disturbance, the project owner shall provide the maps and drawings to the PRS, BLM's Authorized Officer and CPM.

(2) If there are changes to the footprint of the project, revised maps and drawings shall be provided to the PRS, BLM's Authorized Officer and CPM at least 15 days prior to the start of ground disturbance.

(3) If there are changes to the scheduling of the construction phases of each power plant, the project owner shall submit a letter to BLM's Authorized Officer and the CPM within 5 days of identifying the changes.

PAL-3 If after review of the plans provided pursuant to **PAL-2**, the PRS determines that materials with moderate, high, or unknown paleontological sensitivity could be impacted, the project owner shall ensure that the PRS prepares, and the project owner submits to BLM's Authorized Officer and the CPM for review and approval, a paleontological resources monitoring and mitigation plan (PRMMP) to identify general and specific measures to minimize potential impacts to significant paleontological resources. Approval of the PRMMP by BLM's Authorized Officer and the CPM shall occur prior to any ground disturbance. The PRMMP shall function as the formal guide for monitoring, collecting, and sampling activities, and may be modified with BLM's Authorized Officer and CPM approval. This document shall be used as the basis of discussion when on-site decisions or changes are proposed. Copies of the PRMMP shall reside with the PRS, each monitor, the project owner's on-site manager, BLM's Authorized Officer and the CPM.

The PRMMP shall be developed in accordance with the guidelines of the SVP (1995) and shall include, but not be limited, to the following:

1. Assurance that the performance and sequence of project-related tasks, such as any literature searches, pre-construction surveys, worker environmental training, fieldwork, flagging or staking, construction monitoring, mapping and data recovery, fossil preparation and collection, identification and inventory, preparation of final reports, and transmittal of materials for curation will be performed according to PRMMP procedures;

2. Identification of the person(s) expected to assist with each of the tasks identified within the PRMMP and the conditions of certification;

3. A thorough discussion of the anticipated geological units expected to be encountered, the location and depth of the units relative to the project when known, and the known sensitivity of those units based on the occurrence of fossils either in that unit or in correlative units;

4. An explanation of why, how, and how much sampling is expected to take place and in what units. Include descriptions of different sampling procedures that shall be used for fine-grained and coarse-grained units;

5. A discussion of the locations of where the monitoring of project construction activities is deemed necessary, and a proposed plan for monitoring and sampling;

6. A discussion of procedures to be followed in the event of a significant fossil discovery, halting construction, resuming construction, and how notifications will be performed;

7. A discussion of equipment and supplies necessary for collection of fossil materials and any specialized equipment needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits;

8. Procedures for inventory, preparation, and delivery for curation into a retrievable storage collection in a public repository or museum, which meets the Department of the Interior 411 Departmental Manual (DM) provisions for museum property, including capability for providing adequate long-term curatorial services, such as a physically secure environment, and maintaining professional staff qualified to catalog, care for, preserve, retrieve, and loan, where appropriate, these materials and associated records;

9. Identification of the institution that has agreed to receive data and fossil materials collected, requirements or specifications for materials delivered for curation, and how they will be met, and the name and phone number of the contact person at the institution; and

10. A copy of the paleontological conditions of certification.

Verification: At least 30 days prior to ground disturbance, the project owner shall provide a copy of the PRMMP to BLM's Authorized Officer and the CPM. The PRMMP shall include an affidavit of authorship by the PRS, and acceptance of the PRMMP by the project owner evidenced by a signature.

PAL-4 If after review of the plans provided pursuant to **PAL-2**, the PRS determines that materials with moderate, high, or unknown paleontological sensitivity could be impacted then, prior to ground disturbance and for the duration of construction activities involving ground disturbance, the project owner and the PRS shall prepare and conduct weekly BLM Authorized Officer- and CPM-approved training for the following workers: project managers, construction supervisors, foremen and general workers involved with or who operate ground-disturbing equipment or tools. Workers shall not excavate in sensitive units prior to receiving BLM Authorized Officer- and CPM-approved worker training. Worker training shall consist of an initial in-person PRS training during the project kick-off, for those mentioned above. Following initial training, a CPM-approved video or in-person training may be used for new employees. The training program may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or other areas of interest or concern. No ground disturbance shall occur prior to BLM's Authorized Officer and CPM approval of the Worker Environmental Awareness Program (WEAP), unless specifically approved by the CPM.

The WEAP shall address the possibility of encountering paleontological resources in the field, the sensitivity and importance of these resources, and legal obligations to preserve and protect those resources.

The training shall include:

1. A discussion of applicable laws and penalties under the law;

2. Good quality photographs or physical examples of vertebrate fossils for project sites containing units of high paleontological sensitivity;

3. Information that the PRS or PRM has the authority to halt or redirect construction in the event of a discovery or unanticipated impact to a paleontological resource;

4. Instruction that employees are to halt or redirect work in the vicinity of a find and to contact their supervisor and the PRS or PRM;

5. An informational brochure that identifies reporting procedures in the event of a discovery;

6. A WEAP certification of completion form signed by each worker indicating that he/she has received the training; and

7. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

Verification:

(1) At least 30 days prior to ground disturbance, the project owner shall submit the proposed WEAP, including the brochure, with the set of reporting procedures for workers to follow.

(2) At least 30 days prior to ground disturbance, the project owner shall submit the script and final video to BLM's Authorized Officer and the CPM for approval if the project owner is planning to use a video for interim training.

(3) If the owner requests an alternate paleontological trainer, the resume and qualifications of the trainer shall be submitted to BLM's Authorized Officer and the CPM for review and approval prior to installation of an alternate trainer. Alternate trainers shall not conduct training prior to BLM's Authorized Officer and CPM authorization.

(4) In the monthly compliance report (MCR, the project owner shall provide copies of the WEAP certification of completion forms with the names of those trained and the trainer or type of training (in-person or video) offered that month. The MCR shall also include a running total of all persons who have completed the training to date.

PAL-5 The project owner shall ensure that the PRS and PRM(s) monitor consistent with the PRMMP all construction-related grading, excavation, trenching, and augering in areas where potential fossil-bearing materials have been identified, both at the site and along any constructed linear facilities associated with the project. In the event that the PRS determines full-time monitoring is not necessary in locations that were identified as potentially fossil-bearing in the PRMMP, the project owner shall notify and seek the concurrence of BLM's Authorized Officer and the CPM.

The project owner shall ensure that the PRS and PRM(s) have the authority to halt or redirect construction if paleontological resources are encountered. The project owner shall ensure that there is no interference with monitoring activities unless directed by the PRS. Monitoring activities shall be conducted as follows:

1. Any change of monitoring from the accepted schedule in the PRMMP shall be proposed in a letter or email from the PRS and the project owner to BLM's Authorized Officer and the CPM prior to the change in monitoring and will be included in the monthly compliance report. The letter or email shall include the justification for the change in monitoring and be submitted to BLM's Authorized Officer and the CPM for review and approval.

2. The project owner shall ensure that the PRM(s) keep a daily monitoring log of paleontological resource activities. The PRS may informally discuss paleontological resource monitoring and mitigation activities with BLM's Authorized Officer and the CPM at any time.

3. The project owner shall ensure that the PRS notifies BLM's Authorized Officer and the CPM within 24 hours of the occurrence of any incidents of non-compliance with any paleontological resources conditions of certification. The PRS shall recommend corrective action to resolve the issues or achieve compliance with the conditions of certification.

4. For any significant paleontological resources encountered, either the project owner or the PRS shall notify BLM's Authorized Officer and the CPM within 24 hours, or Monday morning in the case of a weekend event where construction has been halted because of a paleontological find.

The project owner shall ensure that the PRS prepares a summary of monitoring and other paleontological activities placed in the monthly compliance reports. The summary will include the name(s) of PRS or PRM(s) active during the month, general descriptions of training and monitored construction activities, and general locations of excavations, grading, and other activities. A section of the report shall include the geological units or subunits encountered, descriptions of samplings within each unit, and a list of identified fossils. A final section of the report will address any issues or concerns about the project relating to paleontological resource monitoring, including any incidents of non-compliance or any changes to the monitoring plan that have been approved by BLM's Authorized Officer and the CPM. If no monitoring took place during the month, the report shall include an explanation in the summary as to why monitoring was not conducted.

Verification: The project owner shall ensure that the PRS submits the summary of monitoring and paleontological activities in the MCR. When feasible, BLM's Authorized Officer and the CPM shall be notified 10 days in advance of any proposed changes in monitoring different from the plan identified in the PRMMP. If there is any unforeseen change in monitoring, the notice shall be given as soon as possible prior to implementation of the change.

PAL-6 The project owner, through the designated PRS, shall ensure that all components of the PRMMP are adequately performed including collection of fossil materials, preparation of fossil materials for analysis, analysis of fossils, identification and inventory of fossils, the preparation of fossils for curation, and the delivery for curation of all significant paleontological resource materials encountered and collected during project construction.

Verification: The project owner shall maintain in his/her compliance file copies of signed contracts or agreements with the designated PRS and other qualified research specialists. The project owner shall maintain these files for a period of three years after project completion and approval of BLM Authorized Officer- and CPM-approved paleontological resource report (see **PAL-7**). The project owner shall be responsible for paying any curation fees charged by the museum for fossils collected and curated as a result of paleontological mitigation. A copy of the letter of transmittal submitting the fossils to the curating institution shall be provided to BLM's Authorized Officer and the CPM.

PAL-7 The project owner shall ensure preparation of a Paleontological Resources Report (PRR) by the designated PRS. The PRR shall be prepared following completion of the ground-disturbing activities. The PRR shall include an analysis of the collected fossil materials and related information, and submit it to the CPM for review and approval.

The report shall include, but is not limited to, a description and inventory of recovered fossil materials; a map showing the location of paleontological resources encountered; determinations of sensitivity and significance; and a statement by the PRS that project impacts to paleontological resources have been mitigated below the level of significance.

Verification: Within 90 days after completion of ground-disturbing activities, including landscaping, the project owner shall submit the PRR under confidential cover to BLM's Authorized Officer and the CPM.

D.2.14 CONCLUSIONS

The applicant should easily be able to comply with applicable LORS, provided that the proposed conditions of certification are implemented and followed. The design and construction of the project should have no adverse impact with respect to geological, mineralogical, and paleontological resources. Staff proposes to ensure compliance with applicable LORS through the adoption of the proposed conditions of certification listed below.

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D.3 POWER PLANT EFFICIENCY

Testimony of Shahab Khoshmashrab

D.3.1 SUMMARY OF CONCLUSIONS

The Ridgecrest Solar Power Project, if constructed and operated as proposed, would use solar energy to generate most of its capacity. Fossil fuel, in the form of propane, would be used only to reduce startup time and to keep the temperature of the heat transfer fluid above its relatively high freezing point. Compared to the project's expected overall production rate of approximately 500,000 MW hours (MWh), and compared to a typical fossil fuel-fired power plant of equal capacity, the amount of the annual power production from fossil fuel is insignificant.

The project would decrease reliance on fossil fuel, and would increase reliance on renewable energy resources. It would not create significant adverse effects on fossil fuel energy supplies or resources, would not require additional sources of energy supply, and would not consume fossil fuel energy in a wasteful of inefficient manner. No efficiency standards apply to this project. Staff therefore concludes that this project would present no significant adverse impacts on fossil fuel energy resources.

The Ridgecrest Solar Power Project, if constructed and operated as proposed, would occupy approximately six acres per MW of power output, a figure slightly lower than that of some other solar power technologies.

D.3.2 INTRODUCTION

The Ridgecrest Solar Power Project (Ridgecrest Solar), if constructed and operated as proposed, would generate 250 megawatts (MW) (nominal net output) of electricity. Ridgecrest Solar would be a solar thermal power plant in Kern County, California. The project would use the concentrated parabolic trough solar thermal technology to produce electrical power using steam turbine generators fed from solar steam generators. The land that would be occupied by this project for power generation and power plant operation would be approximately 1,440-acre site. Fossil fuel, in the form of propane, would be used to reduce startup time and to keep the temperature of the heat transfer fluid above its relatively high freezing point.

D.3.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

FOSSIL FUEL USE EFFICIENCY

One of the responsibilities of the California Energy Commission (Energy Commission) is to make findings on whether the energy use by a power plant, including the proposed Ridgecrest Solar project, would result in significant adverse impacts on the environment, as defined in the California Environmental Quality Act (CEQA). If the Energy Commission finds that Ridgecrest Solar's energy consumption creates a

significant adverse impact, it must further determine if feasible mitigation measures could eliminate or minimize that impact. In this analysis, staff addresses the inefficient and unnecessary consumption of energy.

In order to develop the Energy Commission's findings, this analysis will:

- Examine whether the facility would likely present any adverse impacts upon energy resources;
- Examine whether these adverse impacts are significant; and if so,
- Examine whether feasible mitigation measures or alternatives could eliminate those adverse impacts or reduce them to a level of insignificance.

SOLAR LAND USE EFFICIENCY

Solar thermal power plants typically consume much less fossil fuel (usually in the form of natural gas) than other types of thermal power plants. Therefore, common measures of power plant efficiency such as those described above are less meaningful. Solar power plants do occupy vast tracts of land, so, the focus for these types of facilities shifts from fuel efficiency to land use efficiency. To analyze the land use efficiency of a solar facility staff utilizes the following approach.

Solar thermal power plants convert the sun's energy into electricity in three basic steps:

- Mirrors and/or collectors capture the sun's rays.
- This solar energy is converted into heat.
- This heat is converted into electricity, typically in a heat engine such as a steam turbine generator or a Stirling Engine-powered generator.

The effectiveness of each of these steps depends on the specific technology employed; the product of these three steps determines the power plant's overall solar efficiency. The greater the project's solar efficiency, the less land the plant must occupy to produce a given power output.

The most significant environmental impacts caused by solar power plants result from occupying large expanses of land. The extent of these impacts is likely in direct proportion to the number of acres affected. For this reason, staff will evaluate the land use efficiency of proposed solar power plant projects. This efficiency will be expressed in terms of power produced, or MW per acre, and in terms of energy produced, or MW-hours per acre-year. Specifically:

- Power-based solar land use efficiency is calculated by dividing the maximum net power output in MW by the total number of acres impacted by the power plant, including roads and electrical switchyards and substations.
- Energy-based solar land use efficiency is calculated by dividing the annual net electrical energy production in MW-hours per year by the total number of acres impacted by the power plant. Since different solar technologies consume differing quantities of natural gas for morning warm-up, cloudy weather output leveling and heat transfer fluid freeze protection (and some consume no gas at all), this effect is accounted for. Specifically, gas consumption is backed out by reducing the plant's

net energy output by the amount of energy that could have been produced by consuming the project's annual gas consumption in a modern combined cycle power plant. (See **EFFICIENCY APPENDIX A**, immediately following.) This reduced energy output is then be divided by acres impacted.

D.3.4 PROPOSED PROJECT

D.3.4.1 SETTING AND EXISTING CONDITIONS

The applicant proposes to build and operate Ridgecrest Solar, a solar thermal power plant producing a total of 250 MW (nominal net output) and employing the concentrated parabolic trough solar thermal technology. The project would consist of one unit comprised of arrays of parabolic mirrors, solar steam generator heat exchangers, one steam turbine generator, and an air cooled condenser (Solar Millennium 2009a, AFC §§ 2.1, 2.5).

The project's power cycle would be based on a steam cycle (also known as the Rankine cycle) (Solar Millennium 2009a, AFC § 2.5.2).The solar steam generator heat exchangers would receive heated heat transfer fluid from the solar thermal equipment comprised of arrays of parabolic mirrors that collect energy from the sun. The heated heat transfer fluid would be used to generate steam in the heat exchangers. This steam would then expand through the steam turbine generators to produce electrical power.

The project would utilize one natural gas-fired auxiliary boiler to reduce startup time and to keep the temperature of the heat transfer fluid above its relatively high freezing point (54 degrees Fahrenheit [°F]). Except during startup, the project would not use fossil fuel to generate electricity.

D.3.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Project Energy Requirements and Energy Use Efficiency

Ridgecrest Solar would consume insignificant amounts of fossil fuel for power generation. It would consume fossil fuel only to reduce startup time and to keep the temperature of the heat transfer fluid above its relatively high freezing point.

The project would require approximately 35 million British thermal units of propane per hour (MMBtu/hr) for approximately 30 minutes per day for startup and approximately 8 MMBtu/hr of propane only during cold winter nights for freeze protection (approximately 100 hours per year) (Solar Millennium 2009 a, AFC §§ 2.5.2, 2.5.3.3, 2.5.5.1), at a nominal rate of 7,200 MMBtu per year (MMBtu/yr) or approximately 82,000 gallons per year. Compared to a typical fossil fuel-fired power plant of equal capacity, and compared to the relatively considerable resources of fossil fuel in California (see below in **ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES**), this rate is not significant. Propane is a relatively efficient form of fossil fuel, more efficient than natural gas and fuel oil.

The applicant estimates an average overall steam cycle efficiency of 38% for Ridgecrest Solar (Solar Millennium 2009a, AFC Figure 2-7). There are currently no legal or industry standards for measuring the efficiency of solar thermal power plants (CEC 2008d).

Therefore, staff compares the steam cycle efficiency of Ridgecrest Solar to the average efficiency of the typical modern steam turbines currently available in the market. The efficiency figures for these turbines range from 35% to 40%. The project's thermal efficiency of 38% is comparable to this industry figure.

Therefore, staff considers the impact of the project's fuel consumption on energy supplies and energy efficiency to be less than significant.

Adverse Effects on Energy Supplies and Resources

The applicant has described its sources of propane for the project (Solar Millennium 2009a, AFC § 2.5.5.1). Propane is normally created as a by-product of petroleum refining and from natural gas production. Petroleum products and natural gas (with California's access to natural gas resources from the Rocky Mountains, Canada and the southwest) represent considerable energy resources in California. Propane supplies in California amount to approximately 630 million gallons per year from refineries alone. This is only about 60% of California's total propane supply. Compared to this figure, the 0.082-million gallons (7,200 MMBtu) per year needed for Ridgecrest Solar is not significant. Therefore, it appears highly unlikely that the project would create a substantial increase in fossil fuel demand.

Additional Energy Supply Requirements

There appears to be no real likelihood that Ridgecrest Solar would require the development of additional energy supply capacity (see above in **ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES**).

Compliance with Energy Standards

No standards apply to the efficiency of Ridgecrest Solar or other non-cogeneration projects.

Alternatives to Reduce Wasteful, Inefficient, and Unnecessary Energy Consumption

Staff typically evaluates the project alternatives to determine if alternatives exist that could reduce the project's fuel use. The evaluation of alternatives to the project (that could reduce wasteful, inefficient, or unnecessary energy consumption) requires the examination of the project's energy consumption.

Efficiency of Alternatives to the Project

Please see the project alternatives discussed below.

Alternative Generating Technologies

Alternative generating technologies for Ridgecrest Solar are considered in the AFC (Solar Millennium 2009a, AFC § 4.10). For purposes of this analysis, natural gas, oil, coal, nuclear, geothermal, biomass, hydroelectric, wind and solar photovoltaic technologies were all considered. Because this project would consume insignificant amounts of fossil fuel for power production (only during startup), staff believes that the Ridgecrest Solar project would not constitute a significant adverse impact on fossil fuel energy resources compared to feasible alternatives.

The solar insolation falling on the earth's surface can be regarded as an energy resource. Since this energy is inexhaustible, its consumption does not present the concerns inherent in fossil fuel consumption. What is of concern, however, is the extent of land area required to capture this solar energy and convert it to electricity. Setting aside hundreds or thousands of acres of land for solar power generation removes it from alternative uses.

To assess the Ridgecrest Solar's land use efficiency staff proposes to compare the land use efficiency of the solar projects currently before the Commission to the Ridgecrest Solar. This comparsion will help determine a range of viable efficiencies and where the Ridgecrest Solar falls.

As this is written, there are currently four solar power plant projects that have progressed significantly through the Energy Commission siting process. These projects' power and energy output, and the extent of the land occupied by them, are summarized in **Efficiency Table 1**, below. The solar land use efficiency for a typical natural gas-fired combined cycle power plant is shown only for comparison.

Ridgecrest Solar would produce power at the rate of 250 MW net, and would generate energy at the rate of 500,000 MW-hours net per year, while occupying 1,440 acres (Solar Millennium 2009a, AFC §§ 2.0, 2.1, 2.2.1).

Staff calculates power-based land use efficiency thus:

Power-based efficiency: 250 MW ÷ 1,440 acres = **0.17 MW/acre** or **6.0 acres/MW**

Staff calculates energy-based land use efficiency thus:

Energy-based efficiency: 500,000 MWh/year ÷ 1,440 acres = **347 MWh/acre-year**

As seen in **Efficiency Table 1**, Ridgecrest Solar, employing the linear parabolic trough technology, is slightly less efficient in use of land than the Beacon Solar Energy Project, which uses the same technology. Ridgecrest Solar is more efficient in use of land than the Ivanpah SEGS project, which employs BrightSource power tower technology, the Calico Solar project, and the Stirling Energy Systems Solar Two project.

Alternatives to Reduce Solar Land Use Impacts

Building and operating a natural gas-fired combined cycle power plant would yield much greater land use efficiency than any solar power plant; see **Efficiency Table 1**. However, this would not achieve the basic project objective, to generate electricity from the renewable energy of the sun and would not further the state's renewable energy development and green-house gas reduction goals.

Efficiency Table 1
Solar Land Use Efficiency

Project	Generating Capacity (MW net)	Annual Energy Production (MWh net)	Annual Fuel Consumption (MMBtu LHV)	Footprint(Acres)	Land Use Efficiency (Power-Based) (MW/acre)	Land Use Efficiency (Energy – Based) (MWh/acre-year)	
						Total	Solar Only[1]
Ridgecrest Solar (09-AFC-6)	**250**	**500,000**	**72,00**	**1,440**	**0.17**	**347**	**346**
Beacon Solar (08-AFC-2)	250	600,000	36,000	1,240	0.20	484	480
Ivanpah SEGS (07-AFC-5)	400	960,000	432,432	3,744	0.11	256	238
SES Solar Two (08-AFC-5)	750	1,620,000	0	6,500	0.12	249	249
Calico Solar (08-AFC-13)	850	1,840,000	0	8,200	0.11	224	224
Avenal Energy (08-AFC-1)[2]	600	3,023,388	24,792,786	25	24.0	120,936	N/A

1 Net energy output is reduced by natural gas-fired combined cycle proxy energy output; see **Efficiency Appendix A**.

2 Example natural gas-fired combined cycle plant.

Building a solar power plant employing a different technology, such as the BrightSource power tower technology of the Ivanpah SEGS project or the Stirling Engine technology of the SES Solar projects, would reduce the solar land use efficiency of Ridgecrest Solar by more than a third.

Alternative Heat Rejection System

The applicant proposes to employ a dry cooling system (air-cooled condensers) as the means for rejecting power cycle heat from the steam turbines (Solar Millennium 2009a, AFC §§ 2.5.1, 2.5.5.2). An alternative heat rejection system would utilize evaporative cooling towers.

The local climate in the project area is characterized by high temperatures and low relative humidity (low wet-bulb temperature). In low temperatures and high relative humidity (low dry-bulb temperature), the air-cooled condenser performs relatively efficiently compared to the evaporative tower. However, at the project area (low wet-bulb temperature and high dry-bulb temperature) the air-cooled condenser performance is relatively poor compared to that of an evaporative cooling tower. Furthermore, the performance of the heat rejection system affects the performance of the steam turbine, impacting turbine efficiency. However, to conserve water in the project site's desert environment, the applicant proposes to employ dry cooling. Even though evaporative cooling could offer greater efficiency, staff believes the applicant's selection of dry cooling is a reasonable tradeoff as it would prevent potentially significant environmental impacts that could result from consumption of the large quantities of water required by wet cooling.

D.3.4.3 CEQA LEVEL OF SIGNIFICANCE

CEQA guidelines state that the environmental analysis "…shall describe feasible measures which could minimize significant adverse impacts, including where relevant, inefficient and unnecessary consumption of energy" (Title 14 CCR §15126.4[a][1]). Appendix F of the guidelines further suggests consideration of such factors as the project's energy requirements and energy use efficiency; its effects on local and regional energy supplies and energy resources; its requirements for additional energy supply capacity; its compliance with existing energy standards; and any alternatives that could reduce the wasteful, inefficient, and unnecessary consumption of energy (Title 14, CCR §15000 et seq., Appendix F).

The inefficient and unnecessary consumption of energy, in the form of non-renewable fuels such as natural gas and oil, constitutes an adverse environmental impact. An adverse impact can be considered significant if it results in:

- Adverse effects on local and regional energy supplies and energy resources;
- A requirement for additional energy supply capacity;
- Noncompliance with existing energy standards; or
- The wasteful, inefficient, and unnecessary consumption of fuel or energy.

The discussions under **FOSSIL FUEL USE EFFICIENCY** and **SOLAR LAND USE EFFICIENCY** in Subsection **D.3.3** also describe the CEQA level of significance as related to power plant efficiency.

D.3.5 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because (1) it eliminates about 42 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources (desert tortoise and Mohave ground squirrel), cultural resources, and recreational uses, and (2) avoids constructing a solar facility in the Mohave Ground Squirrel Conservation Area (MGSCA).

The Northern Unit Alternative would consist of 167 solar collector array loops with a net generating capacity of approximately 146 MW. The total disturbance area would be approximately 1134 acres of land. This alternative would retain 58 percent of the proposed solar array loops and would affect 58 percent of the land of the proposed 250 MW project. The boundaries of the Northern Unit Alternative are shown in **Alternatives Figure 1**.

The reduction in power output would likely result in proportionally reducing the consumption of fossil fuel; as with the original project, the fossil fuel impact would be insignificant. The land-use efficiency would not change because the size of the land to be occupied by the facility (power block and solar field) and the power output would be reduced proportionally.

D.3.6 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would be a 104 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because it eliminates about 58 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources, and cultural resources.

The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of approximately 104 MW. The total disturbance area would be approximately 908 acres of land. This alternative would retain 42 percent of the proposed solar array loops and would affect 42 percent of the land of the proposed 250 MW project.

The boundaries of the Southern Unit Alternative are shown in **Alternatives Figure 2**. This area was would avoid a large portion of the El Paso Wash and sensitive biological resources, including areas that were mapped as occupied tortoise and Mohave ground squirrel habitat (live tortoise and/or active burrows and sign).

The reduction in power output would likely result in proportionally reducing the consumption of fossil fuel; as with the original project, the fossil fuel impact would be

insignificant. The land-use efficiency would not change because both, the size of the land to be occupied by the facility (power block and solar field) and the power output would be reduced proportionally.

D.3. 7 ORIGINAL PROPOSED PROJECT ALTERNATIVE

The Original Proposed Project Alternative would be a 250 MW solar facility as originally proposed by Solar Millennium. This alternative is analyzed because it would reduce the amount of land developed within the Mojave Ground Squirrel Conservation Area and it could transmit the full 250 MW of power that Solar Millennium has requested.

The Original Proposed Project Alternative would consist of 278 solar array loops with a net generating capacity of approximately 250 MW. The total disturbance area would be approximately 1,794 acres of land. A shorter transmission interconnection – 1,250 feet as compared to the proposed project interconnection of 3,900 feet – would be needed.

The boundaries of the Original Proposed Project Alternative are shown in **Alternatives Figure 3**. This project footprint contains two desert ephemeral washes that would require redirection and smaller dry desert washes also traverse the site. In addition this site is the location of prime desert tortoise and Mojave ground squirrel habitat.

Both, the power output to be generated and the quantities of fossil fuel to be consumed by this alternative would remain unchanged; as with the original project, the fossil fuel impact would be insignificant. The land-use efficiency would not change because the size of the land to be occupied by the facility (power block and solar field) and the power output would remain unchanged.

D.3.8 NO PROJECT/NO ACTION ALTERNATIVES

NO PROJECT/NO ACTION ALTERNATIVE #1

No Action on Ridgecrest Solar Power Project application and on CDCA land use plan amendment

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site and no ground disturbance. The decreased reliance on fossil fuel and increased reliance on renewable energy resources that would occur with the proposed project would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet

State and Federal mandates, and those projects would have similar impacts in other locations

NO PROJECT/NO ACTION ALTERNATIVE #2

No Action on Ridgecrest Solar Power Project and amend the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site will be developed with another solar technology. Construction and operation requirements for solar technologies vary; however, they would all decrease reliance on fossil fuel, and would increase reliance on renewable energy resources as with the proposed project.

NO PROJECT/NO ACTION ALTERNATIVE #3

No Action on Ridgecrest Solar Power Project application and amend the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended so no solar projects can be approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no construction of a solar facility. Therefore, there would be no decreased reliance on fossil fuel and increased reliance on renewable energy resources as with the proposed project. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.3.9 CUMULATIVE IMPACT ANALYSIS

There are no nearby power plant projects or other projects consuming large amounts of fossil fuel that hold the potential for cumulative energy consumption impacts when aggregated with the project, because the amount of fuel to be consumed by Ridgecrest Solar would be insignificant compared to the considerable resources of fossil fuel, including propane, in California.

Staff believes that the construction and operation of the project would not create indirect impacts (in the form of additional fuel consumption) that would not have otherwise occurred without this project. Because Ridgecrest Solar would consume significantly

less fossil fuel than a typical fossil fuel-fired power plant, it should compete favorably in the California power market and replace fossil fuel burning power plants. The project would therefore cause a positive impact on the cumulative amount of fossil fuel consumed for power generation.

C.3.10 COMPLIANCE WITH LORS

No federal, state, or local/county laws, ordinances, regulations, and standards (LORS) apply to the efficiency of this project.

C.3.11 NOTEWORTHY PUBLIC BENEFITS

Ridgecrest Solar would employ an advanced solar thermal technology. Solar energy is renewable and unlimited. The project would have a less than significant adverse impact on nonrenewable energy resources. Consequently, the project would help in reducing California's dependence on fossil fuel-fired power plants.

C.3.12 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

No conditions of certification are proposed.

C.3.13 CONCLUSIONS

FOSSIL FUEL ENERGY USE

Ridgecrest Solar, if constructed and operated as proposed, would use solar energy to generate most of its capacity, consuming insignificant amounts of fossil fuel for power production. The project would decrease reliance on fossil fuel, and would increase reliance on renewable energy resources. It would not create significant adverse effects on energy supplies or resources, would not require additional sources of energy supply, and would not consume energy in a wasteful or inefficient manner. No energy standards apply to this project. Staff therefore concludes that this project would present no significant adverse impacts on energy resources.

No cumulative impacts on energy resources are likely. Facility closure would not likely present significant impacts on electric system efficiency.

LAND USE

Ridgecrest Solar, if constructed and operated as proposed, would occupy approximately six acres per MW of power output, a figure less than that of some other solar power technologies. Employing a more land-intensive solar technology, such as the BrightSource power tower technology or Stirling Engine technology, would almost halve the land use efficiency..

C.3.14 REFERENCES

CEC 2008d – Report of Conversation between Steve Baker (CEC staff, Power Plant Siting Division) and Golam Kibrya (CEC staff, Energy Resource and Development Division). February 22, 2008.

Solar Millennium 2009a- Solar Millennium (tn: 52939). Application for Certification Vol 1 & 2, dated 8/24/2009.

EFFICIENCY APPENDIX A
SOLAR POWER PLANT EFFICIENCY CALCULATION
GAS-FIRED PROXY

In calculating the efficiency of a solar power plant, it is desired to subtract the effect of natural gas burned for morning startup, cloudy weather augmentation and Therminol freeze protection. As a proxy, we will use an average efficiency based on several recent baseload combined cycle power plant projects in the Energy Commission siting process. Baseload combined cycles were chosen because their intended dispatch most nearly mirrors the intended dispatch of solar plants, that is, operate at full load in a position high on the dispatch authority's loading order.

The most recent such projects are:

Colusa Generating Station (06-AFC-9)

Nominal 660 MW 2-on-1 Combined Cycle with GE Frame 7FA CGTs
Air cooled condenser, evaporative inlet air cooling
Efficiency with duct burners on: 666.3 MW @ 52.5% LHV
Efficiency with duct burners off: 519.4 MW @ 55.3% LHV
Efficiency (average of these two): **53.9% LHV**

San Gabriel Generating Station (07-AFC-2)

Nominal 696 MW 2-on-1 Combined Cycle with Siemens 5000F CGTs
Air cooled condenser, evaporative inlet air cooling
Efficiency with duct burners on: 695.8 MW @ 52.1% LHV
Efficiency with duct burners off: 556.9 MW @ 55.1% LHV
Efficiency (average of these two): **53.6% LHV**

KRCD Community Power Plant (07-AFC-7)

Nominal 565 MW 2-on-1 Combined Cycle with GE or Siemens F-class CGTs
Evaporative cooling, evaporative or fogging inlet air cooling
Efficiency with GE CGTs: 497 MW @ 54.6% LHV
Efficiency with Siemens CGTs: 565 MW @ 56.1% LHV
Efficiency (average of these two): **55.4% LHV**

Avenal Energy (08-AFC-1)

Nominal 600 MW 2-on-1 Combined Cycle with GE Frame 7FA CGTs
Air cooled condenser, inlet air chillers
Efficiency with duct burners on: 600.0 MW @ 50.5% LHV
Efficiency with duct burners off: 506.5 MW @ 53.4% LHV
Efficiency (average of these two): **52.0% LHV**

Average of these four power plants: **53.7% LHV**

D.4 POWER PLANT RELIABILITY

Testimony of Shahab Khoshmashrab

D.4.1 SUMMARY OF CONCLUSIONS

The expected equivalent availability factor for this project is 96-99 percent, which staff believes is achievable (The availability factor of a power plant is the percentage of time it is available to generate power; both planned and unplanned outages subtract from this availability). Based on a review of the proposal, staff concludes that the Ridgecrest Solar Power Project would be built and would operate (throughout its intended 30-year life) in a manner consistent with industry norms for reliable operation. No conditions of certification are proposed.

D.4.2 INTRODUCTION

In this analysis, California Energy Commission (Energy Commission) staff addresses the reliability issues of the Ridgecrest Solar Power Project (Ridgecrest Solar) to determine if the power plant is likely to be built in accordance with typical industry norms for reliable power generation. Staff uses this norm as a benchmark because it ensures that the resulting project would not be likely to degrade the overall reliability of the electric system it serves (see the "Setting" subsection, below).

The scope of this power plant reliability analysis covers:

- Equipment availability;
- Plant maintainability;
- Fuel and water availability; and
- Power plant reliability in relation to natural hazards.

Staff examined the project design criteria to determine if the project is likely to be built in accordance with typical industry norms for reliable power generation. The applicant has not predicted an availability factor for the project, but staff expects this figure to be similar to the other solar power plant projects that are going through the Energy Commission's licensing process utilizing the same solar thermal technology (parabolic trough). The expected overall availability factor for these projects ranges between 96-99 percent; staff expects the same for Ridgecrest Solar. While these predictions are made by the applicants, staff commonly uses typical industry norms as the benchmark, rather than the applicant's projection, to evaluate the project's reliability (see below).

D.4.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

METHOD FOR DETERMINING RELIABILITY

The Energy Commission must make findings as to how a project is designed, sited, and operated in order to ensure its safe and reliable operation (Title 20, CCR §1752[c]).

Staff takes the approach that a project is acceptable if it does not degrade the reliability of the utility system to which it is connected. This is likely the case if a project is at least as reliable as other power plants on that system.

The availability factor of a power plant is the percentage of time it is available to generate power; both planned and unplanned outages subtract from this availability. Measures of power plant reliability are based upon both the plant's actual ability to generate power when it is considered to be available and upon starting failures and unplanned (or forced) outages. For practical purposes, reliability can be considered a combination of these two industry measures, making a reliable power plant one that is available when called upon to operate. Power plant systems must be able to operate for extended periods without shutting down for maintenance or repairs. Achieving this reliability requires adequate levels of equipment availability, plant maintainability with scheduled maintenance outages, fuel and water availability, and resistance to natural hazards. Staff examines these factors for the project and compares them to industry norms. If the factors compare favorably for this project, staff may then conclude that Ridgecrest Solar would be as reliable as other power plants on the electric system and would not degrade system reliability.

D.4.4 PROPOSED PROJECT

D.4.4.1 SETTING AND EXISTING CONDITIONS

In the restructured competitive electric power industry, the responsibility for maintaining system reliability falls largely to the state's control area operators, such as the California Independent System Operator (California ISO), that purchase, dispatch, and sell electric power throughout the state. Determining how the California ISO and other control area operators would ensure system reliability has been an ongoing effort. Protocols that allow sufficient reliability to be maintained under the competitive market system have been developed and put in place. "Must-run" power purchase agreements and "participating generator" agreements are two mechanisms that have been employed to ensure an adequate supply of reliable power.

The California ISO's mechanisms to ensure adequate power plant reliability apparently were devised under the assumption that the individual power plants that compete to sell power into the system will each exhibit a level of reliability similar to that of power plants of past decades. However, there has been valid cause to believe that, under free market competition, financial pressures on power plant owners to minimize capital outlays and maintenance expenditures may act to reduce the reliability of many power plants, both existing and newly constructed (McGraw-Hill 1994). It is possible that, if significant numbers of power plants were to exhibit individual reliability sufficiently lower than this historical level, the assumptions used by California ISO to ensure system reliability would prove invalid, with potentially disappointing results. Accordingly, staff has recommended that power plant owners continue to build and operate their projects to the level of reliability to which all in the industry are accustomed.

As part of its plan to provide needed reliability, the applicant proposes to operate the 250-megawatt (MW) (net power output) Ridgecrest Solar, a solar thermal power plant

facility employing an advanced solar power technology. This project, using renewable solar energy, would provide dependable power to the grid, generally during the hours of peak power consumption by the interconnecting utility(s). This project would help serve the need for renewable energy in California, as all its generated electricity would be produced by a reliable source of energy that is available during the hot summer afternoons, when power is needed most.

The expected availability factor for the project is 96-99 percent.

D.4.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

EQUIPMENT AVAILABILITY

Equipment availability would be ensured by adoption of appropriate quality assurance/quality control (QA/QC) programs during the design, procurement, construction, and operation of the plant and by providing for adequate maintenance and repair of the equipment and systems discussed below.

Quality Control Program

Staff expects the project's QA/QC program to be typical of the power industry. Equipment would be purchased from qualified suppliers based on technical and commercial evaluations. Suppliers' personnel, production capability, past performance, QA programs, and quality history would be evaluated. The project owner would perform receipt inspections, test components, and administer independent testing contracts. Staff expects that implementation of this program would result in typical reliability of design and construction. To ensure this implementation, staff has proposed appropriate conditions of certification in the section of this document entitled **Facility Design**.

PLANT MAINTAINABILITY

Equipment Redundancy

The project, as proposed in the AFC, would be able to operate only when the sun is shining. Maintenance or repairs could be done when the plant is shut down at night. This would help to enhance the project's reliability. The nature of solar thermal generating technology also provides inherent redundancy; the series-parallel arrangement of solar collector assemblies would allow for reduced output generation if one (or possible several) rows of solar collectors were to require service or repair (SM 2009a, AFC §§ 2.5.1, 2.5.3). This redundancy would allow service or repair to be done during sunny days when the plant is in operation, if required.

Major plant systems are designed with adequate redundancy to ensure their continued operation if equipment fails.

Maintenance Program

Equipment manufacturers provide maintenance recommendations for their products, and the applicant would most likely base the project's maintenance program on those recommendations. Such a program would encompass both preventive and predictive

maintenance techniques. Maintenance outages would probably be planned for periods of low electricity demand. Staff expects that the project would be adequately maintained to ensure an acceptable level of reliability.

FUEL AND WATER AVAILABILITY

The long-term availability of fuel and of water for cooling or process use is necessary to ensure the reliability of any power plant. The need for reliable sources of fuel and water is obvious; lacking long-term availability of either source, the service life of the plant could be curtailed, threatening both the power supply and the economic viability of the plant.

Fuel Availability

Ridgecrest Solar would consume insignificant amounts of propane for power generation. The sole consumption of propane would be to reduce startup time and to keep the temperature of the heat transfer fluid above its freezing point.

Propane would be delivered to the Ridgecrest Solar site via trucks from a local distributer (SM 2009a, AFC § 2.5.5.1). Propane is normally created as a by-product of petroleum refining and from natural gas production. Petroleum products and natural gas (with California's access to natural gas resources from the Rocky Mountains, Canada and the southwest) represent considerable energy resources in California. Propane supplies in California amount to approximately 630 million gallons per year from refineries alone. This is only about 60% of California's total propane supply. Compared to this figure, the 0.082-million gallons per year needed for Ridgecrest Solar is very small. Staff believes that there would be adequate propane supply and pipeline capacity to meet the project's needs.

Water Supply Reliability

Ridgecrest Solar has proposed to use well water from the Indian Wells Valley Water District for domestic and industrial water needs, including steam cycle makeup, mirror washing, service water and fire protection water. The project would be dry cooled, so no water would be required for power plant cooling. According to the **Soil and Water Resources** section of this document, the proposed use of onsite groundwater for power plant cooling would create significant unmitigated adverse impacts related to water resources. Therefore, at this time, staff cannot conclude that this source of water supply is a reliable source of water for the project.

POWER PLANT RELIABILITY IN RELATION TO NATURAL HAZARDS

Natural forces can threaten the reliable operation of a power plant. Tsunamis (tidal waves) and seiches (waves in inland bodies of water) are not likely to present hazards for this project, but seismic shaking (earthquakes), flooding and high winds could present credible threats to the project's reliable operation (SM 2009a, AFC §§ 5.5, 5.17).

Seismic Shaking

The project will be designed and constructed to the latest applicable LORS (SM 2009a, AFC Appendix C). Compliance with current seismic design LORS represents an

upgrading of performance during seismic shaking compared to older facilities since these LORS have been continually upgraded. Because it would be built to the latest seismic design LORS, this project would likely perform at least as well as, and perhaps better than, existing plants in the electric power system. Staff has proposed conditions of certification to ensure this; see the section of this document entitled **FACILITY DESIGN**. In light of the general historical performance of California power plants and the electrical system in seismic events, staff has no special concerns with the power plant's functional reliability during earthquakes. Also see the **GEOLOGY AND PALEONTOLOGY** section of this document.

Flooding

Portions of the site lie within a 100-year or 500-year flood plain (SM 2009a, AFC § 5.17.2.8). Project features would be designed and built to provide adequate levels of flood resistance. Staff believes there are no special concerns with power plant functional reliability due to flooding. For further discussion, see **SOIL AND WATER RESOURCES** and **GEOLOGY AND PALEONTOLOGY**.

High Winds

High winds are common in the region of the site, which could potentially cause damage to the solar mirrors. Project features would be built to withstand wind loading. Design would be in accordance with applicable LORS, including the latest California Building Code (see the **FACILITY DESIGN** section of this document). Staff believes there are no special concerns with power plant functional reliability due to wind.

COMPARISON WITH EXISTING FACILITIES

The North American Electric Reliability Corporation (NERC) maintains industry statistics for availability factors (as well as other related reliability data). The NERC regularly polls North American utility companies on their project reliability through its Generating Availability Data System and periodically summarizes and publishes those statistics on the Internet at <http://www.nerc.com>. Energy Commission staff typically compares the applicant's claims for reliability to the statistical reliability of similar power plants. Because solar technology is relatively new and the technologies employed so varied, no NERC statistics are available for solar power plants. Staff's typical comparison with other existing facilities thus cannot be accomplished. But, based on experience with power plants and due the proven solar thermal technology proposed for this project, staff believes that the stated range of availability factor for the project is reasonable and likely achievable.

D.4.4.3 CEQA LEVEL OF SIGNIFICANCE

This does not apply to power plant reliability.

D.4.5 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because (1) it eliminates about 42 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources

(desert tortoise and Mohave ground squirrel), cultural resources, and recreational uses, and (2) avoids constructing a solar facility in the Mohave Ground Squirrel Conservation Area (MGSCA).

The Northern Unit Alternative would consist of 167 solar collector array loops with a net generating capacity of approximately 146 MW. The total disturbance area would be approximately 1134 acres of land. This alternative would retain 58 percent of the proposed solar array loops and would affect 58 percent of the land of the proposed 250 MW project. The boundaries of the Northern Unit Alternative are shown in **Alternatives Figure 1**.

Staff's methods of analysis and conclusions as related to Power Plant Reliability would remain unchanged. This alternative would be built and would operate in a manner consistent with industry norms for reliable operation.

D.4.6 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would be a 104 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because it eliminates about 58 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources, and cultural resources.

The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of approximately 104 MW. The total disturbance area would be approximately 908 acres of land. This alternative would retain 42 percent of the proposed solar array loops and would affect 42 percent of the land of the proposed 250 MW project.

The boundaries of the Southern Unit Alternative are shown in **Alternatives Figure 2**. This area was would avoid a large portion of the El Paso Wash and sensitive biological resources, including areas that were mapped as occupied tortoise and Mohave ground squirrel habitat (live tortoise and/or active burrows and sign).

Staff's methods of analysis and conclusions as related to Power Plant Reliability would remain unchanged. This alternative would be built and would operate in a manner consistent with industry norms for reliable operation.

D.4. 7 ORIGINAL PROPOSED PROJECT ALTERNATIVE

The Original Proposed Project Alternative would be a 250 MW solar facility as originally proposed by Solar Millennium. This alternative is analyzed because it would reduce the amount of land developed within the Mojave Ground Squirrel Conservation Area and it could transmit the full 250 MW of power that Solar Millennium has requested.

The Original Proposed Project Alternative would consist of 278 solar array loops with a net generating capacity of approximately 250 MW. The total disturbance area would be

approximately 1,794 acres of land. A shorter transmission interconnection – 1,250 feet as compared to the proposed project interconnection of 3,900 feet – would be needed.

The boundaries of the Original Proposed Project Alternative are shown in **Alternatives Figure 3**. This project footprint contains two desert ephemeral washes that would require redirection and smaller dry desert washes also traverse the site. In addition this site is the location of prime desert tortoise and Mojave ground squirrel habitat.

Staff's methods of analysis and conclusions as related to Power Plant Reliability would remain unchanged. This alternative would be built and would operate in a manner consistent with industry norms for reliable operation.

D.4.8 NO PROJECT/NO ACTION ALTERNATIVES

NO PROJECT/NO ACTION ALTERNATIVE #1

No Action on Ridgecrest Solar Power Project application and on CDCA land use plan amendment

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site and no ground disturbance. The decreased reliance on fossil fuel and increased reliance on renewable energy resources that would occur with the proposed project would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations

NO PROJECT/NO ACTION ALTERNATIVE #2

No Action on Ridgecrest Solar Power Project and amend the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site will be developed with another solar technology. Construction and operation requirements for

solar technologies vary; however, they would all decrease reliance on fossil fuel, and would increase reliance on renewable energy resources as with the proposed project.

NO PROJECT/NO ACTION ALTERNATIVE #3

No Action on Ridgecrest Solar Power Project application and amend the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended so no solar projects can be approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no construction of a solar facility. Therefore, there would be no decreased reliance on fossil fuel and increased reliance on renewable energy resources as with the proposed project. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

D.4.8 NOTEWORTHY PUBLIC BENEFITS

This project, if successful, would help serve the need for renewable energy in California, as all of the electricity generated would be produced by a reliable source of energy that is available during the hot summer afternoons, when power is needed most.

D.4.9 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

No Conditions of Certification are proposed.

D.4.10 CONCLUSIONS

The expected equivalent availability factor for this project is 96-99 percent, which staff believes is achievable (The availability factor of a power plant is the percentage of time it is available to generate power; both planned and unplanned outages subtract from this availability). Based on a review of the proposal, with the exception of the source of water supply currently selected by the applicant (see the **SOIL AND WATER RESOURCES** section of this document), staff concludes that the Ridgecrest Solar Power Project would be built and would operate (throughout its intended 30-year life) in a manner consistent with industry norms for reliable operation. No conditions of certification are proposed.

D.4.11 REFERENCES

SM 2009a - Solar Millenium LLC/J. Eichhammer (tn 53100). AFC for Ridgecrest Solar Power Project, dated 8/31/2009. Submitted to CEC/Docket Unit on 9/1/2009.

D.5 TRANSMISSION SYSTEM ENGINEERING

Testimony of Ajoy Guha, P. E. and Mark Hesters

D.5.1 SUMMARY OF CONCLUSIONS

The proposed interconnecting facilities including the Ridgecrest Solar Power Project (RSPP) 230 kV switchyard, the generator 230 kV overhead tie line and termination to the new Southern California Edison's (SCE) Millennium 230 kV substation are adequate and in accordance with industry standards and good utility practices, and are acceptable to staff according to engineering Laws, Ordinances, Regulations and Standards (LORS).

The California Independent System Operator's (California ISO) Phase I Interconnection Study (Phase I Study) does not provide a meaningful forecast of the transmission reliability impacts of the RSPP. The Phase I Study analyzed the impacts of 12,305 MW of generation in the RSPP cluster; however, after a December 2010 milestone, most of the generation dropped out of the interconnection process and only 2,065 MW remained. Staff expects that the reliability impacts of 2,065 MW will be significantly smaller than the impacts of 12,305 MW. The California ISO Phase II Interconnection Study (Phase II Study) is being performed based on the 2,065 MW in the RSPP cluster. The Phase II Study will be completed by September 2010, but will not be available in time to be incorporated in staff's analysis of the RSPP. Condition of Certification TSE-5 requires that the Phase II Study be provided to the California Energy Commission before the start of transmission facility construction.

Because the Phase 1 Study does not provide a meaningful analysis of the reliability impacts of interconnecting the RSPP, staff is unable to determine whether or not the project will comply with reliability LORS.

D.5.2 INTRODUCTION

The Transmission System Engineering (TSE) analysis examines whether or not the facilities associated with the proposed interconnection conforms to all applicable LORS required for safe and reliable electric power transmission. Staff's analysis evaluates the power plant switchyard, outlet line, termination and downstream facilities identified by the applicant. Additionally, under the CEQA, the Energy Commission must conduct an environmental review of the "whole of the action," which may include facilities not licensed by the Energy Commission (California Code of Regulations, title 14, §15378). Therefore, the Energy Commission must identify the system impacts and necessary new or modified downstream transmission facilities (beyond the first point of the proposed interconnection) that are required for interconnection and represent the "whole of the action." The downstream network upgrade mitigation measures that will be required to maintain system reliability for the addition of the power plant, are used to identify the requirement for any additional CEQA analysis for potential indirect impacts.

According to the previous guidelines staff so far relied on the System Impact Study (SIS) and Facility Study (FS) as well as the review of these studies by the agencies responsible for ensuring the adjacent interconnecting grid meets reliability standards.

The proposed RSPP would interconnect to the SCE transmission network and requires analysis by SCE and approval of the California ISO. However, the California ISO's generator interconnection study process under the new LGIP Tariff is in transition from a queue or serial SIS to a cluster window process for the Phase I and Phase II Studies. The Phase I Study is similar to the former System Impact Study except it is now performed for a group of projects in the same geographical area of a utility that apply for interconnection in the same request window. The Phase II Study is performed after generators in each cluster meet specific milestones required to stay in the generator interconnection queue. The Phase II Study is then performed only on the generators left in the queue. The interconnection studies analyze the effect of the proposed project on the ability of the transmission network to meet reliability standards (California ISO 2009a).

SCE'S ROLE

SCE is responsible for ensuring electric system reliability in the SCE system for addition of the proposed generating plant. SCE will provide the analysis and reports in their Phase I and Phase II Studies, and their approval for the facilities and changes required in the SCE system for the proposed transmission modifications.

CALIFORNIA ISO'S ROLE

The California ISO is responsible for ensuring electric system reliability for all participating transmission owners and is also responsible for developing the standards necessary to achieve system reliability. The California ISO is responsible for completing the studies of the SCE system to ensure adequacy of the proposed transmission interconnection. The California ISO will determine the reliability impacts of the proposed transmission modifications on the SCE transmission system in accordance with all applicable reliability criteria. According to the California ISO Tariff, the California ISO will determine the "Need" for transmission additions or upgrades downstream from the interconnection point to ensure reliability of the transmission grid. The California ISO will, therefore, review the Phase I Study performed by SCE and/or any third party, provide their analysis, conclusions and recommendations. Upon completion of the SCE Phase II Study based on the expected mid-2013 commercial operation date (COD) or current COD the California ISO would execute a Large Generator Interconnection Agreement (LGIA) between the California ISO and the project owner. If necessary, the California ISO may provide written and verbal testimony on their findings at the Energy Commission hearings.

D.5.3 PROPOSED PROJECT

D.5.3.1 SETTING AND EXISTING CONDITIONS

The RSPP would be located in a 1,760-acre site in the high northern Mojave Desert in the northeastern Kern County about five miles southwest of the City of Ridgecrest. The project's nominal 250 MW output would be produced by two solar fields (one would be located north of Brown Road and the other south of Brown Road), and facilities on site would include a power block and a switchyard.

The RSPP, a solar plant, would consist of a steam turbine generator (STG) unit operating with a total 250 MW nominal output. The STG unit would be rated at 300 MVA, and connected by an 18 kV line through a 12,000-ampere bus duct, 12,000-ampere 24 kV circuit breaker and three disconnect switches to the low voltage terminal of a dedicated 220/275/330MVA, 18/230 kV generator step-up (GSU) transformer with an impedance of 8 percent @220 MVA (SM 2009a, Pages 2-1 to 2-3 and SM 2009d, Transmission System Design).

SWITCHYARD AND INTERCONNECTION FACILITIES

The high voltage terminals of the GSU transformer would be connected to the 230 kV switchyard bus by short overhead conductors through a 3,000-ampere circuit 230 kV breaker and two disconnect switches.

The new RSPP 230 kV switchyard would be interconnected to the SCE system by building a new 0.5-mile long single circuit overhead line with 715.5 kcmil steel-reinforced aluminum conductors (ACSR) on 75 to 120-foot steel poles. The applicant would build, own and operate the RSPP switchyard and the generator tie line (SM 2009d, Transmission System Design).

The generator interconnection tie line would terminate to the SCE Kramer-Inyokern 230 kV line by building a new SCE 230 kV substation adjacent to the plant facility. The existing Kramer-Inyokern 230 kV line would be rerouted around the project site and looped into the new SCE 230 kV substation. The new substation is propose as a 3,000-ampere ring bus configuration with five 3,000-ampere 230 kV breakers (63 kA short circuit duty) and ten 3,000-ampere disconnect switches. SCE would build, own and operate new 230 kV substation and transmission outlets within the substation fence line (SM 2009d, Transmission System Design).

The configuration of the RSPP 230 kV switchyard, the generator 230 kV overhead tie line to the new SCE Millennium 230 kV substation and its termination at the new 230 kV substation are adequate and in accordance with industry standards and good utility practices, and are acceptable to staff. The proposed Conditions of Certification TSE-1 through TSE-8 ensure that the proposed facilities are designed, built and operated in accordance with good utility practices and applicable LORS.

D.5.3.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

For the interconnection of a proposed generating unit or transmission facility to the grid, the interconnecting utility and the control area operator are responsible for ensuring grid reliability. For the RSPP, SCE and the California ISO are responsible for ensuring grid reliability.

The California ISO's generator interconnection study process is in transition from a serial process to an interconnection window cluster study process. The RSPP was studied under the window cluster process and the transmission reliability impacts of the proposed project are studied in the Phase I and Phase II Studies. The Phase I Study is similar to the former System Impact Study except it is now performed for a group or cluster of projects in the same geographical area of a utility that apply for interconnection in the same request window. The Phase II Study is performed after

generators in each cluster meet specific milestones required to stay in the generator interconnection queue. The Phase II Study is then performed for generators that meet the milestones in each cluster.

The Phase I Studies for projects in the transition cluster were conducted to determine the preferred and alternative generator interconnection methods and to identify any mitigation measures required to ensure system conformance with utility reliability criteria, NERC planning standards, WECC reliability criteria, and California ISO reliability criteria. Staff relies on the studies and any review conducted by the responsible agencies to determine the effect of the projects on the transmission grid and to identify any necessary downstream facilities or indirect project impacts required to bring the transmission network into compliance with applicable reliability standards (NERC2006, WECC 2006, California ISO 2002a, 2007a & 2009a).

The Phase I Study analyzes the grid with and without the generator or generators in a cluster under conditions specified in the planning standards and reliability criteria. The standards and criteria define the assumptions used in the study and establish the thresholds by which grid reliability is determined. The studies must analyze the impact of the projects for their proposed first year(s) of operation and thus are based on a forecast of loads, generation and transmission. Load forecasts are developed by the interconnected utility, which would be SCE in this case. Generation and transmission forecasts are based on the interconnection queue. The studies are focused on thermal overloads, voltage deviations, system stability (excessive oscillations in generators and transmission system, voltage collapse, loss of loads or cascading outages), short circuit duties and substation evaluation

Under the new LGIP, generators are able to choose between either “full capacity” or “energy only” depending on whether or not the generator wants to have the right to generate energy 24-hours per day. A generator that chooses the full capacity option will be required to pay for transmission network upgrades that are needed to allow the generator to operate under virtually any system conditions and as such could sign contracts that allowed them to provide capacity to utilities. Energy only generators would not pay for network transmission upgrades, and essentially would have access to as available transmission capacity, and would likely not be able to sign capacity contracts.

If the studies show that the interconnection of the project or cluster of projects causes the grid to be out of compliance with reliability standards, the study will then identify mitigation alternatives or ways in which the grid could be brought into compliance with reliability standards. If the interconnecting utility determines that the only feasible mitigation includes transmission modifications or additions which require CEQA review as part of the “whole of the action,” the Energy Commission must analyze those modifications or additions according to CEQA requirements. Where the Phase I Study identifies transmission modifications required for the reliable interconnection of a cluster of generators, staff will analyze the proposed generating project’s impact on individual reliability criteria violations to determine whether or not the identified mitigation measures are a reasonably foreseeable consequence of the proposed project.

D.5.3.2.1 Scope of the Transition Cluster Phase I Interconnection Study

The July 28, 2009, Transition Cluster Phase I Study was prepared by the California ISO in coordination with SCE. The Phase I Study analyzed 36 queue generation projects in the East of Lugo SCE area totaling 12,305 MW net generation output, including a proposed 750 MW RSPP which has been reduced to 250 MW (SM 2009c, Transition Cluster Phase I interconnection Study, Page 3). As of December 4, 2009 only 18 projects (2,065 MW) of the original 36 projects remain in the interconnection queue. Reducing the size of the cluster by 18 projects and 10,240 MW means the Phase I Study results no longer provide a meaningful forecast of the reliability impacts of the proposed project or the other projects in the cluster. Staff typically relies on the California ISO Phase I Study to show project compliance with LORS and to indentify the downstream transmission facilities required to reliably interconnect a generator to the existing transmission grid. Thus, the Phase I Study does not provide a meaningful forecast of the reliability impacts of the cluster or the proposed RSPP and consequently the mitigation plan including downstream transmission upgrades is not reasonable for the updated generator cluster.

CEQA requires the analysis of reasonably foreseeable consequences of proposed projects based on the best available information. The California ISO is the reliability authority for generator interconnections and its Phase I Study for the RSPP provides the best available information on the reliability impacts of the proposed project. However, the significant reduction in the number of generators studied in the cluster with the RSPP reduces the Phase 1 Study results to idle speculation. It is not possible to determine the impacts of the proposed project or even the cluster of generators because the size of the cluster has decreased so significantly. The revised 2,065 MW cluster including the RSPP will be analyzed in the Phase II Study and will provide an accurate and acceptable forecast of the reliability impacts of the RSPP and its associated cluster of generator projects.

The Transition Cluster Phase II Study is currently scheduled to be completed by September 2010 and will not be available in time to be incorporated in staff's analysis of the RSPP. If the Phase II Study finds that the RSPP and the remaining projects in its cluster would require the construction or upgrade of downstream transmission facilities in order to maintain grid reliability, those transmission facilities would require a license from the California Public Utilities Commission or other permitting authorities. Staff anticipates that future clusters will likely include fewer generators and the Phase I Studies which are not part of the Transition Cluster will provide less speculative study results and a better forecast of the reasonably foreseeable transmission impacts of a specific generator.

CALIFORNIA ISO REVIEW

In accordance with the new LGIP as in the California ISO Tariff, on satisfactory completion of the Transition Cluster Phase II Study the California ISO instead of issuing a final approval letter would proceed to execute LGIA between the California ISO and the project owner. The California ISO may also provide written and verbal testimony on their findings at the Energy Commission hearings, if necessary.

Performance of the Phase II Study, including the Operation study and execution of the LGIA would ensure system reliability in the California ISO grid and compliance with WECC/NERC and California ISO Planning standards. Condition of Certification TSE-5 requires the project owner to submit these documents to the CEC at least 60-days prior to the start of transmission facility construction (WECC 2006, NERC 2006, California ISO 2002a and 2007a).

D.5.3.3 CEQA LEVEL OF SIGNIFICANCE

Generally staff relies on the California ISO Phase I /System Impact Study to determine whether or not the proposed generation project will likely comply with reliability and to identify the transmission facilities required for reliable interconnection. For the Transition Cluster projects the Phase I Study does not provide an accurate forecast of impacts of the RSPP on the SCE transmission grid. The transmission upgrades identified in the Phase I Study are not reasonably foreseeable consequences of the proposed generating project. Relying on available information, staff is unable to identify any likely indirect project transmission impacts. Upon completion of the Phase II Study and the execution of the LGIA, the impacts of the RSPP on grid reliability will be identified. In order to ensure compliance with reliability LORS, Condition of Certification TSE-5 requires the submittal of the Phase II Study and the executed LGIA prior to the start of construction of transmission facilities (2009d, Phase I Interconnection Study report).

D5.3.3.1 DOWNSTREAM FACILITIES

The Phase II Study will determine what, if any, downstream reliability upgrades outside the existing substation fence lines will be needed to accommodate the proposed the proposed RSPP including the switchyard, the interconnection tie line and termination at the new SCE 230 kV substation. The study will include the California ISO's approved planned projects in the insufficient SCE east of Lugo area network. Consequently after execution of the LGIA with the applicant, the California ISO/SCE would proceed through the California Public Utilities Commission's Certificate of Public Convenience and Necessity (CPCN) permit process for construction of facilities, which would include any necessary CEQA and or NEPA analysis, related to any potential transmission system upgrades.

D.5.4 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because (1) it eliminates about 42 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources (desert tortoise and Mohave ground squirrel), cultural resources, and recreational uses, and (2) avoids constructing a solar facility in the Mohave Ground Squirrel Conservation Area (MGSCA).

D.5.4.1 SETTING AND EXISTING CONDITIONS

The Northern Unit Alternative would consist of 167 solar collector array loops with a net generating capacity of approximately 146 MW occupying approximately 1135 acres of

land. This alternative would retain 58 percent of the proposed solar array loops and would affect 58 percent of the land of the proposed 250 MW project. The boundaries of the Northern Unit Alternative are shown in **Alternatives Figure 1**.

D.5.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Similar to the proposed project, the Northern Unit Alternative would transmit power to the grid through the planned SCE 230-kV substation to be located near the proposed project site. The power block covering approximately 18 acres, would remain north of Brown Road, as proposed by the project and would include all operational power facilities, structures, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system). The proposed transmission line alignment is 3,900 ft and would connect to the proposed switchyard (5.5 acres) adjacent to the existing SCE 230kV transmission line, west of the proposed project. In addition, the site would require access roads, a parking lot, bio-remediation unit and main office building (3 acres) all of which are proposed north of Brown Road within the proposed project footprint (SM 2010a). The proposed 16.3 acre water line would remain at the location as proposed by the project. The Northern Unit Alternative would not require the relocation of the two existing SCE transmission lines. A smaller, 146 MW, project would likely have fewer impacts on existing transmission facilities than the proposed project but these impacts would be identified through the California ISO's Large Generator Interconnection Process.

D.5.4.3 CEQA LEVEL OF SIGNIFICANCE

As stated above, the Northern Unit Alternative is evaluated in this SA/DEIS because it would reduce some impacts of the project. Additionally, the Northern Unit Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals, while minimizing impacts to the desert environment. A limited acreage alternative was suggested in scoping comments.

D.5.5 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would be a 104 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because it eliminates about 58 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources, and cultural resources.

D.5.5.1 SETTING AND EXISTING CONDITIONS

The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of approximately 104 MW occupying approximately 826 acres of land. This alternative would retain 42 percent of the proposed solar array loops and would affect 42 percent of the land of the proposed 250 MW project.

The boundaries of the Southern Unit Alternative are shown in **Alternatives Figure 2**. This area was would avoid a large portion of the El Paso Wash and sensitive biological resources, including areas that were mapped as occupied tortoise and Mohave ground squirrel habitat (live tortoise and/or active burrows and sign).

D.5.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Similar to the proposed project, the Southern Unit Alternative would transmit power to the grid through the planned SCE 230-kV substation to be located near the proposed project site. The power block, spanning approximately 18 acres, would remain north of Brown Road, as proposed by the project and would include all operational power facilities, structures, transmission lines and related electrical system, potable and treated water tanks, and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system). The proposed transmission line alignment is 3,900 ft and would connect to the proposed switchyard (5.5 acres) adjacent to the existing SCE 230kV transmission line, west of the proposed project. In addition, the site would require access roads, a parking lot, bio-remediation unit and main office building (3 acres) all of which are proposed north of Brown Road (AECOM 2009). The proposed 16.3 acre water line would remain at the location as proposed by the project. Similar to the proposed project, the Southern Unit Alternative would require the relocation of the two existing SCE transmission lines, which would require approximately 58.2 acres. A smaller, 104 MW, project would likely have fewer impacts on existing transmission facilities than the proposed project but these impacts would be identified through the California ISO's Large Generator Interconnection Process.

D.5.5.3 CEQA LEVEL OF SIGNIFICANCE

As stated above, the Southern Unit Alternative is evaluated in this SA/DEIS because it would reduce some impacts of the project. Additionally, the Southern Unit Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals, while minimizing impacts to the desert environment. A limited acreage alternative was suggested in scoping comments.

D.5.6 ORIGINAL PROPOSED PROJECT ALTERNATIVE

The Original Proposed Project Alternative would be a 250 MW solar facility as originally proposed by Solar Millennium. This alternative is analyzed because it would reduce the amount of land developed within the Mojave Ground Squirrel Conservation Area and it could transmit the full 250 MW of power that Solar Millennium has requested.

D.5.6.1 SETTING AND EXISTING CONDITIONS

The Original Proposed Project Alternative would consist of 278 solar array loops with a net generating capacity of approximately 250 MW occupying approximately 1,760 acres of land. This alternative would occupy approximately 755 acres north of Brown Road and approximately 685 acres south of Brown Road. A shorter transmission interconnection would be needed, 1,250 feet as compared to the proposed project interconnection of 3,900 feet.

The boundaries of Original Proposed Alternative are shown in **Alternatives Figure 3**. This project footprint contains two desert ephemeral washes that would require

redirection and smaller dry desert washes also traverse the site. In addition this site is the location of prime desert tortoise and Mojave ground squirrel habitat.

D.5.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Similar to the proposed project, the Original Proposed Project Alternative would transmit power to the grid through the planned SCE 230-kV substation located near the proposed project site and would require infrastructure including a main office building (3 acres), power block, water line, transmission line, switch yard, access roads, parking area, bio-remediation unit and maintenance building (AECOM 2009). The off-site water line covers approximately 18 acres and proposed in the same location as the proposed project. In contrast to the proposed project, the bioremediation unit would be located north of Brown Road within the proposed project footprint. The power block and ancillary facilities would be located south of Brown Road on approximately 18 acres in addition to the transmission line and switch-yard (5.5 acres). The Original Proposed Project Alternative would require the relocation of the two existing SCE transmission lines. However, the proposed realignment would be reduced in length by 550 feet as compared to the proposed project.

As stated above, the Original Proposed Alternative is evaluated in this SA/DEIS because it reduces land developed with the MGSCA. Additionally, the Original Proposed Alternative would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals.

D.5.7 NO PROJECT/NO ACTION ALTERNATIVE

The No Project Alternative under CEQA or the No Action Alternative under NEPA defines the scenario that would exist if the proposed Ridgecrest Solar Power Project were not constructed. The CEQA Guidelines state that "the purpose of describing and analyzing a 'no project' alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project" (Cal. Code Regs., tit. 14 § 15126.6(i)). The No Project analysis in this SA/EIR considers existing conditions and "what would be reasonably expected to occur in the foreseeable future if the project were not approved…" (Cal. Code Regs, tit. 14 § 15126.6(e)(2)). Under NEPA, the No Action Alternative is used as a benchmark of existing conditions by which the public and decision makers can compare the environmental effects of the proposed action and the alternatives.

D.5.7.1 SETTING AND EXISTING CONDITIONS

If the No Project/No Action Alternative were selected, the construction and operational impacts of the Ridgecrest Solar Power Project would not occur. There would be no grading of the site, no loss of resources or disturbance of approximately 1944 acres of desert habitat, no impacts to cultural resources, and no installation of power generation and transmission equipment. The No Project/No Action Alternative would also eliminate contributions to cumulative impacts on a number of resources and environmental parameters in Kern County and in the Mojave Desert as a whole.

D.5.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

In the absence of the Ridgecrest Solar Power Project, however, other power plants, both renewable and non-renewable, would have to be constructed to serve the demand for electricity and to meet RPS. If the No Project/No Action Alternative were chosen, other utility-scale solar power facilities may be built, and the impacts to the environment may be similar to those of the proposed project because these technologies require large amounts of land similar to the Ridgecrest Solar Power Project. The No Project/No Action Alternative may also lead to siting of other non-solar renewable technologies to help achieve the California RPS. If the proposed project were not built, California would not benefit from the reduction in greenhouse gases that this facility would provide, and SCE would not receive the 250 MW contribution to its renewable state-mandated energy portfolio.

D.5.8 CUMULATIVE IMPACTS

Staff has reviewed the lists of existing and foreseeable projects as presented in the Cumulative Scenario section of this SA/DEIS. Staff's review considers whether the interconnection of RSPP to SCE's transmission system along with other existing and foreseeable generation projects would conform to all LORS required for safe and reliable electric power transmission. The analysis described above under the heading Proposed Project – Scope of System Impact Studies is conducted in coordination with, and the approval of, California ISO to consider existing and proposed generator interconnections to the transmission grid and their potential safety and reliability impacts under a number of conservative contingency conditions.

The cumulative marginal impacts to the safe and reliable operation of the transmission system due to the RSPP project, as identified in the Phase II Study, would be mitigated with the Energy Commission's and BLM's incorporation of the mitigation measures and CoC's set forth in this section.

D.5.9 COMPLIANCE WITH LORS

The proposed interconnection facilities including the RSPP 230 kV switchyard, 230 kV overhead tie line to the new SCE Millennium 230 kV substation, and its termination at the new 230 kV substation are adequate in accordance with industry standards and good utility practices, and are acceptable to staff according to engineering LORS.

The Phase I Study results were found very speculative and inaccurate due to inclusion of 12,305 MW cluster generation projects including the RSPP. The Phase II Study will be performed with 2,065 MW active cluster generation projects including the RSPP.

Consequently after execution of the LGIA with applicant, the California ISO/SCE would proceed through the California Utility Commission's Certificate of Public Convenience and Necessity (CPCN) permit process for construction of facilities, which would include necessary CEQA analysis.

Because the Phase 1 Study does not provide a meaningful analysis of the reliability impacts of interconnecting the RSPP, staff is unable to determine whether or not the project will comply with reliability LORS.

D.5.9.1 TRANSMISISON SYSTEM ENGINEERING LORS

- California Public Utilities Commission (CPUC) General Order 95 (GO-95), “Rules for Overhead Electric Line Construction,” formulates uniform requirements for construction of overhead lines. Compliance with this order ensures adequate service and safety to persons engaged in the construction, maintenance and operation or use of overhead electric lines and to the public in general.
- California Public Utilities Commission (CPUC) General Order 128 (GO-128), “Rules for Construction of Underground Electric Supply and Communications Systems,” formulates uniform requirements and minimum standards to be used for underground supply systems to ensure adequate service and safety to persons engaged in the construction, maintenance and operation or use of underground electric lines and to the public in general.
- The National Electric Safety Code, 1999 provides electrical, mechanical, civil and structural requirements for overhead electric line construction and operation.
- NERC/WECC Planning Standards: The Western Electricity Coordinating Council (WECC) Planning Standards are merged with the North American Electric Reliability Council (NERC) Planning Standards and provide the system performance standards used in assessing the reliability of the interconnected system. These standards require the continuity of service to loads as the first priority and preservation of interconnected operation as a secondary priority. Certain aspects of the NERC/WECC standards are either more stringent or more specific than the NERC standards alone. These standards provide planning for electric systems so as to withstand the more probable forced and maintenance outage system contingencies at projected customer demand and anticipated electricity transfer levels, while continuing to operate reliably within equipment and electric system thermal, voltage and stability limits. These standards include the reliability criteria for system adequacy and security, system modeling data requirements, system protection and control, and system restoration. Analysis of the WECC system is based to a large degree on Section I.A of the standards, “NERC and WECC Planning Standards with Table I and WECC Disturbance-Performance Table” and on Section I.D, “NERC and WECC Standards for Voltage Support and Reactive Power”. These standards require that the results of power flow and stability simulations verify defined performance levels. Performance levels are defined by specifying the allowable variations in thermal loading, voltage and frequency, and loss of load that may occur on systems during various disturbances. Performance levels range from no significant adverse effects inside and outside a system area during a minor disturbance (loss of load or a single transmission element out of service) to a level that seeks to prevent system cascading and the subsequent blackout of islanded areas during a major disturbance (such as loss of multiple 500 kV lines along a common right of way, and/or multiple generators). While controlled loss of generation or load or system separation is permitted in certain circumstances, their uncontrolled loss is not permitted (WECC 2006).

- North American Reliability Council (NERC) Reliability Standards for the Bulk Electric Systems of North America provide national policies, standards, principles and guidelines to assure the adequacy and security of the electric transmission system. The NERC Reliability Standards provide for system performance levels under normal and contingency conditions. With regard to power flow and stability simulations, while these Reliability Standards are similar to NERC/WECC Standards, certain aspects of the NERC/WECC Standards are either more stringent or more specific than the NERC Standards for Transmission System Contingency Performance. The NERC Reliability Standards apply not only to interconnected system operation but also to individual service areas (NERC 2006).
- California ISO Planning Standards also provide standards, and guidelines to assure the adequacy, security and reliability in the planning of the California ISO transmission grid facilities. The California ISO Grid Planning Standards incorporate the NERC/WECC and NERC Reliability Planning Standards. With regard to power flow and stability simulations, these Planning Standards are similar to the NERC/WECC or NERC Reliability Planning Standards for Transmission System Contingency Performance. However, the California ISO Standards also provide some additional requirements that are not found in the WECC/NERC or NERC Standards. The California ISO Standards apply to all participating transmission owners interconnecting to the California ISO controlled grid. They also apply when there are any impacts to the California ISO grid due to facilities interconnecting to adjacent controlled grids not operated by the California ISO (California ISO 2002a).
- California ISO/FERC Electric Tariff provides guidelines for construction of all transmission additions/upgrades (projects) within the California ISO controlled grid. The California ISO determines the "Need" for the proposed project where it will promote economic efficiency or maintain system reliability. The California ISO also determines the Cost Responsibility of the proposed project and provides an Operational Review of all facilities that are to be connected to the California ISO grid (California ISO 2007a)..

D.5.10 PROPOSED CONDITIONS OF CERTIFICATIONS/MITIGATION MEASURES

TSE-1 The project owner shall furnish to the CPM and to the CBO a schedule of transmission facility design submittals, a Master Drawing List, a Master Specifications List, and a Major Equipment and Structure List. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide designated packages to the CPM when requested.

Verification: Prior to the start of construction, the project owner shall submit the schedule, a Master Drawing List, and a Master Specifications List to the CBO and to the CPM. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment (see a list of major equipment in **Table 1: Major Equipment List** below). Additions and

deletions shall be made to the table only with CPM and CBO approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

Transmission System Engineering Table 1
Major Equipment List

Breakers
Step-up Transformer
Switchyard
Busses
Surge Arrestors
Disconnects and Wave-traps
Take off facilities
Electrical Control Building
Switchyard Control Building
Transmission Pole/Tower
Insulators and Conductors
Grounding System

TSE-2 Prior to the start of construction the project owner shall assign an electrical engineer and at least one of each of the following to the project:

A. A civil engineer;

B. A geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering;

C. A design engineer, who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; or

D. A mechanical engineer.

(Business and Professions Code Sections 6704 et seq., require state registration to practice as a civil engineer or structural engineer in California.)

The tasks performed by the civil, mechanical, electrical or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (e.g., proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer. The civil, geotechnical or civil and design engineer assigned in conformance with Facility Design condition **GEN-5**, may be responsible for design and review of the TSE facilities.

The project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all engineers assigned to the project. If any one of the designated engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer. This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform with predicted conditions used as a basis for design of earthwork or foundations.

The electrical engineer shall:

1. Be responsible for the electrical design of the power plant switchyard, outlet and termination facilities; and

2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

Verification: Prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all the responsible engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

TSE-3 If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend corrective action (1998 CBC, Chapter 1, Section 108.4, Approval Required; Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector; Appendix Chapter 33, Section 3317.7, Notification of Noncompliance). The discrepancy documentation shall become a controlled document and shall be submitted to the CBO for review and approval and shall reference this condition of certification.

Verification: The project owner shall submit a copy of the CBO's approval or disapproval of any corrective action taken to resolve a discrepancy to the CPM within 15 days of receipt. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action required to obtain the CBO's approval.

TSE-4 For the power plant switchyard, outlet line and termination, the project owner shall not begin any increment of construction until plans for that increment have been approved by the CBO. These plans, together with design changes and design change notices, shall remain on the site for one year after completion of construction. The project owner shall request that the CBO

inspect the installation to ensure compliance with the requirements of applicable LORS. The following activities shall be reported in the Monthly Compliance Report:

A. Receipt or delay of major electrical equipment;

B. Testing or energization of major electrical equipment; and

C. The number of electrical drawings approved, submitted for approval, and still to be submitted.

Verification: Prior to the start of each increment of construction, the project owner shall submit to the CBO for review and approval the final design plans, specifications and calculations for equipment and systems of the power plant switchyard, outlet line and termination, including a copy of the signed and stamped statement from the responsible electrical engineer attesting to compliance with the applicable LORS, and send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

TSE-5 The project owner shall ensure that the design, construction, and operation of the proposed transmission facilities will conform to all applicable LORS, and the requirements listed below. The project owner shall submit the required number of copies of the design drawings and calculations, as determined by the CBO. Once approved, the project owner shall inform the CPM and CBO of any anticipated changes to the design, and shall submit a detailed description of the proposed change and complete engineering, environmental, and economic rationale for the change to the CPM and CBO for review and approval.

A. The power plant outlet line shall meet or exceed the electrical, mechanical, civil, and structural requirements of CPUC General Order 95 or National Electric Safety Code (NESC); Title 8 of the California Code and Regulations (Title 8); Articles 35, 36 and 37 of the *High Voltage Electric Safety Orders*, California ISO standards, National Electric Code (NEC) and related industry standards.

B. Breakers and busses in the power plant switchyard and other switchyards, where applicable, shall be sized to comply with a short-circuit analysis.

C. Outlet line crossings and line parallels with transmission and distribution facilities shall be coordinated with the transmission line owner and comply with the owner's standards.

D. The project conductors shall be sized to accommodate the full output of the project.

E. Termination facilities shall comply with applicable SCE interconnection standards.

F. The project owner shall provide to the CPM:

i) The Special Protection System (SPS) sequencing and timing if applicable,

ii) A letter stating that the mitigation measures or projects selected by the transmission owners for each reliability criteria violation, for which the project is responsible, are acceptable,

iii) The final Phase II Interconnection Study, including a description of facility upgrades, operational mitigation measures, and/or special protection system sequencing and timing if applicable; and

iv) A copy of the executed LGIA signed by the California ISO and the project owner.

Verification: Prior to the start of construction or start of modification of transmission facilities, the project owner shall submit to the CBO for approval:

A. Design drawings, specifications, and calculations conforming with CPUC General Order 95 or National Electric Safety Code (NESC); Title 8 of the California Code and Regulations (Title 8); Articles 35, 36 and 37 of the *High Voltage Electric Safety Orders*, CA ISO standards, National Electric Code (NEC) and related industry standards, for the poles/towers, foundations, anchor bolts, conductors, grounding systems, and major switchyard equipment;

B. For each element of the transmission facilities identified above, the submittal package to the CBO shall contain the design criteria, a discussion of the calculation method(s), a sample calculation based on "worst case conditions"[1] and a statement signed and sealed by the registered engineer in responsible charge, or other acceptable alternative verification, that the transmission element(s) will conform with CPUC General Order 95 or National Electric Safety Code (NESC); Title 8 of the California Code and Regulations (Title 8); Articles 35, 36 and 37 of the *High Voltage Electric Safety Orders*, California ISO standards, National Electric Code (NEC), and related industry standards;

C. Electrical one-line diagrams signed and sealed by the registered professional electrical engineer in charge, a route map, and an engineering description of the equipment and configurations covered by requirements **TSE-5** a) through g);

D. The Special Protection System (SPS) sequencing and timing if applicable shall be provided concurrently to the CPM.

E. A letter stating that the mitigation measures or projects selected by the transmission owners for each reliability criteria violation, for which the project is responsible, are acceptable,

F. The final Phase II Interconnection Study, including a description of facility upgrades, operational mitigation measures, and/or special protection system sequencing and timing if applicable, and

G. A copy of the executed LGIA signed by the California ISO and the project owner.

[1] Worst-case conditions for the foundations would include for instance, a dead-end or angle pole.

Prior to the start of construction of or modification of transmission facilities, the project owner shall inform the CBO and the CPM of any anticipated changes to the design that are different from the design previously submitted and approved and shall submit a detailed description of the proposed change and complete engineering, environmental, and economic rationale for the change to the CPM and CBO for review and approval.

TSE-6 The project owner shall provide the following Notice to the California Independent System Operator (California ISO) prior to synchronizing the facility with the California Transmission system:

1. At least one week prior to synchronizing the facility with the grid for testing, provide the California ISO a letter stating the proposed date of synchronization; and

2. At least one business day prior to synchronizing the facility with the grid for testing, provide telephone notification to the California ISO Outage Coordination Department.

Verification: The project owner shall provide copies of the California ISO letter to the CPM when it is sent to the California ISO one week prior to initial synchronization with the grid. The project owner shall contact the California ISO Outage Coordination Department, Monday through Friday, between the hours of 0700 and 1530 at (916) 351-2300 at least one business day prior to synchronizing the facility with the grid for testing. A report of conversation with the California ISO shall be provided electronically to the CPM one day before synchronizing the facility with the California transmission system for the first time.

TSE-7 The project owner shall be responsible for the inspection of the transmission facilities during and after project construction, and any subsequent CPM and CBO approved changes thereto, to ensure conformance with CPUC GO-95 or NESC, Title 8, CCR, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", applicable interconnection standards, NEC and related industry standards. In case of non-conformance, the project owner shall inform the CPM and CBO in writing, within 10 days of discovering such non-conformance and describe the corrective actions to be taken.

Verification: Within 60 days after first synchronization of the project, the project owner shall transmit to the CPM and CBO:

A. "As built" engineering description(s) and one-line drawings of the electrical portion of the facilities signed and sealed by the registered electrical engineer in responsible charge. A statement attesting to conformance with CPUC GO-95 or NESC, Title 8, California Code of Regulations, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", and applicable interconnection standards, NEC, related industry standards, and these conditions shall be provided concurrently.

B. An "as built" engineering description of the mechanical, structural, and civil portion of the transmission facilities signed and sealed by the registered engineer in responsible charge or acceptable alternative verification. "As built" drawings of the

electrical, mechanical, structural, and civil portion of the transmission facilities shall be maintained at the power plant and made available, if requested, for CPM audit as set forth in the "Compliance Monitoring Plan".

C. A summary of inspections of the completed transmission facilities, and identification of any nonconforming work and corrective actions taken, signed and sealed by the registered engineer in charge.

D.5.11 CONCLUSIONS

1. The proposed interconnection facilities including the RSPP 230 kV switchyard, generator 230 kV overhead tie line to the new SCE Millennium 230 kV substation, and its termination at the new 230 kV substation are adequate in accordance with industry standards and good utility practices, and are acceptable to staff according to engineering LORS.

2. The Phase I Study results were not found to provide a meaningful analysis of the RSPP due to the inclusion of 12,305 MW cluster generation projects including the RSPP, which resulted in a significant number of reliability impacts and downstream major transmission. The Phase II Study will be performed with the 2,065 MW remaining cluster generation projects including RSPP. The Phase II study will provide an accurate identification of system impacts and a mitigation plan with downstream transmission upgrades. Consequently after completion of the Phase II Study and execution of the LGIA with applicant, the California ISO/SCE would proceed through the California Utility Commission's CPCN permit process for construction of facilities, which would include necessary CEQA analysis.

3. Because the Phase 1 Study does not provide a meaningful analysis of the reliability impacts of interconnecting the RSPP, staff is unable to determine whether or not the project will comply with reliability LORS.

4. The RSPP, as local solar generation, would provide clean renewable energy towards meeting state mandate and goals.

D.5.12 REFERENCES

California ISO (California Independent System Operator) 1998a. California ISO Tariff Scheduling Protocol posted April 1998, Amendments 1,4,5,6, and 7 incorporated.

California ISO (California Independent System Operator) 1998b. California ISO Dispatch Protocol posted April 1998.

California ISO (California Independent System Operator) 2002a. California ISO Planning Standards, February 7, 2002.

California ISO (California Independent System Operator) 2007a. California ISO, FERC Electric Tariff, First Replacement Vol. No. 1, March, 2007.

California ISO (California Independent System Operator) 2009a, Appendix Y - Large Generator Interconnection Procedures (LGIP) for Interconnection Requests in a Queue Cluster Window, http://www.caiso.com/2471/247199c130150.pdf.

SM 2009a - Solar Millenium LLC/J. Eichhammer (tn 53100). AFC for Ridgecrest Solar Power Project, dated 8/31/2009. Submitted to CEC/Docket Unit on 9/1/2009.

SM 2009c - Solar Millennium/ N. Tenenbaum 53251 Letter Regarding Confidential Cluster Phase I Interconnection Study 9/16/2009 Submitted to CEC/Docket Unit 9/16/2009.

SM 2009d - Solar Milenium 54005 Application for Certification Volume 3 Supplement 10/26/2009 Submitted to CEC/Docket Unit 10/30/2009.

SM 2010a - Solar Millennium/ A. Harron 55004 Applicant's Responses to CEC Data Request Set 1 & 2 with Bio Files 1/25/2010 Submitted to CEC/Docket Unit 1/25/2010.

NERC (North American Electric Reliability Council) 2006. Reliability Standards for the Bulk Electric Systems of North America, May 2 2006.

WECC (Western Electricity Coordinating Council) 2006. NERC/WECC Planning Standards, August 2006.

D.5.13 DEFINITION OF TERMS

ACSR	Aluminum cable steel reinforced.
AAC	All Aluminum conductor.
ACSS	Aluminum conductor steel-supported.
Ampacity	Current-carrying capacity, expressed in amperes, of a conductor at specified ambient conditions, at which damage to the conductor is nonexistent or deemed acceptable based on economic, safety, and reliability considerations.
Ampere	The unit of current flowing in a conductor.
Kiloampere (kA)	1,000 Amperes
Bundled	Two wires, 18 inches apart.
Bus	Conductors that serve as a common connection for two or more circuits.
Conductor	The part of the transmission line (the wire) that carries the current.

Congestion Management	Congestion management is a scheduling protocol, which provides that dispatched generation and transmission loading (imports) would not violate criteria.
Emergency Overload	See Single Contingency. This is also called an L-1.
Hertz	The unit for System Frequency.
Kcmil or KCM	Thousand circular mil. A unit of the conductor's cross sectional area, when divided by 1,273, the area in square inches is obtained.
Kilovolt (kV)	A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground. 1,000 Volts.
Loop	An electrical cul de sac. A transmission configuration that interrupts an existing circuit, diverts it to another connection and returns it back to the interrupted circuit, thus forming a loop or cul de sac.
MVAR or Megavars	Megavolt Ampere-Reactive. One million Volt-Ampere-Reactive. Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system.
Megavolt Ampere (MVA)	A unit of apparent power, equals the product of the line voltage in kilovolts, current in amperes, the square root of 3, and divided by 1000.
Megawatt (MW)	A unit of power equivalent to 1,341 horsepower.
Normal Operation/ Normal Overload	When all customers receive the power they are entitled to without interruption and at steady voltage, and no element of the transmission system is loaded beyond its continuous rating.
N-1 Condition	See Single Contingency.
Outlet	Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation facilities to the main grid.
Power Flow Analysis	A power flow analysis is a forward looking computer simulation of essentially all generation and transmission system facilities that identifies overloaded circuits, transformers and other equipment and system voltage levels.

Reactive Power	Reactive power is generally associated with the reactive nature of inductive loads like motor loads that must be fed by generation units in the system. An adequate supply of reactive power is required to maintain voltage levels in the system.
Remedial Action Scheme (RAS)	A remedial action scheme is an automatic control provision, which, for instance, would trip a selected generating unit upon a circuit overload.
SSAC	Steel Supported Aluminum Conductor.
SF6	Sulfur hexafluoride is an insulating medium.
Single Contingency	Also known as emergency or N-1 condition, occurs when one major transmission element (circuit, transformer, circuit breaker, etc.) or one generator is out of service.
Solid Dielectric Cable	Copper or aluminum conductors that are insulated by solid polyethylene type insulation and covered by a metallic shield and outer polyethylene jacket.
SVC	Static VAR Compensator: An equipment made of Capacitors and Reactors with electronic controls for producing and controlling Reactive Power in the Power System.
Switchyard	A power plant switchyard (switchyard) is an integral part of a power plant and is used as an outlet for one or more electric generators.
Thermal rating	See ampacity.
TSE	Transmission System Engineering.
TRV	Transient Recovery Voltage
Tap	A transmission configuration creating an interconnection through a sort single circuit to a small or medium sized load or a generator. The new single circuit line is inserted into an existing circuit by utilizing breakers at existing terminals of the circuit, rather than installing breakers at the interconnection in a new switchyard.
Undercrossing	A transmission configuration where a transmission line crosses below the conductors of another transmission line, generally at 90 degrees.

Underbuild A transmission or distribution configuration where a transmission or distribution circuit is attached to a transmission tower or pole below (under) the principle transmission line conductors.

VAR Voltage Ampere Reactive, a measure for Reactive power in the power system.

E GENERAL CONDITIONS INCLUDING COMPLIANCE MONITORING AND CLOSURE PLAN

Testimony of Dale Rundquist

E.1 INTRODUCTION

The project's General Compliance Conditions of Certification, including the Compliance Monitoring and Closure Plan (Compliance Plan) have been established as required by Public Resources Code Section 25532. The plan provides a means for assuring that the facility is constructed, operated, and closed in compliance with public health and safety, environmental and other applicable regulations, guidelines, and conditions adopted or established by the California Energy Commission and specified in the written decision on the Application for Certification or otherwise required by law. The Compliance Plan will be integrated with a U.S. Bureau of Land Management (BLM) Compliance Monitoring Plan (hereafter referred to as the Compliance Plan) to assure compliance with the terms and conditions of any approved Right-of-Way (ROW) grant including the approved Plan of Development (POD).

The Compliance Plan is composed of elements that:

- Set forth the duties and responsibilities of BLM's Authorized Officer, the Compliance Project Manager (CPM), the project owner/lease holder, delegate agencies, and others;
- Set forth the requirements for handling confidential records and maintaining the compliance record;
- State procedures for settling disputes and making post-certification changes;
- State procedures for requesting and approving ROW Grant or POD changes;
- State the requirements for periodic compliance reports and other administrative procedures that are necessary to verify the compliance status for all BLM and Energy Commission approved conditions of certification/mitigation measures;
- Establish requirements for modifications or amendments to facility closure, revegetation, and restoration plans; and
- Specify conditions of certification for each technical area containing the measures required to mitigate any and all potential adverse project impacts associated with construction, operation and closure. Each specific condition of certification also includes a verification provision that describes the method of assuring that the condition has been satisfied.

Conditions of Certification referred to herein serve the purpose of both the Energy Commission's Conditions of Certification for purposes of the California Environmental Quality Act (CEQA) and BLM's Mitigation Measures for purposes of the National Environmental Policy Act (NEPA).

E.2 DEFINITIONS

The following terms and definitions are used to establish when conditions of certification are implemented.

BLM AUTHORIZED OFFICER:

The BLM Authorized Officer for the Project is the BLM Ridgecrest Field Manager or his designated Compliance Inspector that is responsible for oversight and inspection of all construction and operational related activities on public land.

PRE-CONSTRUCTION SITE MOBILIZATION

Preconstruction activities allowed during site mobilization are limited to the installation of fencing, construction trailers, construction trailer utilities, and construction trailer parking at the site. Limited ground disturbance, grading, and trenching associated with the above mentioned pre-construction activities are considered part of site mobilization. Walking, driving or parking a passenger vehicle, pickup truck and/or light vehicle is allowable during site mobilization.

CONSTRUCTION

Onsite work to install permanent equipment or structures for any facility.

GROUND DISTURBANCE

Any ground disturbing activities that result in the removal or disturbance of top soil or vegetation.

GRADING, BORING, AND TRENCHING

Construction-related grading, boring, and trenching refers to activities that result in subsurface soil work at the site and for access roads and linear facilities, e.g., alteration of the topographical features such as leveling, removal of hills or high spots, moving of soil from one area to another, and/or removal of soil.

Notwithstanding the definitions of ground disturbance, grading, boring, and trenching above, construction does not include the following:

1. The installation of environmental monitoring equipment;

2. A soil or geological investigation;

3. A topographical survey;

4. Any other study or investigation to determine the environmental acceptability or feasibility of the use of the site for any particular facility; and

5. Any work to provide access to the site for any of the purposes specified in “Construction” 1, 2, 3, or 4 above except for the grading of roads to access the site.

START OF COMMERCIAL OPERATION

For compliance monitoring purposes, “commercial operation” begins after the completion of start-up and commissioning, and when the power plant has reached reliable steady-state production of electricity at the rated capacity. At the start of commercial operation, plant control is usually transferred from the construction manager to the plant operations manager.

E.3 BLM’S AUTHORIZED OFFICER AND COMPLIANCE PROJECT MANAGER RESPONSIBILITIES

BLM’s Authorized Officer (AO) or Compliance Inspector and the CEC’s Compliance Project Manager (CPM) shall oversee the compliance monitoring and are responsible for:

1. Ensuring that the design, construction, operation, and closure of the project facilities are in compliance with the terms and conditions of BLM’s ROW Grant and the Energy Commission Decision;

2. Resolving complaints;

3. Processing post-certification changes to the conditions of certification, project description (petition to amend), and ownership or operational control (petition for change of ownership) (See **COMPLIANCE-14** instructions for filing petitions);

4. Documenting and tracking compliance filings, and;

5. Ensuring that compliance files are maintained and accessible.

BLM’s AO is the main contact person for all construction BLM lands and will consult with appropriate responsible agencies and Energy Commission staff when handling disputes, complaints, and amendments. The CPM is the contact person for the Energy Commission and will assist the BLM with disputes, complaints, and amendments.

All project compliance submittals are submitted to BLM’s AO for processing. Where a submittal required by a condition of certification requires BLM’s AO and/or CPM approval, the approval will involve all appropriate BLM personnel, Energy Commission staff and management. All submittals must include searchable electronic versions (pdf or word files).

E.4 CHIEF BUILDING OFFICIAL RESPONSIBILITIES

The Chief Building Official (CBO) shall serve as BLM's and the Energy Commission's delegate to assure the project is designed and constructed in accordance with BLM's Right-of-Way Grant, the Energy Commission's Decision including Conditions of Certification, the California Building Standards Code, local building codes and

applicable laws, ordinances, regulations and standards to ensure health and safety. The CBO is typically made-up of a team of specialists covering civil, structural, mechanical, and electrical disciplines whose duties include the following:

1. Performing design review and plan checks of all drawings, specifications and procedures;

2. Conducting construction inspection;

3. Functioning as BLM's and the Energy Commission's delegate including reporting noncompliance issues or violations to the BLM Authorized Officer for action and taking any action, including issuing a Stop Work Order, to ensure compliance;

4. Exercising access as needed to all project owner/lease holder construction records, construction, and inspection procedures, test equipment and test results; and

5. Providing weekly reports on the status of construction to BLM's Authorized Officer and the CPM.

6. All construction documents shall be approved by the BLM's Authorized Office prior to any construction activity.

PRE-CONSTRUCTION AND PRE-OPERATION COMPLIANCE MEETING

BLM's AO and the CPM shall schedule pre-construction and pre-operation compliance meetings prior to the projected start-dates of construction, plant operation, or both. The purpose of these meetings is to assemble the technical staff of the BLM, the Energy Commission, the project owner/lease holder, and the construction contractor to review the status of all pre-construction or pre-operation requirements contained in BLM's and the Energy Commission's conditions of certification in order to confirm that all applicable conditions of certification have been met, or if they have not been met, to ensure that the proper action is taken. In addition, these meetings ensure, to the extent possible, that BLM and Energy Commission conditions will not delay the construction and operation of the plant due to oversight and to preclude any last minute, unforeseen issues from arising. Pre-construction meetings held during the certification process must be publicly noticed unless they are confined to administrative issues and processes.

BLM AND ENERGY COMMISSION RECORD

BLM and the Energy Commission shall maintain the following documents and information as a public record, in either the Energy Commission's Compliance file or Dockets file, for the life of the project (or other period as required):

- All documents demonstrating compliance with any legal requirements relating to the construction and operation of the facility;
- All monthly and annual compliance reports filed by the project owner/lease holder;
- All complaints of noncompliance filed with BLM and the Energy Commission; and
- All petitions/requests for project or condition of certification changes and the resulting BLM, Energy Commission staff or Energy Commission action.

E.5 PROJECT OWNER/LEASE HOLDER RESPONSIBILITIES

The project owner/lease holder is responsible for ensuring that the compliance conditions of certification and all other conditions of certification that appear in BLM's ROW Grant and the Energy Commission Decision are satisfied. The compliance conditions regarding post-certification changes specify measures that the project owner/lease holder must take when requesting changes in the project design, conditions of certification, or ownership. Failure to comply with any of the conditions of certification or compliance conditions may result in the reopening of the case and a revocation of the Energy Commission certification; an administrative fine; or other action as appropriate. A summary of the Compliance Conditions of Certification is included as Compliance Table 1 at the conclusion of this section. The BLM ROW grant holder will comply with the terms, conditions, and special stipulations of the ROW grant. Failure to comply with applicable laws or regulations or any of the terms and conditions of a BLM ROW grant may result in the suspension or termination of the ROW grant (43 CFR 2807.17). Prior to suspending or terminating an ROW grant, BLM will provide written notice to the holder stating it intends to suspend or terminate and will provide reasonable opportunity to correct any noncompliance.

E.6 COMPLIANCE MITIGATION MEASURES/CONDITIONS OF CERTIFICATION

UNRESTRICTED ACCESS (COMPLIANCE-1)

BLM's AO, responsible BLM staff, the CPM, responsible Energy Commission staff, and delegated agencies or consultants shall be guaranteed and granted unrestricted access to the power plant site, related facilities, project-related staff, and the records maintained on-site for the purpose of conducting audits, surveys, inspections, or general site visits. Although BLM's AO and the CPM will normally schedule site visits on dates and times agreeable to the project owner/lease holder, BLM's AO and the CPM reserve the right to make unannounced visits at any time.

COMPLIANCE RECORD (COMPLIANCE-2)

The project owner/lease holder shall maintain project files on-site or at an alternative site approved by BLM's AO and the CPM for the life of the project, unless a lesser period of time is specified by the conditions of certification. The files shall contain copies of all "as-built" drawings, documents submitted as verification for conditions, and other project-related documents. As-built drawings of all facilities including linear facilities shall be provided to the BLM AO for inclusion in the BLM administrative record, and to the Energy Commission CBO, within 90-days of completion of that portion of the facility or project.

BLM and Energy Commission staff and delegate agencies shall, upon request to the project owner/lease holder, be given unrestricted access to the files maintained pursuant to this condition.

COMPLIANCE VERIFICATION SUBMITTALS (COMPLIANCE-3)

Each condition of certification is followed by a means of verification. The verification describes the Energy Commission's procedure(s) to ensure post-certification compliance with adopted conditions. The verification procedures, unlike the conditions, may be modified as necessary by BLM's AO and the CPM. (See **COMPLIANCE-14** for requirements to modify conditions of certification.)

Verification of compliance with the conditions of certification can be accomplished by the following:

1. Monthly and/or annual compliance reports filed by the project owner/lease holder or authorized agent, reporting on work done and providing pertinent documentation, as required by the specific conditions of certification;

2. Appropriate letters from delegate agencies verifying compliance;

3. BLM and Energy Commission staff audits of project records; and/or

4. BLM and Energy Commission staff inspections of work, or other evidence that the requirements are satisfied.

Verification lead times associated with start of construction may require the project owner to file submittals during the certification process, particularly if construction is planned to commence shortly after certification.

A cover letter from the project owner/lease holder or authorized agent is required for all compliance submittals and correspondence pertaining to compliance matters. The cover letter subject line shall identify the project by AFC number, the appropriate condition(s) of certification by condition number(s), and a brief description of the subject of the submittal. The project owner/lease holder shall also identify those submittals not required by a condition of certification with a statement such as: "This submittal is for information only and is not required by a specific condition of certification." When submitting supplementary or corrected information, the project owner/lease holder shall reference the date of the previous submittal and BLM/Energy Commission condition number.

The project owner/lease holder is responsible for the delivery and content of all verification submittals to the BLM's AO and CPM, whether such condition was satisfied by work performed by the project owner/lease holder or an agent of the project owner/lease holder.

All hardcopy submittals shall be addressed to each of the following:

BLM's Authorized Officer
(CACA-xxxxx, xxxxx, xxxxx, and xxxxx)
U.S. Bureau of Land Management
ADDRESS
CITY, STATE ZIP

Dale Rundquist, CPM
(09-AFC-9C)
California Energy Commission
1516 Ninth Street, MS-2000
Sacramento, CA 95814

Those submittals shall be accompanied by a searchable electronic copy, on a CD, or by e-mail, as agreed upon by BLM's AO and the CPM.

If the project owner/lease holder desires BLM and/or Energy Commission staff action by a specific date, that request shall be made in the submittal cover letter and shall include a detailed explanation of the effects on the project if that date is not met.

PRE-CONSTRUCTION MATRIX AND TASKS PRIOR TO START OF CONSTRUCTION (COMPLIANCE-4)

Prior to commencing construction, a compliance matrix addressing only those conditions that must be fulfilled before the start of construction shall be submitted by the project owner/lease holder to BLM's AO and the CPM. This matrix will be included with the project owner/lease holder's first compliance submittal or prior to the first pre-construction meeting, whichever comes first. It will be submitted in the same format as the compliance matrix described below. In order to begin any on-site mobilization or surface disturbing activities on public land, the BLM AO must approve a written Notice to Proceed (NTP). NTPs will be phased as appropriate to facilitate timely implementation of construction.

Construction shall not commence until the pre-construction matrix is submitted, all pre-construction conditions have been complied with, and BLM's AO and the CPM have issued a letter and BLM has issued an NTP to the project owner/lease holder authorizing construction. Various lead times for submittal of compliance verification documents to BLM's AO and the CPM for conditions of certification are established to allow sufficient BLM and Energy Commission staff time to review and comment and, if necessary, allow the project owner/lease holder to revise the submittal in a timely manner. This will ensure that project construction may proceed according to schedule.

Failure to submit compliance documents within the specified lead-time may result in delays in authorization to commence various stages of project development.

If the project owner/lease holder anticipates commencing project construction as soon as the project is certified, it may be necessary for the project owner/lease holder to file compliance submittals prior to project certification. Compliance submittals should be completed in advance where the necessary lead time for a required compliance event extends beyond the date anticipated for start of construction. The project owner/lease holder must understand that the submittal of compliance documents prior to project certification is at the owner/lease holder's own risk, pending project approval. Any submittal approved by Energy Commission staff is subject to change, based upon BLM's ROW Grant and the Energy Commission Decision.

Compliance Reporting

There are two different compliance reports that the project owner/lease holder must submit to assist BLM's AO and the CPM in tracking activities and monitoring compliance with the terms and conditions of BLM's ROW Grant and the Energy Commission Decision. During construction, the project owner/lease holder or authorized agent will submit monthly compliance reports. During operation, an annual compliance report must be submitted. These reports, and the requirement for an accompanying

compliance matrix, are described below. The majority of the conditions of certification require that compliance submittals be submitted to BLM's AO and the CPM in the monthly or annual compliance reports.

POSTING OF A SURETY BOND (COMPLIANCE-5)

Prior to site disturbance and each increment of construction, the project owner/lease holder shall post a surety bond adequate to cover the cost of decommissioning and restoration, including the removal of the project features that have been constructed for that portion of the site and restoring the native topography and vegetation. An "increment of construction" shall mean a significant feature of construction, such as site grading, a building, a fluid storage tank, a water treatment facility, a hydrogen production facility, a switchyard, or a group of solar collectors connected to an electrical transformer (including that transformer). This surety bond will apply to all site disturbance features.

The project owner/lease holder shall provide the surety bond to the BLM AO for approval and to the CPM for review with written evidence indicating that the surety bond is adequate to cover the cost of decommissioning and removing the project features constructed, allowing for site restoration. The written evidence shall include a valid estimate showing that the amount of the bond is adequate to accomplish such work. The timing for the submittal of the surety bond and approval of this document shall be coordinated with the BLM AO and CPM. Over the life of the project, the surety bond will be updated as necessary to account for any changes to the project description and/or decommissioning costs.

COMPLIANCE MATRIX (COMPLIANCE-6)

A compliance matrix shall be submitted by the project owner/lease holder to BLM's AO and the CPM along with each monthly and annual compliance report. The compliance matrix is intended to provide BLM's AO and the CPM with the current status of all conditions of certification in a spreadsheet format. The compliance matrix must identify:

1. The technical area;

2. The condition number;

3. A brief description of the verification action or submittal required by the condition;

4. The date the submittal is required (e.g., 60 days prior to construction, after final inspection, etc.);

5. The expected or actual submittal date;

6. The date a submittal or action was approved by the Chief Building Official (CBO), BLM's AO, CPM, or delegate agency, if applicable;

7. The compliance status of each condition, e.g., "not started," "in progress" or "completed" (include the date); and

8. If the condition was amended, the date of the amendment.

Satisfied conditions shall be placed at the end of the matrix.

MONTHLY COMPLIANCE REPORT (COMPLIANCE-7)

The first monthly compliance report is due one month following the Energy Commission business meeting date upon which the project was approved, unless otherwise agreed to by BLM's AO and the CPM. The first monthly compliance report shall include the AFC number and an initial list of dates for each of the events identified on the Key Events List. The Key Events List Form is found at the end of this section.

During pre-construction and construction of each power plant, the project owner/lease holder or authorized agent shall submit an original and an electronic searchable version of the monthly compliance report within 10 working days after the end of each reporting month or other period of time agreed to by BLM's AO and the CPM. Monthly compliance reports shall clearly identify the reporting month. The reports shall contain, at a minimum:

1. A summary of the current project construction status, a revised/updated schedule if there are significant delays, and an explanation of any significant changes to the schedule;

2. Documents required by specific conditions to be submitted along with the monthly compliance report. Each of these items must be identified in the transmittal letter, as well as the conditions they satisfy and submitted as attachments to the monthly compliance report;

3. An initial, and thereafter updated, compliance matrix showing the status of all conditions of certification (fully satisfied conditions do not need to be included in the matrix after they have been reported as completed);

4. A list of conditions that have been satisfied during the reporting period, and a description or reference to the actions that satisfied the condition;

5. A list of any submittal deadlines that were missed, accompanied by an explanation and an estimate of when the information will be provided;

6. A cumulative listing of any approved changes to conditions of certification;

7. A listing of any filings submitted to, or permits issued by, other governmental agencies during the month;

8. A projection of project compliance activities scheduled during the next two months. The project owner/lease holder shall notify BLM's AO and the CPM as soon as any changes are made to the project construction schedule that would affect compliance with conditions of certification;

9. A listing of the month's additions to the on-site compliance file; and

10. A listing of complaints, notices of violation, official warnings, and citations received during the month, a description of the resolution of the resolved actions, and the status of any unresolved actions.

All sections, exhibits, or addendums shall be separated by tabbed dividers or as acceptable by BLM's AO and the CPM.

ANNUAL COMPLIANCE REPORT (COMPLIANCE-8)

After construction of each power plant is complete or when a power plant goes into commercial operations, the project owner/lease holder shall submit annual compliance reports instead of monthly compliance reports. The reports are for each year of commercial operation and are due to BLM's AO and the CPM each year at a date agreed to by BLM's AO and the CPM. Annual compliance reports shall be submitted over the life of the project unless otherwise specified by BLM's AO and the CPM. Each annual compliance report shall include the AFC number, identify the reporting period and shall contain the following:

1. An updated compliance matrix showing the status of all conditions of certification (fully satisfied conditions do not need to be included in the matrix after they have been reported as completed);

2. A summary of the current project operating status and an explanation of any significant changes to facility operations during the year;

3. Documents required by specific conditions to be submitted along with the annual compliance report. Each of these items must be identified in the transmittal letter, with the condition it satisfies, and submitted as attachments to the annual compliance report;

4. A cumulative listing of all post-certification changes by the Energy Commission or changes to the BLM ROW grant or approved POD by BLM , or cleared by BLM's AO and the CPM;

5. An explanation for any submittal deadlines that were missed, accompanied by an estimate of when the information will be provided;

6. A listing of filings submitted to, or permits issued by, other governmental agencies during the year;

7. A projection of project compliance activities scheduled during the next year;

8. A listing of the year's additions to the on-site compliance file;

9. An evaluation of the on-site contingency plan for unplanned facility closure, including any suggestions necessary for bringing the plan up to date [see Compliance Conditions for Facility Closure in section E.8]; and

10. A listing of complaints, notices of violation, official warnings, and citations received during the year, a description of the resolution of any resolved matters, and the status of any unresolved matters.

CONFIDENTIAL INFORMATION (COMPLIANCE-9)

Any information that the project owner/lease holder deems confidential shall be submitted to the Energy Commission's executive director with an application for confidentiality pursuant to Title 20, California Code of Regulations, Section 2505(a). Any information that is determined to be confidential shall be kept confidential as provided for in Title 20, California Code of Regulations, Section 2501 et. seq.

Any information the ROW holder deems confidential shall be submitted to the BLM AO with a written request for said confidentiality along with a justification for the request. All confidential submissions to BLM should be clearly stamped "proprietary information" by the holder when submitted.

ANNUAL ENERGY FACILITY COMPLIANCE FEE (COMPLIANCE-10)

Pursuant to the provisions of Section 25806(b) of the Public Resources Code, the project owner/lease holder is required to pay an annual compliance fee, which is adjusted annually. Current compliance fee information is available on the Energy Commission's website http://www.energy.ca.gov/siting/filing_fees.html. You may also contact the CPM for the current fee information. The initial payment is due on the date the Energy Commission adopts the final decision. All subsequent payments are due by July 1 of each year in which the facility retains its certification. The payment instrument shall be made payable to the California Energy Commission and mailed to: Accounting Office MS-02, California Energy Commission, 1516 9th St., Sacramento, CA 95814.

REPORTING OF COMPLAINTS, NOTICES, AND CITATIONS (COMPLIANCE-11)

Prior to the start of construction, the project owner/lease holder must send a letter to property owners living within one mile of the project notifying them of a telephone number to contact project representatives with questions, complaints, or concerns. If the telephone is not staffed 24 hours per day, it shall include automatic answering with date and time stamp recording. All recorded complaints shall be responded to within 24 hours. The telephone number shall be posted at the project site and made easily visible to passersby during construction and operation. The telephone number shall be provided to BLM's AO and the CPM who will post it on the Energy Commission's web page at:

http://www.energy.ca.gov/sitingcases/power_plants_contacts.html

Any changes to the telephone number shall be submitted immediately to BLM's AO and the CPM, who will update the web page.

In addition to the monthly and annual compliance reporting requirements described above, the project owner/lease holder shall report and provide copies to BLM's AO and the CPM of all complaint forms, including noise and lighting complaints, notices of violation, notices of fines, official warnings, and citations, within 10 days of receipt. Complaints shall be logged and numbered. Noise complaints shall be recorded on the form provided in the **NOISE** conditions of certification. All other complaints shall be recorded on the complaint form (Attachment 1).

E.7 FACILITY CLOSURE

At some point in the future, the project will cease operation and close down. At that time, it will be necessary to implement the Closure, Revegetation and Restoration Plan to ensure that the closure occurs in such a way that public health and safety and the environment are protected from adverse impacts. Although the project setting for this project does not appear, at this time, to present any special or unusual closure problems, it is impossible to foresee what the situation will be in 30 years or more when the project ceases operation. Therefore, provisions must be made that provide the flexibility to deal with the specific situation and project setting that exist at the time of closure. Laws, ordinances, regulations, and standards (LORS) pertaining to facility closure are identified in the sections dealing with each technical area. Facility closure will be consistent with LORS in effect at the time of closure. Closure would be conducted in accordance with Condition of Certification **BIO-14** that requires the project owner/lease holder to develop and implement a Closure, Revegetation and Rehabilitation Plan.

There are at least three circumstances in which a facility closure can take place: planned closure, unplanned temporary closure, and unplanned permanent closure.

CLOSURE DEFINITIONS

Planned Closure

A planned closure occurs when the facility is closed in an anticipated, orderly manner, at the end of its useful economic or mechanical life, or due to gradual obsolescence.

Unplanned Temporary Closure

An unplanned temporary closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a natural disaster or an emergency. Short-term is defined as cessation of construction activities or operations of a power plant for a period less than 6-months long. Cessation of construction of operations for a period longer than 6 months in considered a permanent closure.

Unplanned Permanent Closure

An unplanned permanent closure occurs if the project owner/lease holder closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unplanned closure where the owner/lease holder implements the on-site contingency plan. It can also include unplanned closure where the project owner/lease holder fails to implement the contingency plan, and the project is essentially abandoned.

E.8 COMPLIANCE CONDITIONS FOR FACILITY CLOSURE

PLANNED CLOSURE (COMPLIANCE-11)

In order to ensure that a planned facility closure does not create adverse impacts, a closure process that provides for careful consideration of available options and

applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of closure will be undertaken. To ensure adequate review of a planned project closure, the project owner/lease holder shall submit a revision or update to the approved Closure, Revegetation and Rehabilitation Plan to BLM and the Energy Commission for review and approval at least 12 months (or other period of time agreed to by BLM's AO and the CPM) prior to commencement of closure activities. The project owner/lease holder shall file 50 copies and 50 CDs with the Energy Commission and 10 copies and 10 CDs with BLM (or other number of copies agreed upon by BLM's AO and the CPM) of a proposed facility closure plan/Closure, Revegetation and Rehabilitation Plan.

The plan shall:

1. Identify and discuss any impacts and mitigation to address significant adverse impacts associated with proposed closure activities and to address facilities, equipment, or other project related materials that must be removed from the site;

2. Identify a schedule of activities for closure of the power plant site, transmission line corridor, and all other appurtenant facilities constructed as part of the project;

3. Address conformance of the plan with all applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of facility closure, and applicable conditions of certification; and

4. Address any changes to the site revegetation, rehabilitation, monitoring and long-term maintenance specified in the existing plan that are needed for site revegetation and rehabilitation to be successful.

Prior to submittal of an amended or revised Closure, Revegetation and Restoration Plan, a meeting shall be held between the project owner/lease holder, BLM's AO and the Energy Commission CPM for the purpose of discussing the specific contents of the plan.

In the event that there are significant issues associated with the proposed facility Closure, Revegetation and Restoration plan's approval, or the desires of local officials or interested parties are inconsistent with the plan, BLM's AO the CPM shall hold one or more workshops and/or BLM and the Energy Commission may hold public hearings as part of its approval procedure.

As necessary, prior to or during the closure plan process, the project owner/lease holder shall take appropriate steps to eliminate any immediate threats to public health and safety and the environment, but shall not commence any other closure activities until BLM and the Energy Commission approve the facility Closure, Revegetation and Restoration plan.

UNPLANNED TEMPORARY CLOSURE/ON-SITE CONTINGENCY PLAN (COMPLIANCE-12)

In order to ensure that public health and safety and the environment are protected in the event of an unplanned temporary facility closure, it is essential to have an On-Site

Contingency Plan in place. The On-Site Contingency Plan will help to ensure that all necessary steps to mitigate public health and safety impacts and environmental impacts are taken in a timely manner.

The project owner/lease holder shall submit an On-Site Contingency Plan for BLM's AO and CPM review and approval. The plan shall be submitted no less than 60 days (or other time agreed to by BLM's AO and the CPM) after approval of any NTP or letter granting approval to commence construction for each phase of construction. A copy of the approved plan must be in place during commercial operation of the facility and shall be kept at the site at all times.

The project owner/lease holder, in consultation with BLM's AO and the CPM, will update the On-Site Contingency Plan as necessary. BLM's AO and the CPM may require revisions to the On-Site Contingency Plan over the life of the project. In the annual compliance reports submitted to the Energy Commission, the project owner/lease holder will review the On-Site Contingency Plan and recommend changes to bring the plan up to date. Any changes to the plan must be approved by BLM's AO and the CPM.

The On-Site Contingency Plan shall provide for taking immediate steps to secure the facility from trespassing or encroachment. In addition, for closures of more than 90 days, unless other arrangements are agreed to by BLM's AO and the CPM, the plan shall provide for removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment, and the safe shutdown of all equipment. (Also see specific conditions of certification for the technical areas of Hazardous Materials Management and Waste Management.)

In addition, consistent with requirements under unplanned permanent closure addressed below, the nature and extent of insurance coverage, and major equipment warranties must also be included in the On-Site Contingency Plan. In addition, the status of the insurance coverage and major equipment warranties must be updated in the annual compliance reports.

In the event of an unplanned temporary closure, the project owner/lease holder shall notify BLM's AO and the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the On-Site Contingency Plan. The project owner/lease holder shall keep BLM's AO and the CPM informed of the circumstances and expected duration of the closure.

If BLM's AO and the CPM determine that an unplanned temporary closure is likely to be permanent, or for a duration of more than six months, a Closure Plan consistent with the requirements for a planned closure shall be developed and submitted to BLM's AO and the CPM within 90 days of BLM's AO and the CPM's determination (or other period of time agreed to by BLM's AO and the CPM).

UNPLANNED PERMANENT CLOSURE/ON-SITE CONTINGENCY PLAN (COMPLIANCE-13)

The On-Site Contingency Plan required for unplanned temporary closure shall also cover unplanned permanent facility closure. All of the requirements specified for unplanned temporary closure shall also apply to unplanned permanent closure. In addition, the On-Site Contingency Plan shall address how the project owner/lease holder will ensure that all required closure steps will be successfully undertaken in the event of abandonment.

In the event of an unplanned permanent closure, the project owner/lease holder shall notify BLM's AO and the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the On-Site Contingency Plan. The project owner/lease holder shall keep BLM's AO and the CPM informed of the status of all closure activities.

To ensure that public health and safety and the environment are protected in the event of an unplanned temporary closure, the project owner/lease holder shall submit an On-Site Contingency Plan no less than 60 days after a NTP is issued for each phase of development.

POST CERTIFICATION CHANGES TO BLM'S ROW GRANT AND/OR THE ENERGY COMMISSION DECISION: AMENDMENTS, OWNERSHIP CHANGES, STAFF APPROVED PROJECT MODIFICATIONS, AND VERIFICATION CHANGES (COMPLIANCE-14)

The project owner/lease holder must petition the Energy Commission pursuant to Title 20, California Code of Regulations, Section 1769, in order to modify the project (including linear facilities) design, operation or performance requirements, and to transfer ownership or operational control of the facility. The BLM ROW holder must file a written request in the form of an application to the BLM AO in order to change the terms and conditions of their ROW grant or POD. Written requests will be in a manner prescribed by the BLM AO.

It is the responsibility of the project owner/lease holder to contact BLM's AO and the CPM to determine if a proposed project change should be considered a project modification pursuant to Title 20, California Code of Regulations, Section 1769. Implementation of a project modification without first securing BLM and either Energy Commission or Energy Commission staff approval, may result in enforcement action that could result in civil penalties in accordance with Section 25534 of the Public Resources Code.

A petition is required for amendments and for staff approved project modifications as specified below. Both shall be filed as a "Petition to Amend." Staff will determine if the change is significant or insignificant. For verification changes, a letter from the project owner/lease holder is sufficient. In all cases, the petition or letter requesting a change should be submitted to BLM's AO and the CPM, who will file it with the Energy Commission's Dockets Unit in accordance with Title 20, California Code of Regulations, Section 1209.

The criteria that determine which type of approval and the process that applies are explained below. They reflect the provisions of Title 20, California Code of Regulations, Section 1769 at the time this condition was drafted. If the Commission's rules regarding amendments are amended, the rules in effect at the time an amendment is requested shall apply.

Amendment

The project owner/lease holder shall petition the Energy Commission, pursuant to Title 20, California Code of Regulations, Section 1769(a), when proposing modifications to the project (including linear facilities) design, operation, or performance requirements. If a proposed modification results in the deletion or change of a condition of certification, or makes changes that would cause the project not to comply with any applicable laws, ordinances, regulations, or standards, the petition will be processed as a formal amendment to the Energy Commission's final decision, which requires public notice and review of the BLM-Energy Commission staff analysis, and approval by the full Energy Commission. The petition shall be in the form of a legal brief and fulfill the requirements of Section 1769(a). Upon request, the CPM will provide you with a sample petition to use as a template.

The ROW holder shall file an application to amend the BLM ROW grant for any substantial deviation or change in use. The requirements to amend a ROW grant are the same as when filing a new application including paying processing and monitoring fees and rent.

Staff Approved Project Modification

Modifications that do not result in deletions or changes to conditions of certification, and that are compliant with laws, ordinances, regulations, and standards, may be authorized by BLM's AO and the CPM as a staff approved project modification (SAPM) pursuant to Title 20, California Code of Regulations, Section 1769(a) (2). This process usually requires minimal time to complete, and requires an Energy Commission 14-day public review of the Notice of SAPM that includes the BLM and Energy Commission staff's intention to approve the modification unless substantive objections are filed. These requests must also be submitted in the form of a "Petition to Amend" as described above. BLM and the Energy Commission intend to integrate a process to jointly approve SAPMs to avoid duplication of approval processes and ensure appropriate documentation for the public record.

Change of Ownership

Change of ownership or operational control also requires that the project owner/lease holder file a petition pursuant to Title 20, California Code of Regulations, Section 1769(b). This process requires public notice and approval by the full Commission and BLM. The petition shall be in the form of a legal brief and fulfill the requirements of Title 20, California Code of Regulations, Section 1769(b). Upon request, the CPM will provide a sample petition to use as a template. The transfer of ownership of a BLM ROW grant must be through the filing of an application for assignment of the grant.

Verification Change

A verification may be modified by BLM's AO and the CPM without requesting an amendment to the ROW Grant or Energy Commission decision if the change does not require modifying any conditions of certification and provides an effective alternate means of verification.

E.9 CBO DELEGATION AND AGENCY COOPERATION

In performing construction and operation monitoring of the project, BLM and Energy Commission staff act as, and have the authority of, the Chief Building Official (CBO). BLM and Energy Commission staff may delegate CBO responsibility an independent third party contractor. BLM and the Energy Commission intend to avoid duplication by integrating the responsibilities of the CBO with those of a BLM compliance inspector and will work jointly in the selection of a CBO. BLM and Energy Commission staff retain CBO authority when selecting a delegate CBO, including enforcing and interpreting federal, state, and local codes, and use of discretion, as necessary, in implementing the various codes and standards.

BLM and Energy Commission staff may also seek the cooperation of state, regional, and local agencies that have an interest in environmental protection when conducting project monitoring.

E.10 ENFORCEMENT

BLM's legal authority to enforce the terms and conditions of its ROW Grant is specified in 43 CFR 2807.16 to 2807.19. BLM may issue an immediate temporary suspension of activities it they determine a holder has violated one or more of the terms, conditions, or stipulations of the grant. BLM may also suspend or terminate an ROW grant if a holder does not comply with applicable laws and regulation or any terns, conditions, or special stipulations contained in the grant. Prior to suspending or terminating an ROW grant, BLM will provide written notice to the holder stating it intends to suspend or terminate and will provide reasonable opportunity to correct any noncompliance.

The Energy Commission's legal authority to enforce the terms and conditions of its Decision is specified in Public Resources Code Sections 25534 and 25900. The Energy Commission may amend or revoke the certification for any facility, and may impose a civil penalty for any significant failure to comply with the terms or conditions of the Energy Commission Decision. The specific action and amount of any fines the Energy Commission may impose would take into account the specific circumstances of the incident(s). This would include such factors as the previous compliance history, whether the cause of the incident involves willful disregard of LORS, oversight, unforeseeable events, and other factors the Energy Commission may consider.

ENERGY COMMISSION NONCOMPLIANCE COMPLAINT PROCEDURES

Any person or agency may file a complaint alleging noncompliance with the conditions of certification. Such a complaint will be subject to review by the Energy Commission

pursuant to Title 20, California Code of Regulations, Section 1237, but in many instances the noncompliance can be resolved by using the informal dispute resolution process. Both the informal and formal complaint procedure, as described in current state law and regulations, are described below. They shall be followed unless superseded by future law or regulations.

Informal Dispute Resolution Process

The following procedure is designed to informally resolve disputes concerning the interpretation of compliance with the requirements of this compliance plan. The project owner/lease holder, the Energy Commission, or any other party, including members of the public, may initiate an informal dispute resolution process. Disputes may pertain to actions or decisions made by any party, including the Energy Commission's delegate agents.

This process may precede the more formal complaint and investigation procedure specified in Title 20, California Code of Regulations, Section 1237, but is not intended to be a substitute for, or prerequisite to it. This informal procedure may not be used to change the terms and conditions of certification as approved by the Energy Commission, although the agreed upon resolution may result in a project owner/lease holder, or in some cases the Energy Commission staff, proposing an amendment.

The process encourages all parties involved in a dispute to discuss the matter and to reach an agreement resolving the dispute. If a dispute cannot be resolved, then the matter must be brought before the full Energy Commission for consideration via the complaint and investigation procedure.

Request for Informal Investigation

Any individual, group, or agency may request the Energy Commission to conduct an informal investigation of alleged noncompliance with the Energy Commission's terms and conditions of certification. All requests for informal investigations shall be made to the designated CPM.

Upon receipt of a request for informal investigation, the CPM shall promptly notify the project owner/lease holder of the allegation by telephone and letter. All known and relevant information of the alleged noncompliance shall be provided to the project owner/lease holder, BLM and to the Energy Commission staff. The CPM will evaluate the request and the information to determine if further investigation is necessary. If the CPM finds that further investigation is necessary, the project owner/lease holder will be asked to promptly investigate the matter. Within seven working days of the CPM's request, the project owner/lease holder shall provide a written report to the CPM of the results of the investigation, including corrective measures proposed or undertaken. Depending on the urgency of the noncompliance matter, the CPM may conduct a site visit and/or request the project owner/lease holder to also provide an initial verbal report, within 48 hours.

Request for Informal Meeting

In the event that either the party requesting an investigation or the Energy Commission staff is not satisfied with the project owner/lease holder's report, investigation of the

event, or corrective measures proposed or undertaken, either party may submit a written request to the CPM for a meeting with the project owner/lease holder. Such request shall be made within 14 days of the project owner/lease holder's filing of its written report. Upon receipt of such a request, the CPM shall:

1. Immediately schedule a meeting with the requesting party and the project owner/lease holder, to be held at a mutually convenient time and place;

2. Secure the attendance of appropriate Energy Commission staff and staff of any other agencies with expertise in the subject area of concern, as necessary;

3. Conduct such meeting in an informal and objective manner so as to encourage the voluntary settlement of the dispute in a fair and equitable manner;

4. Promptly prepare and distribute copies to all in attendance and to the project file, after the conclusion of such a meeting, a summary memorandum that fairly and accurately identifies the positions of all parties and any understandings reached. If an agreement has not been reached, the CPM shall inform the complainant of the formal complaint process and requirements provided under Title 20, California Code of Regulations, Section 1230 et seq.

Formal Dispute Resolution Procedure-Complaints and Investigations

Any person may file a complaint with the Energy Commission's Dockets Unit alleging noncompliance with a Commission decision adopted pursuant to Public Resources Code Section 25500. Requirements for complaint filings and a description of how complaints are processed are in Title 20, California Code of Regulations, Section 1237.

KEY EVENTS LIST

PROJECT: _____

DOCKET #: _____

COMPLIANCE PROJECT MANAGER: _____

BLM AUTHORIZED OFFICER: _____

EVENT DESCRIPTION	DATE
Certification Date	
Obtain Site Control	
Online Date	
POWER PLANT SITE ACTIVITIES	
Start Site Mobilization	
Start Ground Disturbance	
Start Grading	
Start Construction	
Begin Pouring Major Foundation Concrete	
Begin Installation of Major Equipment	
Completion of Installation of Major Equipment	
First Combustion of Gas Turbine	
Obtain Building Occupation Permit	
Start Commercial Operation	
Complete All Construction	
TRANSMISSION LINE ACTIVITIES	
Start T/L Construction	
Synchronization with Grid and Interconnection	
Complete T/L Construction	
FUEL SUPPLY LINE ACTIVITIES	
Start Gas Pipeline Construction and Interconnection	
Complete Gas Pipeline Construction	
WATER SUPPLY LINE ACTIVITIES	
Start Water Supply Line Construction	
Complete Water Supply Line Construction	

Compliance Table 1
Summary of Compliance Conditions of Certification

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-1	Unrestricted Access	The project owner/lease holder shall grant BLM and Energy Commission staff, delegate agencies or consultants unrestricted access to the power plant site.
COMPLIANCE-2	Compliance Record	The project owner/lease holder shall maintain project files on-site. BLM and Energy Commission staff and delegate agencies shall be given unrestricted access to the files.
COMPLIANCE-3	Compliance Verification Submittals	The project owner/lease holder is responsible for the delivery and content of all verification submittals to BLM's Authorized Officer and the CPM, whether such condition was satisfied by work performed or the project owner/lease holder or his agent.
COMPLIANCE-4	Pre-construction Matrix and Tasks Prior to Start of Construction	Construction shall not commence until the all of the following activities/submittals have been completed: • property owners living within one mile of the project have been notified of a telephone number to contact for questions, complaints or concerns, • a pre-construction matrix has been submitted identifying only those conditions that must be fulfilled before the start of construction, • all pre-construction conditions have been complied with, • BLM's Authorized Officer and the CPM have issued a letter to the project owner/lease holder authorizing construction.
COMPLIANCE-5	Compliance Matrix	The project owner/lease holder shall submit a compliance matrix (in a spreadsheet format) with each monthly and annual compliance report which includes the status of all compliance conditions of certification.
COMPLIANCE-6	Monthly Compliance Report including a Key Events List	During construction, the project owner/lease holder shall submit monthly compliance reports (MCRs) which include specific information. The first MCR is due the month following the Energy Commission business meeting date on which the project was approved and shall include an initial list of dates for each of the events identified on the Key Events List.

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-7	Annual Compliance Reports	After construction ends and throughout the life of the project, the project owner/lease holder shall submit annual compliance reports instead of monthly compliance reports.
COMPLIANCE-8	Confidential Information	Any information the project owner/lease holder deems confidential shall be submitted to BLM and the Energy Commission's executive director with a request for confidentiality.
COMPLIANCE-9	Annual fees	Payment of Annual Energy Facility Compliance Fee to the Energy Commission;
COMPLIANCE-10	Reporting of Complaints, Notices and Citations	Within 10 days of receipt, the project owner/lease holder shall report to BLM's Authorized Officer and the CPM, all notices, complaints, and citations.
COMPLIANCE-11	Planned Facility Closure	The project owner/lease holder shall submit any revisions or changes to the Closure, Revegetation and Restoration Plan to BLM's Authorized Officer and the CPM at least 12 months prior to commencement of a planned closure.
COMPLIANCE-12	Unplanned Temporary Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned temporary closure, the project owner/lease holder shall submit an On-Site Contingency Plan no less than 60 days after an NTP is issued for each power plant.
COMPLIANCE-13	Unplanned Permanent Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned temporary closure, the project owner/lease holder shall submit an On-Site Contingency Plan no less than 60 days after an NTP is issued for each power plant.
COMPLIANCE-14	Post-certification changes to the ROW Grant and/or Decision	The project owner/lease holder must petition the Energy Commission and file an application to amend the ROW grant to delete or change a condition of certification, modify the project design or operational requirements and/or transfer ownership of operational control of the facility.

Attachment 1 - Complaint Report/Resolution Form

Complaint Log Number:_____ Docket Number:_____

Project Name:_____

COMPLAINTANT INFORMATION

Name:_____ Phone Number:_____

Address:_____

COMPLAINT

DATE COMPLAINT RECEIVED:_____ TIME COMPLAINT RECEIVED:_____

COMPLAINT RECEIVED BY: ☐ TELEPHONE ☐ IN WRITING (COPY ATTACHED)

DATE OF FIRST OCCURRENCE:_____

DESCRIPTION OF COMPLAINT (INCLUDING DATES, FREQUENCY, AND DURATION):_____

FINDINGS OF INVESTIGATION BY PLANT PERSONNEL:_____

DOES COMPLAINT RELATE TO VIOLATION OF BLM ROW GRANT? ☐ YES ☐ NO

DOES COMPLAINT RELATE TO VIOLATION OF A CEC REQUIREMENT? ☐ YES ☐ NO

DATE COMPLAINTANT CONTACTED TO DISCUSS FINDINGS:_____

DESCRIPTION OF CORECTIVE MEASURES TAKEN OR OTHER COMPLAINT RESOLUTION:_____

DOES COMPLAINTANT AGREE WITH PROPOSED RESOLUTION? ☐ YES ☐ NO

IF NOT, EXPLAIN:_____

CORRECTIVE ACTION

IF CORRECTIVE ACTION NECESSARY, DATE COMPLETED:_____

DATE FIRST LETTER SENT TO COMPLAINTANT (COPY ATTACHED):_____

DATE FINAL LETTER SENT TO COMPLAINTANT (COPY ATTACHED):_____

OTHER RELEVANT INFORMATION:_____

"This information is certified to be correct."

PLANT MANAGER SIGNATURE:_____ DATE:_____

(ATTACH ADDITIONAL PAGES AND ALL SUPPORTING DOCUMENTATION, AS REQUIRED)

F. LIST OF PREPARERS AND REVIEWERS

RIDGECREST SOLAR POWER PROJECT
LIST OF PREPARERS & REVIEWERS

CALIFORNIA ENERGY COMMISSION

Executive Summary ..... Eric Solorio

Introduction ..... Eric Solorio

Description of Proposed Project and Alternatives ..... Eric Solorio

Alternatives ..... Suzanne Phinney

Cumulative Scenario ..... Suzanne Phinney

Air Quality ..... Tao Jiang and William Walters, P.E.

Biological Resources ..... Richard Anderson, David Bise, Andrea Martine, and Joy Nishida

Cultural Resources and Native American Values ..... Glenn Farris and Michael McGuirt

Hazardous Materials Management ..... Alvin Greenberg, Ph.D.

Public Health and Safety ..... Alvin Greenberg, Ph.D.

Land Use, Recreation, and Wilderness ..... Shaelyn Strattan

Noise and Vibration ..... Erin Bright

Socioeconomics and Environmental Justice ..... Sue Walker

Soil and Water Resources ..... Michael Donovan P.G., C.Hg., Michael Daly P.E., and John R. Thornton P.E.

Traffic and Transportation ..... Robert Fiore

Transmission Line Safety and Nuisance ..... Obed Odoemelam, Ph.D.

Visual Resources ..... Michael Clayton

Waste Management ..... Suzanne Phinney, D.Env.

Worker Safety and Fire Protection ..... Alvin Greenberg, Ph.D.

Facility Design ..... Shahab Khoshmashrab

Geology, Paleontology, and Minerals ..... Dal Hunter

Power Plant Efficiency ..... Shahab Khoshmashrab

Power Plant Reliability ..... Shahab Khoshmashrab

Transmission System Engineering ..... Ajoy Guha, P. E. and Mark Hesters

General Conditions ..... Dale Rundquist

Project Assistant ..... April Albright

BUREAU OF LAND MANAGEMENT

Ridgecrest Field Office

Supervisory Recreation ..... Craig Beck
Wildlife Biologist ..... Shelley Ellis
Natural Resource Specialist ..... Glenn Harris
Supervisory Resource Management Specialist ..... Robert Pawelek
Field Manager ..... Hector Villalobos
Archaeologist ..... Donald Storm
Realty Specialist ..... Paul Rodriguez
Supervisory Geologist ..... Linn Gum
Geologist ..... Randy Porter

El Centro Field Office

Archaeologist ..... Tom Zale

California Desert District

RECO Program Manager ..... Greg Miller
Planning and NEPA Coordinator ..... Lynnette Elser
Planning and NEPA Coordinator ..... Jeff Childers
DDM, Resources ..... Alan Stein
CDD Biologist ..... Larry LaPre
Ecology and Environmental Contractor ..... David McIntyre
Project Manager ..... Janet Eubanks
Business Support Assistant ..... Florence Smith
Hydrologist ..... Noel Ludwig
Archaeologist ..... Rolla Queen
Clerk ..... Elizabeth Traub

California State Office

Planning and NEPA Coordinator ..... Sandra McGinnis

OFFICE OF THE SOLICITOR

Solicitor, Pacific Southwest Regional Solicitor's Office ..... Kevin Tanaka
Solicitor, Department of Interior's Solicitor's Office ..... Michael Hickey

G. WITNESS QUALIFICATIONS AND DECLARATIONS

DECLARATION OF
Eric K. Solorio

I, Eric Solorio, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Project Manager (Planner III).

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on the **Executive Summary, Introduction, and Description of Project and Alternatives** in the Staff Assessment/Draft Plan Amendment/Draft Environmental Impact Statement for the **Ridgecrest Solar Power Project** (09-AFC-9) based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 3-19-10 Signed: Original signed by E. Solorio

At: Sacramento, California

ERIC SOLORIO

SUMMARY

I'm currently a project manager for the California Energy Commission. I have seven years of experience managing business operations for real estate development companies and three years of experience with economic development through international trade and foreign direct investment. I have a working knowledge of the California Environmental Quality Act. My strengths are in business development, strategic planning, team building, economic analysis, and raising private equity. I'm experienced with managing diverse groups of people to accomplish common objectives.

PROFESSIONAL EXPERIENCE

Presentation Skills

- Organize and participate in public workshops to facilitate public participation in the environmental review of large-scale real estate development projects, up to 4,000 acres in size.
- Organize and participate in international trade and investment, "business to business" workshops.
- Organize and participate in international trade and investment, business development seminars.
- Make presentations to foreign delegations and dignitaries to solicit "foreign direct investment" into California business ventures.
- Assist with implementing protocol for receiving foreign trade delegations visiting California.

Technical Skills

- Review and analyze Application(s) for Certification submitted to the California Energy Commission for proposed, utility-scale thermal power plant development.
- Manage the development of comprehensive environmental impact reports, in accordance with the California Environmental Quality Act, the Warren Alquist Act, the federal Clean Air Act and the federal Clean Water Act.
- Develop and maintain financial models for various business types: real estate development, resource development (forestry) and international trade (technology transfers).
- Work with the following software applications: Access, Excel, PowerPoint, Project and Word.

Legislation and Policy Analysis

- Review and analyze proposed legislation that could affect international trade and investment in California, and draft official Agency opinions.

Writing

- I've written weekly reports to the Governor's office (two years), business plans, letters, memos and environmental impact reports.

EMPLOYMENT HISTORY

October 2008 – Present	**Project Manager**	California Energy Commission; Siting, Transmission and Environmental Protection Division
May 1999 – April 2008	**Owner / Manager**	Various Real Estate Development Partnerships in California
Sept. 2001 – Nov. 2002	**Owner / Manager**	Technology Transfer Services
Nov. 1999 – August 2001	**Special Assistant to Deputy Secretary**	California Trade and Commerce Agency, International Trade and Investment Division

EDUCATION

California State University at Sacramento
Major: International Business
Minor: Economics

DECLARATION OF
Suzanne L. Phinney, D.Env.

I, Suzanne L. Phinney, declare as follows:

1. I am presently employed by Aspen Environmental Group, consultant to the California Energy Commission's Facilities Siting Office of the Systems Assessments and Facilities Siting Division as a Senior Associate.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on Alternatives, Cumulative Scenario and Waste Management for the **Ridgecrest Solar Power Project** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony and errata is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and errata and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 3/18/2010 Signed: Original signed by S. Phinney

At: Sacramento, California

SUZANNE L. PHINNEY

Senior Associate, Energy and Infrastructure

ACADEMIC BACKGROUND

Doctorate, Environmental Science & Engineering (D.Env.), University of California, Los Angeles, 1981
M.S., Marine Biology, Dalhousie University, Halifax, Nova Scotia, Canada, 1975
B.A., Biological Sciences, University of California, Berkeley, 1973

PROFESSIONAL EXPERIENCE

Dr. Phinney has 30 years of experience in the environmental and energy field, providing technical and policy support in energy analysis, environmental assessment, environmental remediation, air and water quality assessments, risk assessment, regulatory compliance, permitting, and project/program management. Her particular emphasis is energy and infrastructure with projects addressing climate change, alternative energy generation technologies, liquefied natural gas, petroleum infrastructure, advanced transportation vehicles and fuels, land use and energy, and power plant siting. Prior to employment at Aspen, Dr. Phinney worked for 16 years with Aerojet, where she oversaw all environmental and safety issues.

Aspen Environmental Group — 2001 to present

Dr. Phinney manages energy and infrastructure projects for Aspen and provides environmental support on major projects. She has provided energy and environmental expertise to the following clients:

California Energy Commission (CEC). Dr. Phinney has supported CEC staff since 2001. She has prepared CEQA equivalent analyses for multiple power plants throughout the State, and has authored or contributed to over a dozen special studies. She is currently Deputy Program Manager for planning studies conducted by the Aspen team. Her major efforts for the CEC include the following.

- **Power Plant Siting, CEC, Project Management/Technical Support (2001 – Present).** Dr. Phinney prepared the alternatives analysis for the following list of power plants under review by the Energy Commission. The Alternatives analysis considers renewable technologies, including utility-scale and distributed PV.
  - **Palomar Energy Project –** 500 MW combined-cycle natural gas facility in Escondido, San Diego County
  - **Russell City Energy Center –** 600 MW combined-cycle natural gas facility in Hayward, Alameda County
  - **Eastshore Energy Center -** 115.5 MW simple-cycle natural gas facility in Hayward, Alameda County
  - **Carrizo Energy Solar Farm –** 177 MW solar thermal (Compact Linear Fresnel Reflector) plant in the Carrizo Plain, San Luis Obispo County
  - **CPV Sentinel Energy Project –** 850 MW natural gas plant in the Coachella Valley, Riverside County
  - **Marsh Landing Generating Station-** 930 MW natural gas plant within the existing Contra Costa Power Plant in Antioch, Contra Costa County
  - **Orange Grove Project –** 96 MW natural-gas peaking facility near Pala, San Diego County
  - **Willow Pass Generating Station –** 550 MW natural gas plant within the existing Pittsburg Power Plant in Pittsburg, Contra Costa County

- **Almond 2 Peaking Power Plant Project** – 174 MW natural-gas peaking facility near Ceres, Stanislaus County
- **Abengoa Mojave Solar Project** – 250 MW solar thermal (parabolic trough) plant near Harper Dry Lake, San Bernardino County
- **Ridgecrest Solar Power Project** – 250 MW solar thermal (parabolic trough) plant on 3,920 acres of BLM land near Ridgecrest, Kern County
- **Rice Solar Energy Project** – 150 MW solar thermal (power tower) plant with molten salt storage in Riverside County

Dr. Phinney prepared the waste management assessments of power plant licensing applications:

- **Eastshore Energy Center –** 115.5 MW natural gas simple-cycle plant in Hayward, Alameda County
- **Carrizo Energy Solar Farm –** 177 MW solar thermal (Compact Linear Fresnel Reflector) plant in the Carrizo Plain, San Luis Obispo County
- **Palmdale Hybrid Power Project –** 570 MW natural gas-solar thermal (parabolic trough) hybrid plant in Palmdale, Los Angeles County
- **SES Solar Two Siting Case –** 750 MW solar thermal (Stirling dish) plant on 6,500 acres of mostly BLM land in Imperial County
- **Hanford Energy Park Peaker Plant –** 120 MW simple-cycle, natural gas facility in Hanford, Kings County
- **Ridgecrest Solar Power Project** – 250 MW solar thermal (parabolic trough) plant on 3,920 acres of BLM land near Ridgecrest, Kern County
- **Blythe Solar Power Project** – 1,000 MW solar thermal (parabolic trough) plant on 9,400 acres of BLM land near Blythe, Riverside County
- **Palen Solar Power Project** – 500 MW solar thermal (parabolic trough) plant on 5,200 acres of BLM land in the Chuckwalla Valley, Riverside County

Dr. Phinney also coordinated the study of cooling water alternatives for the Tesla and Tracy natural gas, combined-cycle power plants.

Energy Policy Studies, CEC, Project Management/Technical Support (2001 – Present). Dr.Phinney prepared the policy reports and provided expert support to the Energy Commission on the following projects:

- **RETI Stakeholder Steering Committee Support, CEC, Project Team (2010)**. Dr. Phinney is supporting state agency coordination of and stakeholder input to support California ISO and publicly-owned utility planning of initial Competitive Renewable Energy Zone (CREZ)-transmission projects and update CREZ and conceptual transmission plan to facilitate project applications and permitting approvals beyond 2010.
- **Energy Aware Facility Planning and Siting Guide, CEC, Project Manager (2009-2010).** Dr. Phinney is updating a 1997 version of the Energy Aware Guide to help local governments plan for and permit electricity generation facilities and transmission lines that will be needed in the upcoming years. The Guide informs planners, decision makers and the public about what, how, and why electricity infrastructure may be developed.
- **Environmental Screening Tool for Out-of-State Renewable Energy Facilities, CEC, Project Manager (2009).** Dr. Phinney prepared an environmental screening tool/analysis allowing CEC to determine quickly whether out-of-state renewable facilities requesting RPS certification met California laws, ordinances, regulations and standards.
- **Advanced Energy Pathways, CEC, Project Manager (2006 – 2008).** Dr. Phinney provided project management support for a 3-year study evaluating the effects of advanced transportation technologies and fuels (out to 2050) on California's natural gas and electricity systems. This report involved the

development of baseline and alternative energy demand and supply scenarios, in-depth technical analysis of advanced transportation technologies and fuels, and the development of an energy-rich model.

- **Environmental Performance Report, CEC, Project Manager/Technical Support (2001, 2003, 2005)**.Dr. Phinney was Project Manager for Aspen's technical contributions, graphics and production efforts for the 2001 Environmental Performance Report (EPR) which detailed the current and historical air, water and biological impacts from in-state generation facilities. She provided support to the water resources discussion in the 2003 EPR and managed the analysis of out-of-state generation facilities for the 2005 EPR.
- **Advanced Electric Generation Technologies, CEC, Project Manager (2001 - 2002).** Dr. Phinney served as Project Manager for a report defining the technical development, developmental capacity, commercial status, costs and deployment constraints of selected alternative electric generation technologies. Technologies included geothermal, fuel cell, solar thermal, solar photovoltaic, wind and hydro. The focus was on development and application of the technology in California. Two page fact sheets on each technology and a matrix comparing all technologies was developed. Finally, an updated discussion of renewable technologies was developed for insertion into the alternatives section of Staff Assessments for power plant applications.
- **Liquefied Natural Gas Support, CEC, Technical Author (2002 – 2007**). Dr. Phinney has been instrumental in the preparation of numerous safety and policy reports on liquefied natural gas (LNG). She authored the Commission document: *International and National Efforts to Address the Safety and Security of Importing Liquefied Natural Gas: A Compendium*. This report reviewed national and international LNG regulations, standards and guidelines, reviewed risk assessment techniques, and identified, compiled and reviewed LNG safety/risk studies. Dr. Phinney helped organize LNG Access Workshops held in June 2005 and prepared a 40 page summary of presentations made at the workshops. She developed over 30 fact sheets on LNG subject areas for distribution to the public. Dr. Phinney compiled state and local comments on a proposed LNG terminal at the Port of Long Beach; these were presented in the *Safety Advisory Report on the Proposed Sound Energy Solutions Natural Gas Terminal at the Port of Long Beach, California*, which was delivered to the Federal Energy Regulatory Commission within the mandated 30-day period imposed by the 2005 federal Energy Bill. She provided technical review for the report *The Outlook for Global Trade in Liquefied Natural Projections to the year 2020.*
- **Natural Gas Market Assessment Support, CEC, Technical Author/Editorial Support (2005 –** 2007). Dr. Phinne**y c**ontributed to natural gas supply and demand analyses for the Commission document, *Natural Gas Assessment Update*. She provided support to the 2005 and 2007 Integrated Energy Policy Report (IEPR) documents, *Preliminary (and subsequently the Revised report) Reference Case in Support of the 2005 Natural Gas Market Assessment* and *2007 Natural Gas Market Assessment.* She edited the Commission document *Natural Gas Quality: Power Turbine Performance During Heat Content Surges.*
- **Petroleum Infrastructure Environmental Performance Report, CEC, Project Manager (2005)**. Dr. Phinney served as Project Manager for the 2005 IEPR document *Petroleum Infrastructure Environmental Performance Report.* In addition to managing preparation of the report and workshop presentations, she prepared responses to comments and provided policy recommendations.
- **Hydropower and Global Climate Change, CEC, Technical Author (2005)**. Dr. Phinney coauthored the document *Potential Changes in Hydropower Production from Global Climate Change in California and the Western United States*. This report investigated the effects of climate change on hydropower production in the West and compared impacts and policy actions in California, the Pacific Northwest, and the Southwest.
- **Land Use and Energy, CEC, Project Manager/Technical Author (2006 – 2008).** Dr. Phinney authored a CEC report on the linkages between land use and energy, which ultimately became one of

the two chapters presented in the 2006 IEPR Update. The report highlighted how energy can be better integrated in land use planning, and how efforts such as smart growth can help the state meet its energy and greenhouse gas emission reduction goals. She organized a full-day workshop involving over a dozen speakers representing state agencies, local governments, research entities, environmental groups, utilities, and non-profits. Dr. Phinney was one of the authors of the 2007 land use and energy follow-up report which further defined the role of land use in meeting California's energy and climate change goals. She helped synthesize the report into a chapter for the 2007 IEPR. Dr. Phinney helped edit the Land Use Subgroup of the Climate Action Team report prepared for submission to the California Air Resources Board AB 32 Scoping Plan.

- **AB 1632 Nuclear Power Plant Assessment, CEC, Technical Author (2007 – 2008).** Dr. Phinney was a key member of a team evaluating nuclear power issues in the state in response to AB 1632 legislation. She managed and prepared report sections regarding the impacts to local communities and the environmental issues and costs associated with alternatives, including renewables, to the state's two nuclear facilities. These sections were incorporated in the report *An Assessment of California's Nuclear Power Plants.*

California Public Utilities Commission. Dr. Phinney has managed several environmental assessments for the CPUC and supported many other CPUC documents prepared by Aspen.

- **Looking Glass Network Initial Study/Mitigated Negative Declaration, CPUC, Project Manager (2002 – 2003).** Dr. Phinney served as Project Manager for the preparation of Initial Study/Mitigated Negative Declarations (IS/MND) for this telecommunication project that involved construction in the San Francisco Bay Area and the Los Angeles Basin to allow fiber optic connections in numerous locations.
- **Williams Communications Sentry Marysville Project IS/MND, CPUC, Project Manager (2002 – 2003).** Dr. Phinney served as Project Manager for the installation of fiber optic connection to a Beale Air Force Base in Yuba County.
- **Kirby Hills II Natural Gas Storage Facility IS/MND, CPUC, Project Manager (2007).** Dr. Phinney managed an IS/MND for expansions at a natural gas storage facility in Solano County.
- **Multiple EIR Documents, CPUC, Technical Editor (2004 - 2008).** Dr. Phinney provided editorial and QA/QC review for the Diablo Canyon Steam Generator Replacement EIR, the Miguel Mission 230 kV Transmission Line EIR and the Sunrise Powerlink EIR/EIS.

California Institute of Technology/University of California. Dr. Phinney provided project management support to the following project.

- **Combined Array for Research in Millimeter-wave Astronomy EIS/EIR**, **U.S. Forest Service and the University of California (2001 – 2002).** Dr. Phinney was the Project Manager for this EIS/EIR for a radio telescope antenna array to be placed at a high altitude site in the Inyo National Forest. The evaluation of alternatives was especially contentious, and Aspen's field analyses of several potential sites were pivotal in the ultimate selection of one of these alternative sites.

Western Area Power Administration. Dr. Phinney provided editorial and QA/QC support to the following projects.

- **North Area ROW Maintenance Project Environmental Assessment, Western, Technical Editor/QA/QC (2006-2008).** Dr. Phinney provided technical editing and QA/QC support for all documents relating to the development of 800 miles of transmission lines in Northern California.
- **Sacramento Area Voltage Support Supplemental EIS/EA, Technical Editor/QA/QC (2006 – 2008).** Dr. Phinney provided technical editing and QA/QC support for all environmental documentation and permitting for new construction and reconstruction of transmission lines in the greater Sacramento area.

Vermont Yankee Nuclear Power Plant Report, Vermont Department of Public Service, Project Manager (December 2008 to January 2009). Dr. Phinney was the Project Manager and provided technical support for the environmental analysis of the continued operation of the Vermont Yankee Nuclear Power Station in Vernon, Vermont. The report assessed the environmental impacts to land, water and air resources (including climate change), soil and seismicity, on-site and off-site storage and disposal of high-level and low-level nuclear waste.

GenCorp 1999 to 2000

- As Vice President, Environmental and Regulatory Affairs, Dr. Phinney held primary responsibility for coordinating the company's aerospace and automotive environmental activities with various federal, State, and local regulatory agencies. Her specific responsibilities included: working with external groups and entities to develop responsible environmental legislation, regulations, and standards and the implementation of sound public policy; developing stakeholder base and strategy to ensure that company objectives were achieved; facilitating company and regulatory agency discussions to achieve more comprehensive and quicker remediation of sites; and spearheading a stakeholder group to develop and fund scientific studies on selected chemicals of concern.

Aerojet General Corporation 1984 to 1999

As Vice President, Environmental Health and Safety, Dr. Phinney ensured that programs were in place to meet all regulatory requirements and company initiatives. Her responsibilities included: providing strategic direction and management of all superfund-related investigation and remediation activities; developing environmental management plans; communicating environmental requirements, concerns, and successes to both internal and external audiences, including the board of directors, investment banking, and the analyst community; and participating as a member of the leadership council in defining company-wide business objectives and targets.

- Dr. Phinney created the first corporate EHS department, defining and staffing key functional areas. She managed a $20,000,000 annual budget and oversaw a staff of up to 30 professionals. Select accomplishments include: the development of remediation technologies that resulted in the cleanup of over 50 billion gallons of contaminated groundwater; development of the world's first groundwater treatment facility for perchlorate; significant reductions in emissions and hazardous waste generation; representation on numerous legislative and regulatory task forces and leadership positions on external business and community EHS committees and councils; and extensive public outreach efforts.

PREVIOUS EXPERIENCE, 1976 TO 1984

Jacobs Engineering Group. Dr. Phinney conducted toxicological, ecological, and air and water quality assessments.

Department of Environmental Science and Engineering at the University of California, Los Angeles. Dr. Phinney analyzed legal, economic, public health, and administrative barriers to waste water reuse. She also conducted an analysis of ecological and institutional factors in coastal siting of power plants.

Southwest Los Angeles Junior College. Dr. Phinney taught lecture and laboratory courses in general science.

TRAINING

- Certificate, Executive Program, University of California, Davis, 1989
- Expert Witness Training, California Energy Commission, 2001

HONORS AND AWARDS

- Who's Who of American Women, 18th Edition

- YWCA Outstanding Woman of the Year (Sciences) Award, 1992
- Woman of Achievement Award, Downtown Capitol Business and Professional Women, 1993
- Individual Award for Outstanding Contribution in Air Quality, 1995
- Sacramento Safety Center Incorporated, Eagle Award for Safety, 1998
- Regional Award for Outstanding Contribution in Air Quality, 2003

ACTIVITIES AND ASSOCIATIONS

- Editorial Board, The Environmental Professional, 1987-1989
- City of Sacramento Toxic Substances Commission, 1986-1988
- Sacramento Environmental Commission, 1988-1991
- Board of Directors, League of Women Voters of Sacramento, 1989-1999; President 1996-1997; Co-President 1997-1998; 2003-2005; Energy Study Committee 2005; Moderator/Facilitator of Debates and Forums (e.g., climate change, the SACOG's MTP, and flood control)
- Toxics Consultant, League of Women Voters of Sacramento, 1988-1989
- Member, Advisory Committee on AB 3777 (Risk Management Prevention Programs)
- Board of Directors, American Lung Association of Sacramento-Emigrant Trails, 1992-2000; President 1998-1999;
- Board of Directors, Sacramento Metropolitan Chamber of Commerce, 1992-1997; Vice President, Public Policy, 1996-1997
- Board of Directors, Air and Waste Management Association, 1991-1994
- Steering Committee Chair, Cleaner Air Partnership, 1993-1996, 2000-2001; Executive Committee 1993 to present
- Co-chair, TCE Issues Group, 1994-2000
- Sacramento Water Forum, 1995-2000
- Rate Advisory Committee, Sacramento Municipal Utility District, 1999-2001

SELECTED PUBLICATIONS/PRESENTATIONS

Phinney, S.L., Panel Moderator, Climate Change Initiatives for California, AEP Annual Conference, Shell Beach, California, 2007.

Phinney, S.L., Panel Moderator, Is there a Need for LNG in California, AEP Annual Conference, Shell beach, California, 2007.

Phinney, S.L., "LNG Safety Analysis in California – Federal, State and Local Processes" Presented at California Foundation on the Environment and the Economy, 2005.

Phinney, S.L., "Energy Basics" Presented at League of Women Voters of California Annual Convention, 2005.

Phinney, S.L., Presentation to U.S. Department of Justice, Office of the U.S. Attorney, on Women and Equality, 2004.

Phinney, S.L., "Trends in Industrial Waste Generation and Management" Presented at National Ground Water Association Conference, Las Vegas, Nevada, 1996.

Phinney, S.L., "Effective Management of an RI/FS to Reduce Financial Exposure," Manufacturers Alliance Environmental Management Council, Washington, D.C., 1995.

Phinney, S.L., "Knowing Your Compliance Challenge," 7th Annual California Statewide Community Awareness and Emergency Response (CAER) Conference, Sacramento, California, 1995.

Phinney, S.L., "Industry's Role in Broadening the Use of Alternative Fuels in America," Clean Cities Ceremony, Sacramento, California, 1994.

Phinney, S.L., "Aerospace Industry Perspective on Defense Conversion," AAAS Annual Meeting, San Francisco, California, 1994.

Phinney, S.L., "Aerojet's Waste Reduction Successes," Business for the Environment Conference, Sacramento, California, 1993.

Phinney, S.L., "Company Worker Trip Reduction Programs Under the Clean Air Act Amendments." MAPI Hazardous Materials Management Council, Washington, D.C., 1993.

Phinney, S.L., Testimony Before House Government Operations Subcommittee, 1993.

Phinney, S.L., Moderator, The Clean Air Act, A Public Forum, Sacramento, California, 1993.

Phinney, S.L., Plenary Session Chairperson and Speaker, "Business and the Environment: Must You Sacrifice One for the Other?" National Association of Environmental Professionals Conference, Seattle, Washington, 1992.

Phinney, S.L., "Facing the Challenge: The New California EPA." HazMat Northern California Conference, San Jose, California, 1992.

Phinney, S.L., "Understanding the Client Perspective." Environmental Business Conference, Pasadena, California, 1991.

Phinney, S.L., Panelist – Women of Science: Secrets of Success. Workshop, AAAS Annual Meeting, Washington, D.C., 1991.

Phinney, S.L., Keynote Address, ADPA International Symposium on Compatibility and Processing, San Diego, California, 1991.

Phinney, S.L., Keynote Address, Women in Science and Technology Conference, Jackson, Mississippi, 1991.

Phinney, S.L., Guest Speaker, Sacramento County Bar Association, Environmental Law Section, Sacramento, California, 1991.

Phinney, S.L., "Managing CERCLA Compliance from the Corporate Perspective." Hazardous Materials Management Conference/West, Long Beach, California, 1988.

Phinney, S.L., and C.A. Fegan, "Identifying a Feasible, Effective Treatment Method for an Unusual Chemical of Concern." Proceedings, American Defense Preparedness Association 16th Environmental Symposium, New Orleans, Louisiana, 1988.

Phinney, S.L., "A Proactive Superfund Cleanup by Industry." Proceedings of the 4th Annual Hazardous Materials Management Conference/West, Long Beach, California, 1988.

Thompson, C.H., S.L. Phinney and F.R. McLaren, "Aerojet: A Regional Site Program – Problem Definition." Proceedings of the Hazardous Waste and Environmental Emergencies Conference, Cincinnati, Ohio, 1985.

Kahane S.W., S.L. Phinney and A. Wright, "The Tightening Environmental Regulatory Climate for Hazardous Waste Management – Current Mandates and Future Directions for Industrial Compliance." Proceedings of the 1984 AlChE Summer National Meeting, Philadelphia, Pennsylvania, 1984.

Bachrach, A., D.M. Morycz, S.L. Phinney and S.W. Kahane, "Regulation and Offshore Oil and Gas Facilities." In: Emerging Energy/Environmental Trends and the Engineer. Eds. R.D. Nuefeld and R.W. Goodwins, 1983.

Lindberg, R.G., S.L. Phinney, J. Daniels and J. Hastings (eds)., "Environmental Assessment of the U.S. Department of Energy's Solar Thermal Technology Program." Prepared for the U.S. Department of Energy, June 1982.

Kahane, S.W., S.L. Phinney, J.A. Hill and R.C. Sklarew, "Key Considerations in Assessing the Air Impacts of Projected Outer Continental Shelf Oil and Gas Development," presented at the 74th Annual Air Pollution Control Association Meeting, Philadelphia, Pennsylvania, 1981

Phinney, S.L., "The U.S. Environmental Protection Agency's Pesticide Registration Program: A Case Study – Chloramben." Doctoral Dissertation, Environmental Science and Engineering Program, University of California, Los Angeles, California, 1981.

Phinney, S.L., (contributing author) et al. "Institutional Barriers to Wastewater Reuse in Southern California." Environmental Science and Engineering Report Prepared for the Office of Water Research and Technology, U.S. Department of the Interior, 1979.

Phinney, S.L., "Area-Restricted Feeding in American Plaice." Masters Thesis. Dalhousie University, Halifax, Nova Scotia, Canada, 1975.

DECLARATION OF
Tao Jiang

I, Tao Jiang, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as an Air Resources Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on the **Air Quality** for the **Ridgecrest Solar Power Project** (09-AFC-9) based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: March 10, 2010 Signed: Original signed by T. Jiang

At: Sacramento, California

Tao Jiang, Ph.D.

Professional Experience

Air Resources Engineer ***(Jan. 2009 – Present)***

California Energy Commission, Siting Transmission and Environmental Protection Division

Currently acting as air quality technical staff on Siting projects filed with the Energy Commission including Abengoa Mojave Solar, Ridgecrest Solar Millennium and Almond 2 Power Plant, and compliance projects including 42 power plants in construction and operation. Specific responsibilities include the following:

- Analyze the impacts of the construction and operation of large power generation projects on air quality, Green House Gas and climate change
- Determine the conformance to applicable U.S. EPA, CARB and local air district regulations and standards
- Investigate and recommend appropriate emission mitigation measures
- Prepare air quality staff assessments and technical testimony
- Develop and monitor air quality compliance plans
- Review and evaluate U.S. EPA, CARB, and local air district air quality rules and regulations
- Collect, analyze and evaluate data for the effects of air pollutants and power plant emissions on human health, vegetation, wildlife, water resources and the environment
- Develop, recommend, and implement statewide planning and policy initiatives for the Energy Commission and Governor

Research assistant ***(Sep. 2004 – Dec. 2008)***

University of California, Riverside, Chemical & Environmental Engineering

- Investigated phase behavior of air colloidal particles
- Study mediated colloidal interactions in the air particle dispersions
- Construct and evaluate models for gas molecules and air particulate matters
- Perform computer simulation and modeling for gas molecules and air particulate matters

Education

PhD	Chemical & Environmental Engineering, University of California, Riverside (August, 2008)
ME	Materials Science and Engineering, Beijing University of Chemical Technology (June, 2003)
BE	Materials Science and Engineering, Beijing University of Chemical Technology (June, 2000)

DECLARATION OF
Testimony of William Walters, P.E.

I**, William Walters,** declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission's Siting,Transmission and Environmental Protection Division, as a senior associate in engineering and physical sciences.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Air Quality** and **Greenhouse Gases** for the **Ridgecrest Solar Power Plant** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: March 17, 2010 Signed: Original signed by W. Walters

At: Agoura Hills, California

WILLIAM WALTERS, P.E.
Air Quality Specialist

ACADEMIC BACKGROUND
B.S., Chemical Engineering, 1985, Cornell University

PROFESSIONAL EXPERIENCE

Mr. Walters has over 20 years of technical and project management experience in environmental compliance work, including environmental impact reports, emissions inventories, source permitting, energy and pollution control research RCRA/CERCLA site assessment and closure, site inspection, and source monitoring,.

Aspen Environmental Group 2000 to present

Responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- **Engineering and Environmental Technical Assistance to Conduct Application for Certification Review for the California Energy Commission:**
  - Preparation and project management of the air quality section of the Staff Assessment and/or Initial Study and the visual plume assessment for the following California Energy Commission (CEC) licensing projects: Hanford Energy Park; United Golden Gate, Phase I; Huntington Beach Modernization Project (including Expert Witness Testimony); Woodland Generating Station 2; Ocotillo Energy Project, Phase I; Magnolia Power Project; Colusa Power Project; Inland Empire Energy Center; Rio Linda/Elverta Power Plant Project; Roseville Energy Center; Henrietta Peaker Project; Tracy Peaking Power Plant Project (including Expert Witness Testimony); Avenal Energy Project; San Joaquin Valley Energy Center (including expert witness testimony); Salton Sea Unit 6 Project (including expert witness testimony); Modesto Irrigation District Electric Generation Station (including expert witness testimony); Walnut Energy Center (including expert witness testimony); Riverside Energy Resource Center (including expert witness testimony); Pastoria Energy Facility Expansion; Panoche Energy Center; Starwood Power Plant; and Riverside Energy Resource Center Units 3 and 4 Project (in progress).
  - Preparation and project management of the visual plume assessment for the following California Energy Commission (Energy Commission) licensing projects: Metcalf Energy Center Power Project (including Expert Witness Testimony); Contra Costa Power Plant Project (including Expert Witness Testimony); Mountainview Power Project; Potrero Power Plant Project; El Segundo Modernization Project; Morro Bay Power Plant Project; Valero Cogeneration Project; East Altamont Energy Center (including expert witness testimony); Russell City Energy Center; SMUD Cosumnes Power Plant Project (including expert witness testimony); Pico Power Project; Blythe Energy Project Phase II; City of Vernon Malburg Generating Station; San Francisco Electric Reliability Project; Los Esteros Critical Energy Facility Phase II; Roseville Energy Park; City of Vernon Power Plant; South Bay Replacement Project; Walnut Creek Energy Park; Sun Valley Energy Project; Highgrove Power Plant; Colusa Generating Station; Russell City Energy Center; Avenal Energy Project; Carlsbad Energy Center; Community Power Project; Panoche Energy Center; San Gabriel Generating Station; Sentinel Energy Project; and Victorville 2 Hybrid Power Project.
  - Assistance in the aircraft safety review of thermal plume turbulence for the Riverside Energy Resources Center; Russell City Energy Center Amendment (including expert witness testimony); Eastshore Energy Power Plant (including expert witness testimony); Carlsbad Energy Center (in progress), Riverside Energy Resource Center Units 3 and 4 Project; Victorville 2 Hybrid Power Project; and the Blythe Energy Power

Plant and Blythe Energy Project Phase II (including expert witness testimony) siting cases. Assistance in the aircraft safety review of thermal and visual plumes of the operating Blythe Energy Power Plant. Preparation of a white paper on methods for the determination of vertical plume velocity determination for aircraft safety analyses.

- Preparation and instruction of a visual water vapor plume modeling methodology class for the CEC.
- Preparation and project management of the public health section of the Initial Study for the Woodland Generating Station 2 Energy Commission licensing project.
- Preparation of project amendment or project compliance assessments, for air quality or visual plume impacts, for several licensed power plants, including: Metcalf Energy Center; Pastoria Power Plant; Elk Hills Power Plant; Henrietta Peaker Project; Tracy Peaker Project; Magnolia Power Project; Delta Energy Center; SMUD Cosumnes Power Plant; Walnut Energy Center; San Joaquin Valley Energy Center; City of Vernon Malburg Generating Station; Otay Mesa Power Plant; Los Esteros Critical Energy Facility; Pico Power Project; Riverside Energy Resource Center; Blythe Energy Project Phase II; Inland Empire Energy Center; Salton Sea Unit 6 Project; and Starwood Power-Midway Peaking Power Plant.
- Preparation of the air quality section of the staff paper "A Preliminary Environmental Profile of California's Imported Electricity" for the Energy Commission and presentation of the findings before the Commission.
- Preparation of the draft staff paper "Natural Gas Quality: Power Turbine Performance During Heat Content Surge", and presentation of the preliminary findings at the California Air Resources Board Compressed Natural Gas Workshop and a SoCalGas Technical Advisory Committee meeting.
- Preparation of the staff paper "Emission Offsets Availability Issues" and preparation and presentation of the Emission Offsets Constraints Workshop Summary paper for the Energy Commission.
- Preparation of information request and data analysis to update the Energy Commission's Cost of Generation Model capital and operating cost factors for combined and simple cycle gas turbine projects. Additionally, performed a review of the presentation for the revised model as part of the CEC's 2007 Integrated Energy Policy Report workshops, and attended the workshop and answering Commissioner questions on the data collection and data analysis.

- For the **Los Angeles Department of Water and Power (LADWP)**:
  - Preparation of the Air Quality Inventory for the LADWP River Supply Pipeline Project EIR.
  - Project management and preparation of the Air Quality Section for the LADWP Valley Generating Station Stack Removal IS/MND support project.

- For the **U.S. Army Corps of Engineers (Corps)**:
  - Preparation of the Air Quality Section and General Conformity Analysis for the Matilija Dam Ecosystem Restoration Project EIS/R for the Corps.
  - Preparation of emission inventory and General Conformity Analysis of the Murrieta Creek Flood Control Project and the Joint Red Flag exercise to be conducted in the Nevada Test and Training Range.
  - Emission inventory for the construction activities forecast for the San Jose/Old San Jose Creeks Ecosystem Restoration project for the Corps.

- Other Projects:
  - Preparation of the Air Quality Section of the LAUSD New School Construction Program EIR and provided traffic trip and VMT calculation support for the Traffic and Transportation Section.

- Preparation of the draft staff paper "Natural Gas Quality: Power Turbine Performance During Heat Content Surge", and presentation of the preliminary findings at the California Air Resources Board Compressed Natural Gas Workshop and a SoCalGas Technical Advisory Committee meeting.
- Preparation of the Air Quality Section of the Environmental Information Document in support of the Coastal Consistency Determinations for the suspension of operation requests for undeveloped units and leases off the Central California Coast.
- Preparation of comments on the Air Quality, Alternatives, Marine Traffic, Public Safety, and Noise section of the Cabrillo Port Liquefied Natural Gas Deepwater Port Draft EIS/EIR for the City of Oxnard.
- Preparation of the emission estimates used in the Air Quality Sections for the DWR Tehachapi Second Afterbay Project Initial Study and EIR.

Camp Dresser & McKee, Inc. 1998 to 2000

Mr. Walters was responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Preparation of emission inventories and dispersion modeling for criteria and air toxic pollutants for the Los Angeles International Airport Master Plan (LAXMP) EIS/EIR.
- Project Manager/Technical lead for the completion of air permit applications and air compliance audits for two Desa International fireplace accessory manufacturing facilities located in Santa Ana, California.
- Project manager/technical lead for the completion of Risk Management Plans (RMPs) for four J.R. Simplot food processing facilities in Oregon, Idaho, and Washington and the Consolidated Reprographics facility located in Irvine, California.

Planning Consultants Research 1997 to 1998

Mr. Walters was responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Project Manager for a stationary source emission audit of the entire Los Angeles International Airport complex for Los Angeles World Airports (LAWA) in support of the LAXMP.
- Review of the Emission Dispersion Modeling System (EDMS) and preparation of a report with findings to the Federal Aviation Administration for LAWA in support of the LAXMP.
- Project manager for the ambient air monitoring and deposition monitoring studies performed for LAWA in support of the LAXMP, including the selection of the monitoring sites and specialty subcontractor, and review of all monitoring data.

Aspen Environmental Group/Clean Air Solutions 1995 to 1996

Mr. Walters was responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Manager of the Portland, Oregon, office of Clean Air Solutions from March 1995 to December 1995, with responsibilities including Project Management, Business Development, and Administration.
- Control technology assessment, engineering support and Notice of Intent to construct preparation for J.R. Simplot's Hermiston, Oregon, food processing facility. Review and revision of an Air Contaminant Discharge Permit application, Title V permit application, and PSD modeling analysis for J.R. Simplot's Hermiston facility.

- Air quality compliance report including an air emission inventory, regulation and permit compliance determination, and recommendations for compliance for Lumber Tech, Inc.'s Lebanon, Oregon, wood products facility.

Fluor Daniel, Inc. 1990 to 1995 and 1996 to 1997

Mr. Walters was responsible as lead technical or project manager for major environmental projects for both government and private clients. His projects included:

- Prepared several air permit applications for the ARCO Los Angeles Refinery Polypropylene Plant Project; Phase I environmental assessments for properties located in Southern California; and a site investigation and RCRA closure plan for a hazardous waste storage site in Vernon, California.
- Project manager of the Anaconda Smelter site for the U.S. Environmental Protection Agency's (EPA) Alternative Remedial Contract System (ARCS) project during the conclusion of technical activities and project closeout. Prepared a cost recovery report for the project.
- Performed environmental analysis for the Bonneville Power Authority, including air pollution BACT analysis, wastewater analysis, and evaluation of secondary environmental effects of electric power producing technologies.

Jacobs Engineering Group 1988 to 1990

Mr. Walters was responsible for a wide range of air pollution regulatory and testing projects, including the following:

- Project manager of air toxic emission inventory reports prepared for U.S. Borax's boron mining and refining facility and the Naval Aviation Depot (N. Island Naval Base, San Diego, California).
- Prepared air permit applications and regulatory correspondence for several facilities including the U.S. Department of Energy's Feed Material Production Center uranium processing facility in Fernald, Ohio; Evaluation of a sludge dewatering process at Unocal's Wilmington, California, Refinery; and United Airlines blade repair facility at the San Francisco Airport.
- Characterized and quantified air emissions for offshore oil and gas development activities associated with Federal oil and gas Lease Sale 95, offshore southern California, for the U.S. Minerals Management Service.

CERTIFICATIONS

- Chemical Engineer, California License 5973
- CARB, Fundamentals of Enforcement Seminar
- EPA Methods 1-8, 17; Training Seminar

AWARDS

- California Energy Commission Outstanding Performance Award 2001

DECLARATION OF
Richard L. Anderson

I**, Richard L. Anderson,** declare as follows:

1. I am presently under contract with Aspen Environmental Group to provide environmental technical assistance to the California Energy Commission. Under Contract No. 700-05-002, I am serving as a Biological Resource Specialist to provide Peak Workload Support for the Energy Facility Siting Program and for the Energy Planning Program.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I assisted Staff in the analysis of **Biological Resources** for the **Solar Millennium Ridgecrest Project,** and helped to prepare testimony based on my independent analysis of the Application for Certification and supplements hereto, field surveys of the proposed site, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: March 18, 2010 Signed: Original signed by R. Anderson

At: Davis, California

RICHARD L. ANDERSON

2850 Layton Dr.
Davis, CA 95616
530.758.4672
Danderson@cal.net

EDUCATION

1976	B.S. Biological Sciences, University of California at Davis

EXPERIENCE

March 2005 - Present	Biological Resources, water Resources and soil resources consulting related to energy production.
March 2001 – March 2005	Energy Facilities Siting Planner lll---Supervised the Biology, Water, and Soil Resources Unit of the Systems Assessment and Facilities Siting Division of the California Energy Commission. Responsible for biology, water, and soil staff and related products regarding energy planning, policy, and siting.
August 1979 - March 2001	Planner l and Planner ll---Staff Biologist, California Energy Commission Develop and review planning and policy objectives for California's energy facility siting program. Work on interdisciplinary teams responsible for review and preparation of Environmental Impact Reports, environmental planning projects, and locational analyses. Provide expert testimony in the area of biological resources. Act as project manager and contract manager for field research. Organize and direct workshops. Survey existing and proposed energy facility sites. Coordinate biological resource issue evaluation and mitigation planning with Federal, State; and local agencies and other interested parties. Managed several complex multi-year research projects.
October 1977- July 1979	Environmental Specialist ll, California State Water Resources Control Board Responsible for environmental documents produced in the Division of Water Right's application unit. Analyzed and evaluated impacts of direct diversion and/or water storage (reservoir) on the environment. Coordinated and communicated with other State, Federal and local agencies, and the general public. Trained new employees.

PROFESSIONAL AFFILIATIONS/ CERTIFICATION	Raptor Research Foundation The Wildlife Society---Certified Wildlife Biologist, TWS American Ornithological Union Coopers Society American Field Ornithologists Swainson's Hawk Technical Advisory Committee International Erosion Control Association National Wind Coordinating Committee
PUBLICATIONS	Author of numerous staff biological and water resources testimonies for the California Energy Commission of energy projects throughout the state including desert projects to marine biology and water quality issues associated with once-through cooling power plants. Author of numerous environmental assessments for water diversion and impoundment projects. Author of numerous reports and papers regarding conservation of T&E species, wind energy/bird interactions, and standard metrics and methods for monitoring bird interactions with wind turbines/utility structures.

DECLARATION OF
David Bise

I**, David Bise**, declare as follows:

1. I am presently employed by the California Energy Commission in the **Environmental Protection Office** of the **Energy Facilities Siting Division** as a **Planner II**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Biological Resources** for the Ridgecrest Solar Power Project based on my independent analysis of the application and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

   I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: March 15, 2010 Signed: Original signed by D. Bise

At: Sacramento, California

David Bise

Education

University of California at Berkeley
M.S. Wildland Resource Science with emphasis in wildlife management, 1998
Thesis: "Vertebrate-Habitat Relationships in Sierra Nevada Mixed Conifer Forest"

University of California at Davis
B.S. Zoology, Psychology minor, 1992

Relevant Experience

PLANNER II
California Energy Commission, Sacramento, California December 2009 to present
Duties include preparation of biological analyses in power plant siting cases, reviewing environmental compliance, and construction and compliance monitoring on construction sites and during plant operations.

SENIOR BIOLOGIST
Foothill Associates, Rocklin, California March 2004 to December 2009
Duties included conducting biological constraints analyses, project management, budget preparation, focused special-status wildlife and plant surveys, wetland delineations, and tree surveys. Work products that I prepare include biological resource assessments, tree survey reports, tree mitigation monitoring plans, wetland delineations, EIR/EIS biology sections, project mitigation monitoring plans, initial studies, and Section 7 biological assessments. Work area includes Sierras, Bay Area, and greater Sacramento area as well as some project work in southern California. I also prepare summary reports for the U.S. Fish and Wildlife Service for focused survey work that I perform under my survey permits.

As a senior biologist, I currently mentor 3 biology staff members and peer review biological documentation prepared by junior biologists. Work duties also include budgets, scopes and schedules for new project work, workload management for junior staff, project coordination and scheduling, conducting client, agency, and general public meetings, and various marketing tasks including attending marketing meetings on behalf of the biology division and conducting marketing and proposal interviews.

WILDLIFE BIOLOGIST
Sapphos Environmental Inc., Pasadena, California February 2002 to September 2003
Duties included conducting focused wildlife and plant surveys, performing biological assessments, vegetation community mapping, project management and project budget preparation, and mentoring junior staff. Work products prepared included CEQA/NEPA documents such as EIRs, EISs, BAs, and biological technical reports. I also performed project management and budget preparation for a variety of large and small biological tasks. I also prepared summary reports for focused survey work that I performed under my survey permits. Work area included greater Los Angeles, Riverside, San Bernardino, and San Diego counties.

WILDLIFE BIOLOGIST
EDAW Earth and Environmental, San Diego, California March 2001 to January 2002
Duties included conducting focused special-status wildlife and plant surveys, biological site assessments and constraints analyses, vegetation community mapping, and preparation of

environmental documents such as biological assessments, biological constraints analyses, and focused survey reports.

ASSOCIATE BIOLOGIST
Ogden Environmental and Energy Services, San Diego, California April 1999 to March 2001
Duties included endangered species surveys, biological monitoring, construction monitoring, and pre-development surveys. I assisted in writing of biotechnical reports, environmental impact statements, and project proposals. I also performed project management work including preparation of project budgets and project scheduling.

PRIMARY BANDER
Upper Klamath Lake, Oregon September 1998 to October 1998
Duties included performing migration banding of passerine species for the Redwood Sciences Lab of the US Forest Service. Supervised and instructed volunteer banders. Required long hours in the field and some camping overnight for several days at a time. Work products included preparation of banding datasheets and summary banding reports.

WILDLIFE BIOLOGIST
Havasu National Wildlife Refuge Needles, California April 1998 to August 1998
Duties included performing nest searches for federally endangered southwestern willow flycatchers. Job involved extensive nest searching, point counts, banding of adults and juveniles, and vegetation mapping as well as surveying for associated resident and migratory bird species. Work products included survey reports and periodic nest status reports.

FIELD ASSISTANT
Barksdale AFB, Louisiana April 1997 to July 1997
Performed nest searches for resident and neo-tropical migrants in southern pine forests as well as extensive mist netting of resident and migrant birds in northwestern Louisiana. Required prior nest searching and mist-netting experience and ability to identify eastern bird species by sight and sound.

Memberships and Awards

- Member of national and western section of Wildlife Society
- Member of national and western section of International Society of Arboriculture
- USFWS approved biologist for Natomas Basin HCP surveys
- Nevada County, California approved biologist
- El Dorado County, California approved biologist
- Graduated with high honors from UC Davis and UC Berkeley

Special Skills

- Permitted with US Fish and Wildlife Service to survey for vernal pool invertebrates (fairy shrimp), coastal California gnatcatcher, least Bell's vireo, and southwestern willow flycatcher
- International Society of Arboriculture certified arborist
- Completed wetland delineation training course
- Permitted with the federal Bird Banding Laboratory
- Attended Wildlife Society red-legged frog workshop
- Attended Desert Tortoise Council training workshop
- Completed Bureau of Land Management flat-tailed horned lizard survey course
- Hold a scientific collecting permit with California Department of Fish and Game
- Completed fairy shrimp identification class
- Completed Arizona Department of Game and Fish willow flycatcher survey course (4/98)

DECLARATION OF
Andrea Martine

I**, Andrea Martine**, declare as follows:

1. I am presently employed by the California Energy Commission in the **Environmental Protection Office** of the **Energy Facilities Siting Division** as a **Planner II**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepared the staff testimony on **Biological Resources** for the Ridgecrest Power Plant Project based on my independent analysis of the application and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

   I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 3/10/2010 Signed: Original signed by A. Martine

At: Sacramento, California

Andrea Martine

Employment History

California Energy Commission

Planner II, Staff Biologist *12/2009 to present*

As a staff biologist with the Energy Commission, Ms. Martine analyzes the biological resource components of energy facilities siting applications to assess resource impacts, develop mitigation, and to evaluate compliance with applicable federal, state, and local, laws, ordinances, regulations, and standards. This requires working closely with biological resource protection and management agencies, subject matter experts, and Energy Commission consultants as well as with other Energy Commission staff to provide the best available information is included in staff analyses.

California Department of Transportation, District 3

Associate Environmental Planner/Environmental *11/1998 to 7/2000*

Ms. Martine's primary duties with Caltrans as Project Biologist were to analyze environmental impacts to special status plants, wildlife and wetlands and stream associated with transportation projects in Northern California. She wrote environmental documents to satisfy CEQA, NEPA, obtained 404 permits, 401 certification and 1601 agreements for various transportation-related projects. She acted as liaison for Federal Highways Administration while reviewing documents prepared for local projects.

Jones & Stokes Associates, Inc.

Environmental Specialist/Botanist *04/1994 to 11/1998*

While with the environmental consulting firm Jones & Stokes Assoc. Inc., Ms. Martine specialized in listed Brachiopod surveys, special status plant and floristic surveys. She worked throughout California including Sacramento, Placer, Fresno and San Diego counties and several military sites (BEALE AFB, Camp Roberts, & Fort Hunter Ligget). Projects while at JSA included protocol-level surveys for special-status plants and brachiopods, wetland delineations, and monitoring vernal pools, seasonal wetlands and riparian vegetation at mitigation sites. Managed brachiopod projects and budgets and writing biological resources sections of documents to satisfy NEPA and CEQA requirements.

El Dorado National Forest

Botanist (Volunteer) *07/1993 to 08/1993*

Ms. Martine helped prepare environmental analyses of proposed timber and recreational projects in which, she produced inventories and assessments of the existing natural environmental conditions of project sites and watersheds.

EDUCATION

Biological Sciences *B.S.*

California State University , Sacramento *June 1993*

DECLARATION OF
Joy Nishida

I**, Joy Nishida** declare as follows:

1. I am presently employed by the California Energy Commission in the **Biological Resources Unit** of the Siting, Transmission and Environmental Protection Division as a **Planner II**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Biological Resources** for the Ridgecrest Solar Power project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 3/18/10 Signed: Original signed by J. Nishida

At: Sacramento, California

JOY NISHIDA
Biologist

Experience Summary

Twenty-seven years experience in the biological field, including botanical consulting, curatorial management of vertebrate and herbarium collections, college-level instruction, and conducting biological resources impact analyses for inclusion in environmental documents.

Education

- California State Polytechnic University, Pomona—Master of Science, Biological Sciences
- California Polytechnic State University, San Luis Obispo—Bachelor of Science, Environmental & Systematic Biology and Natural Resources Management (Forestry Concentration)
- Certified Arborist — International Society of Arboriculture
  No. WE-8078A, expires 12/31/10

Professional Experience

July 2008 to Present—Planner II: Siting, Transmission & Environmental Protection Division – California Energy Commission, Sacramento

As a staff biologist, primary duties include conducting impact analyses to biological resources for power plant siting projects. Other duties include evaluating compliance with accepted Conditions of Certification related to biological resource technical areas for power plant facilities and coordinating with biological resource protection and management agencies, environmental organizations, universities, and special interest groups to assure their biological input into Commission programs.

January 2008 to July 2008—Environmental Scientist: Regional Programs Unit, Division of Financial Assistance – State Water Resources Control Board, Sacramento

Using scientific judgment, provided technical and administrative review of environmental documents for projects receiving financial assistance from the State Water Board. Reviewed and commented on environmental documents for wastewater treatment and water reclamation facilities, watershed protection, nonpoint source pollution control, and other local assistance projects to assure compliance with the California Environmental Quality Act and other Division's environmental review process. Participated in applicant meetings, prepared Agenda and Resolution language for various projects seeking local funding assistance from the State Water Board, developed environmental review summaries of projects to be funded, initiated consultation with federal authorities, developed mitigation measures, and resolved environmental concerns related to proposed projects. Coordinated interagency review of environmental documents subject to crosscutting federal regulations, and organized and maintained the Environmental Services filing system, library, and database.

April 2005 to January 2008—Botanist, Wetland Ecologist, and Certified Arborist - Jones & Stokes, Sacramento

Organized and conducted general plant surveys and directed plant surveys for special-status plant species, vegetation mapping, arborist surveys, and wetland delineations extensively throughout California. Wrote wetland delineation reports, arborist reports, and biological resource sections for the following environmental documents: Environmental Impact Reports, Environmental Impact Statements, Natural Environment Studies, Initial Studies, and Biological Analyses for listed species. Dealt with the legal requirements regarding the protection of biological resources and developed mitigation to prevent significant impacts. Coordinated the efforts of sub-consultants, clients, and coworkers in the development of environmental documents.

1990-2005—Botanical Consultant – Nishida Botanical Consulting

Worked as an independent contractor to consulting firms, educational facilities, and federal agencies. Duties included organizing and conducting floral inventories, directed searches for special-status plant species, vegetation mapping, monitoring revegetation sites, assisting in wetland delineations, and analyzing impacts on botanical resources.

1990-1996—Instructional Support Technician– California State University, Northridge

As a collections manager for the Department of Biology Herbarium and Vertebrate Collections, responsibilities included the acquisition, preparation, curation, and reorganization of the teaching and research collections. Implemented a database for the vertebrate collections. Recruited and supervised volunteers to assist in the collections. Also supervised graduate students. Other duties included instructional assistance with Botany and Vertebrate classes in the lab and in the field.

1987-1989—Biological Sciences Department Part-time Lecturer– California State Polytechnic University, Pomona

Taught and prepared majors and non-majors freshman level Biology labs.

DECLARATION OF
Glenn J. Farris

I, **Glenn J. Farris**, declare as follows:

1. I am presently employed as a subcontractor to Aspen Environmental Group, a contractor to the California Energy Commission, **Siting, Transmission, and Environmental Protection Division**, as a cultural resources technical specialist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I assisted in the preparation of the staff testimony on **Cultural Resources** for the Ridgecrest Solar Power Project, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: March 17, 2010 Signed: Original signed by G. Farris

At: Sacramento, California

CURRICULUM VITAE

NAME: GLENN J. FARRIS
PLACE OF BIRTH: Fort Benning, Georgia
WORK ADDRESS: 508 Second Street, Suite 108
Davis, CA 95616
HOME ADDRESS: 2425 Elendil Lane
Davis, CA 95616
TELEPHONE: (530) 756-1497 (OFFICE)
E-MAIL: gfarris@omsoft.com

EDUCATION:

M.A. (1979), Ph.D. (1982), (Anthropology) University of California, Davis, CA.

CURRENT EMPLOYMENT:

Partner, Farris, West & Schulz, Archaeological Consultants: Historic Archaeology, Ethnohistory, and Prehistoric Archaeology.

RECENT PAST EMPLOYMENT:

Senior State Archeologist (Retired), Archaeology, History and Museums Division, and Supervisor, State Archaeological Collections Research Facility (SACRF), Department of Parks and Recreation, Sacramento, CA. I worked for DPR starting on April 1, 1978 and retired on April 2, 2008. This position has involved archaeological fieldwork and research throughout the state of California on sites from Eureka to San Diego. I have had a special interest in sites at Fort Ross, Sonoma, La Purisima Mission, Santa Barbara Presidio, Santa Cruz, San Pasqual (San Diego County), and Old Town San Diego covering prehistoric and historic sites.

PREVIOUS EXPERIENCE:

1976 Archaeological excavation and survey at Lake Berryessa with Dr. Martin Baumhoff and Dr. Delbert True.
1977 Excavation at Cooper-Molera Adobe, Monterey, CA. Working for Dr. Robert F. Heizer on historical project.
1978 Archaeological Survey on Mendocino National Forest (Summer seasonal work), Corning District.
1979 Seasonal Archeological Project Leader, California Department of Parks and Recreation. Excavation project at Sonoma Barracks, Sonoma, CA.
1980 Seasonal Archeological Project Leader, California Department of Parks and Recreation. Archeological surveys in Jackson State Forest and Mountain Home State Forest.
1980 Archaeologist, GS-7, U.S. Forest Service. Seasonal archaeological survey leader on Lassen National Forest, east of Mount Lassen.

ELECTED AND APPOINTED POSITIONS HELD:

1. General Chairperson, SHA/CUA Annual Meetings, Sacramento, CA. 1986.
2. Northern Vice-President, Society for California Archaeology. 1987-1989.
3. President, Central California Archaeological Foundation, 1987-1989
4. Board Member, Society for Historical Archaeology, 1988-1992.
5. Associate Editor, Historical Archaeology. 1988--2008.
6. Research Associate, University of California Archaeological Research Facility,

Berkeley. 1990-Present.

7. Board Member, California Mission Studies Association, 1994 - 1996. Publications Committee Chair 1994 –2001.
8. Reviews Editor. Journal of California and Great Basin Anthropology. 1994-Present.
9. Research Associate, Santa Barbara Museum of Natural History, Santa Barbara, CA. December 1995-Present.
10. President, Society for Historical Archaeology (1996 - 1997).
11. Editor, CMSA Occasional Papers, 2000--2003.
12. Corresponding Secretary, Fort Ross Interpretive Association. 2008-Present.

MILITARY SERVICE:

Captain, U.S. Army Intelligence. July 10, 1966-July 9, 1969. Overseas Service: Japan (16 months); Vietnam (14 months). Awards: ARCOM w/1 Oak Leaf Cluster; Bronze Star Medal w/2 OLC.

FEDERAL CIVIL SERVICE:

Special Agent (Criminal Investigator) GS-11 for the Office of the Inspector General, U.S. Department of Agriculture, San Francisco. September 1972-September 1975. Spent two months in training as a law enforcement officer in Washington, DC (training program run by the Treasury Department). Worked with the U.S. Attorney's offices in various western states in bringing legal cases to trial.

AWARDS:

Campbell Menefee Scholastic Award for 1992. Given by the Sonoma County Historical Society for historical research in Sonoma County history leading to publication, Santa Rosa, CA. January 23, 1993.

Institute of History (San Diego Historical Society), Native American History Award, April 24, 1993, Sponsored by the Rancho Santa Fe Historical Society in recognition of the "Year of the American Indian, 1992."

Martin A. Baumhoff Special Award, Society for California Archaeology, Modesto, CA, March 24, 2001.

REPORTS AND PUBLICATIONS AND PAPERS:

Over 100 publications and reports.
90 formal presentations

DECLARATION OF
Michael D. McGuirt

I**, Michael D. McGuirt**, declare as follows:

1. I am presently employed by the California Energy Commission in the **Environmental Protection Office** of the **Siting, Transmission and Environmental Protection Division** as a **Planner III**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Cultural Resources** for the **Solar Millenium Ridgecrest Solar Power** project based on my independent analysis of the application and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

   I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 3/19/10 Signed: Original signed by M. McGuirt

At: Sacramento, California

MICHAEL D. MCGUIRT, MA, RPA

SUMMARY OF PROFESSIONAL EXPERIENCE

Fifteen years of professional academic and cultural resources management experience in western North America, Hawai'i, Central America, and Eastern Europe. Former regulator and present planner with expert knowledge of Section 106 of the National Historic Preservation Act of 1966 (NHPA). Thorough knowledge of the California Environmental Quality Act of 1970, Section 110 of the NHPA, and the US Army Corps of Engineers' Appendix C. Working knowledge of the National Environmental Policy Act of 1969, Native American Graves Protection and Repatriation Act of 1990, and the Archaeological Resources Protection Act of 1979. Expert in developing and coordinating historic preservation solutions that comply with complex Federal, state, and local regulatory environments for large energy, transportation, and telecommunications projects. Expert technical skills in geoarchaeology, mapping and spatial analysis, archaeological survey and excavation, and material culture analysis.

EDUCATION

MASTER OF ARTS, Anthropology, University of Texas at Austin
May 1996

BACHELOR OF ARTS, Anthropology and Archaeological Studies, University of Texas at Austin
December 1990

PROFESSIONAL AFFILIATIONS

Register of Professional Archaeologists
Society for American Archaeology
Society for California Archaeology
National Trust for Historic Preservation
California Preservation Foundation

HONORARY AFFILIATIONS

Honor Society of Phi Kappa Phi

RECENT PROFESSIONAL EMPLOYMENT

ENERGY PLANNER III, California Energy Commission, Sacramento, California
December 2009 to present

Supervise an Energy Commission staff of five professional cultural resources analysts and a varying number of equivalent consultants in the development of CEQA and NEPA analyses of the potential effects that the construction and operation of proposed thermal power plants may have on significant cultural resources, develop and supervise the implementation of agency-wide programs to facilitate agency compliance with Federal historic preservation regulations, and supervise the periodic staff reviews of licensees' actions to ensure compliance with conditions of certification for extant licenses.

ENERGY PLANNER II, California Energy Commission, Sacramento, California
November 2007 to December 2009

Develop environmental impact analyses of the potential effects that the construction and operation of proposed thermal power plants may have on significant cultural resources. Apply applicable Federal, State, and local statutes and regulations, as they relate to the consideration of cultural resources. Design and execute cultural resource impact analyses that are appropriate to the specific regulatory context for each proposed project. Gather and evaluate information on projects and on cultural resources in project areas. Develop and maintain agency and public relationships to acquire the most useful data and to elicit input in the development of California Energy Commission conditions of certification. Succinctly convey, orally in different public forums and in different written technical formats, the results of cultural resource impact analyses and proposed conditions of certifications meant to mitigate adverse impacts to significant cultural resources. Periodic reviews of licensees' actions to ensure compliance with extant conditions of certification. Oversight of consultants' who are preparing cultural resource impact analyses.

ASSOCIATE STATE ARCHAEOLOGIST, Office of Historic Preservation, California Department of Parks and Recreation (California State Parks), Sacramento, California
May 2001 to November 2007

Regulator, in the California Office of Historic Preservation (OHP), of the Advisory Council on Historic Preservation's (Advisory Council) process implementing Section 106 of the National Historic Preservation Act (NHPA). Conducted among the most complex Section 106 reviews, and participated in, and often guided, the consultations of which those reviews were a part. Formally advised other OHP units and the California State Historical Resources Commission on the appropriate disposition and treatment of archaeological resources in the context of other State and Federal historic preservation programs that OHP either administers or in which OHP participates. Worked out of class for two consecutive, six-month terms as a Senior State Archeologist, from December 2004 through December 2005, supervising the Project Review Unit for the State Historic Preservation Officer (SHPO). As the Acting Chief of Project Review, managed and trained a staff of eight professionals and one clerical assistant to conduct, on behalf of the SHPO, the review of all Federal agency actions in the State of California under 36 CFR Part 800, the Advisory Council's Section 106 regulation.

ENVIRONMENTAL SPECIALIST III, Jones & Stokes, Sacramento, California
February 1999 to May 2001

Designed, conducted, and managed short- and long-term archaeological projects in California, Nevada, and New Mexico to comply with Sections 106 and 110 of the NHPA. Prepared proposals. Assisted with client contract negotiations. Conducted archaeological record searches and archival research. Directed Phase I pedestrian inventory surveys and test excavations for Phase II evaluations. Analyzed material culture assemblages. Prepared technical reports and regulatory compliance documents including National Register property and district evaluations, and monitoring and discovery plans. Represented clients in consultations with federal and state agencies, and coordinated and managed clients' compliance with federal cultural resource

regulations and the cultural resource regulations of California, Nevada, and New Mexico.

ASSISTANT ANTHROPOLOGIST, Bernice Pauahi Bishop Museum, Honolulu, Hawai`i
August 1996 to June 1998

Assisted with archaeological project design, preparation of proposals, and client contract negotiations, directed Phase I pedestrian inventory surveys, test excavations for Phase I subsurface inventory surveys, test excavations for property evaluations, and data recovery excavations, and assisted with preparation of technical reports on short-term cultural resource management contracts. Analyzed field records, prepared site reports and synthetic report chapters, and analyzed and prepared reports on lithic assemblages for Phases I–III of a long-term federal highway project (Interstate Route H–3). Conducted research in Hawaiian archaeology, and delivered public and professional presentations of that research. Advised on the integration of geoarchaeological methods and techniques into cultural resource management field efforts, and on geoarchaeological interpretations of extant field records, and designed and conducted geoarchaeological components of fieldwork for short–term cultural resource management contracts.

RECENT PROFESSIONAL DEVELOPMENT

CULTURAL RESOURCE AND ENVIRONMENTAL LAW

Successful CEQA Compliance: An Intensive Two-Day Seminar
Sacramento, California, University of California, Davis, Continuing and Professional Education, Terry Rivasplata and Maggie Townsley
June 2009

ACHP - FHWA Advanced Seminar: Reaching Successful Outcomes in Section 106 Review
Vancouver, Washington, Advisory Council on Historic Preservation, Don Klima and Carol Legard; Federal Highway Administration, Mary Ann Naber
October 2007

NEPA Compliance and Cultural Resources
Portland, Oregon, National Preservation Institute, Joe Trnka
October 2007

Section 106: How to Negotiate and Write Agreements
Sacramento, California, National Preservation Institute, Claudia Nissley
November 2004

Consultation with Indian Tribes on Cultural Resource Issues
Sacramento, California, National Preservation Institute, Thomas F. King and Reba Fuller
September 2003

Section 106: How to Negotiate and Write Agreements
The Presidio, San Francisco, California, National Preservation Institute, Thomas F. King
May 2002

Introduction to CEQA

Sacramento, California, University of California, Davis, Continuing and Professional Education, Ken Bogdan and Terry Rivasplata
July 2000

TECHNICAL ARCHAEOLOGY

Introduction to Historic Site Survey, Preliminary Evaluation, and Artifact ID
West Sacramento, California, California Department of Transportation, Julia Huddleson, Anmarie Medin, Judy Tordoff, and Kimberly Wooten; California Department of Parks and Recreation, Glenn Farris, Larry Felton, and Pete Schulz
September 2006

Principles of Geoarchaeology for Transportation Projects (Course No. 100246)
Sacramento, California, California Department of Transportation, Graham Dalldorf, Glenn Gmoser, Jack Meyer, Stephen Norwick, Adrian Praetzellis, and William Silva
October 2006

INFORMATION TECHNOLOGY AND CULTURAL RESOURCE MANAGEMENT

GIS: Practical Applications for Cultural Resource Projects
Sacramento, California, National Preservation Institute, Deidre McCarthy
September 2006

RECENT PAPERS AND REPORTS

BASTIAN, BEVERLY E. AND MICHAEL D. MCGUIRT

2009 **Cultural Resources**. In *Final Staff Assessment, Canyon Power Plant, Application for Certification (07-AFC-9), Orange County* (CEC-700-2009-008-FSA, September 2009), edited by Siting, Transmission and Environmental Protection Division, California Energy Commission, pp. 4.3-1–4.3-51. Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento. On file with the California Energy Commission, Sacramento.

BLOSSER, AMANDA, MICHAEL D. MCGUIRT, AND BEVERLY E. BASTIAN

2008 **Cultural Resources**. In *Staff Assessment, Orange Grove Project, Application for Certification (08-AFC-4), San Diego County* (CEC-700-2008-009, November 2008), edited by Siting, Transmission and Environmental Protection Division, California Energy Commission, pp. 4.3-1–4.3-43. Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento. On file with the California Energy Commission, Sacramento.

DARCANGELO, JENNIFER, JOHN SHARP, MICHAEL D. MCGUIRT, ANDREA GALVIN, AND CLARENCE CAESAR

2004 ***Section 106 for Experienced Practitioners: Consulting with the California SHPO*** *(GEV4111)*. Course taught on 8 September 2004 in Oakland to California Department of Transportation cultural resources personnel and private sector cultural resource consultants (8 hours).

DARCANGELO, JENNIFER, JOHN SHARP, MICHAEL D. MCGUIRT, AND ANDREA GALVIN
2005 ***How to Consult with the California SHPO***. Workshop presented on 23 April 2005 at the 39th Annual Meeting of the Society for California Archaeology, Sacramento, California (6 hours).

JONES & STOKES
1999a ***Cultural Resource Inventory Report for Williams Communications, Inc. Fiber Optic Cable System Installation Project, Wendover, Nevada to the California State Line***. Volume 1: Draft Report. July. (JSA 98-358.) Sacramento, California. Prepared for Williams Communications, Inc., Tulsa, Oklahoma.

1999b ***Cultural Resources Report for the Williams Communications, Inc. Interstate 80 Fiber Optic Cable System Installation Project***. Volume I. September. (JSA 98-358.) Submitted to Williams Communications, Inc., Tulsa, Oklahoma. On file with the State Historic Preservation Office, Carson City, Nevada.

1999c ***Archaeological Site Avoidance and Monitoring Plans for Williams Communications' Fiber Optic Cable Installation In the Union Pacific Railroad Right-of-Way, Doña Ana County to Hidalgo County, New Mexico***. October. (JSA98-379.) Sacramento, California. Prepared for Williams Communications, Inc., Tulsa, Oklahoma.

2001 ***Final Phase II Cultural Resource Evaluation for the Kramer Mining District, Edwards AFB, Kern and San Bernardino Counties, California***. Volume I. November. Sacramento, California. On file with the Base Historic Preservation Officer, Edwards AFB, California.

LEBO, SUSAN A. AND MICHAEL D. MCGUIRT
1997 ***Geoarchaeology at 800 Nuuanu: Archaeological Inventory Survey of Site 50-80-14-5496 (TMK1-7-02:02), Honolulu, Hawai`i***. Department of Anthropology, Bishop Museum, Honolulu. (100 pp.) Submitted to Bank of Hawaii, Honolulu. On file with the State Historic Preservation Division, Honolulu.

1998a ***Assessments of Stone Architecture: a Case Study from North Hālawa Valley, O`ahu***. Paper presented at the 11th Annual Hawaiian Archaeology Conference of the Society for Hawaiian Archaeology, Kailua-Kona, Hawai`i.

1998b ***Pili Grass, Wood Frame, Brick, and Concrete: Archaeology at 800 Nuuanu***. Department of Anthropology, Bishop Museum, Honolulu. (142 pp.) Submitted to Bank of Hawaii, Honolulu. On file with the State Historic Preservation Division, Honolulu.

LENNSTROM, HEIDI A., P. CHRISTIAAN KLIEGER, MICHAEL D. MCGUIRT, AND SUSAN A. LEBO
1997 ***Archaeological Reconnaissance of Pouhala Marsh, `Ewa District, O`ahu***. Department of Anthropology, Bishop Museum, Honolulu. (14 pp.) Submitted to Ducks

Unlimited, Inc., Rancho Cordova, California. On file with the State Historic Preservation Division, Honolulu.

MCGUIRT, MICHAEL D.

1996 ***The Geoarchaeology and Palynology of an Early Formative Pithouse Village in West-Central New Mexico***. Unpublished M.A. thesis, Department of Anthropology, University of Texas at Austin.

1998 **50-80-10-2010, 50-80-10-2016, 50-80-10-2088, and 50-80-10-2134**. In *Activities and Settlement in an Upper Valley: Data Recovery and Monitoring Archaeology in North Hālawa Valley, O`ahu*, vols. 2a and 2b, edited by Department of Anthropology, Bishop Museum, pp. 1–3, 1–44, 1–5, and 1–46. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

2002 **Committee Reports, OHP Liaison**. *SCA Newsletter* 36(3):4–5.

2004 **Committee Reports, OHP Liaison**. *SCA Newsletter* 38(2):7, 38(3):6–8.

2006 **Preservation Archaeology**. In *California Statewide Historic Preservation Plan: 2006–2010*, edited by Marie Nelson, pp. 8–15. California Department of Parks and Recreation's Office of Historic Preservation, Sacramento. Submitted to the National Park Service, Washington, D.C. On file at the California Office of Historic Preservation, Sacramento.

2008 **Dealing with Multi-element Cultural Resources under Section 106**. In *Historic Properties Are More Than Meets the Eye: Dealing with Historical Archaeological Resources under the Regulatory Context of Section 106 and CEQA*. Session presented on 25 April 2008 at the *33rd Annual California Preservation Conference* of the California Preservation Foundation in Napa, California, moderated by Michelle Messinger and Michael D. McGuirt (1 1/2 hours).

MCGUIRT, MICHAEL D., AMANDA BLOSSER, AND BEVERLY E. BASTIAN

2009 **Cultural Resources**. In *Final Staff Assessment, Beacon Solar Energy Project, Application for Certification (08-AFC-2), Kern County* (CEC-700-2009-005-FSA, August 2009), edited by Siting, Transmission and Environmental Protection Division, California Energy Commission, pp. 4.3-1–4.3-131. Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento. On file with the California Energy Commission, Sacramento.

MCGUIRT, MICHAEL D. AND LESLIE H. HARTZELL

1997 **50-80-10-2139 and 50-80-10-2459**. In *Imu, Adzes, and Upland Agriculture: Inventory Survey Archaeology in North Hālawa Valley, O`ahu*, vols. 2c and 2d, edited by Department of Anthropology, Bishop Museum, pp. 1–17 and 1–5. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

1998 **Chapter 1: Introduction**. In *Activities and Settlement in an Upper Valley: Data Recovery and Monitoring Archaeology in North Hālawa Valley, O`ahu*, vol. 1, edited by Department of Anthropology, Bishop Museum, pp. 1–14. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

McGUIRT, MICHAEL D. AND SHANNON P. MACPHERRON

1998 **50-80-10-2137**. In *Activities and Settlement in an Upper Valley: Data Recovery and Monitoring Archaeology in North Hālawa Valley, O`ahu*, vol. 2b, edited by Department of Anthropology, Bishop Museum, pp. 1–86. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

McGUIRT, MICHAEL AND SARAH C. MURRAY

2008 **Cultural Resources**. In *Preliminary Staff Assessment, Ivanpah Solar Electric Generating System, Application for Certification (07-AFC-5), San Bernardino County* (CEC-700-2008-013-PSA, December 2008), edited by Siting, Transmission and Environmental Protection Division, California Energy Commission, pp. 5.3-1–5.3-73. Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento. On file with the California Energy Commission, Sacramento.

McGUIRT, MICHAEL D. AND DEBORAH I. OLSZEWSKI

1997 **50-80-10-2256**. In *Imu, Adzes, and Upland Agriculture: Inventory Survey Archaeology in North Hālawa Valley, O`ahu*, vol. 2d, edited by Department of Anthropology, Bishop Museum, pp. 1–9. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

MIKESELL, STEPHEN, MICHAEL McGUIRT, AND TRISH FERNANDEZ

2007 **Introduction to the White Papers in State Historical Resources Commission Archaeology Committee White Papers**. *SCA Newsletter* 41(1):18–21.

SHARP, JOHN, MICHAEL D. McGUIRT, JENNIFER DARCANGELO, AND ANDREA GALVIN

2004 ***How to Consult with the California SHPO***. Workshop presented on 18 March 2004 at the 38th Annual Meeting of the Society for California Archaeology, Riverside, California (4 hours).

DECLARATION OF
Alvin J. Greenberg, Ph.D.

I**, Alvin J. Greenberg, Ph.D.** declare as follows:

1. I am presently a consultant to the California Energy Commission, Energy Facilities Siting and Environmental Protection Division.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on the **Public Health, Hazardous Materials Management, and Worker Safety/Fire Protection** sections for the **Ridgecrest Solar Power Project Application** based on my independent analysis of the amendment petition, supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: February 8, 2010 Signed: Original signed by A. Greenberg

At: Sacramento, California

Risk Science Associates

121 Paul Dr., Suite A, San Rafael, Ca. 94903-2047
415-479-7560 fax 415-479-7563
e-mail agreenberg@risksci.com

Name & Title: **Alvin J. Greenberg, Ph.D., FAIC, REA, QEP**
Principal Toxicologist

Dr. Greenberg has had over two decades of complete technical and administrative responsibility as a team leader in the preparation of human and ecological risk assessments, air quality assessments, hazardous materials handling and risk management/prevention, infrastructure vulnerability assessments, occupational safety and health, hazardous waste site characterization, interaction with regulatory agencies in obtaining permits, and conducting lead surveys and studies. He has particular expertise in the assessment of dioxins, lead, diesel exhaust, petroleum hydrocarbons, mercury, the intrusion of subsurface contaminants into indoor air, and the preparation and review of public health/public safety sections of EIRs/EISs. Dr. Greenberg's expertise in risk assessment has led to his appointment as a member of several state and federal advisory committees, including the California EPA Advisory Committee on Stochastic Risk Assessment Methods, the US EPA Workgroup on Cumulative Risk Assessment, the Cal/EPA Peer Review Committee of the Health Risks of Using Ethanol in Reformulated Gasoline, the California Air Resources Board Advisory Committee on Diesel Emissions, the Cal/EPA Department of Toxic Substances Control Program Review Committee, and the DTSC Integrated Site Mitigation Committee. Dr. Greenberg is the former Chair of the Bay Area Air Quality Management District Hearing Board, a former member of the State of California Occupational Health and Safety Standards Board (appointed by the Governor), and former Assistant Deputy Chief for Health, California OSHA. And, since the events of 9/11, Dr. Greenberg has been the lead person for developing vulnerability assessments, power plant security programs, and conducting safety and security audits of power plants for the California Energy Commission and has assisted the CEC in the assessment of safety and security issues for proposed LNG terminals. In addition to providing security expertise to the State of California, Dr. Greenberg was the Team Leader and main consultant to the State of Hawaii on the updating of their Energy Emergency Preparedness Plan.

Years Experience: 26

Education:

B.S. 1969 Chemistry, University of Illinois Urbana

Ph.D. 1976 Pharmaceutical/Medicinal Chemistry, University of California, San Francisco

Postdoctoral Fellowship 1976-1979 Pharmacology/Toxicology, University of California, San Francisco

Postgraduate Training 1980 Inhalation Toxicology, Lovelace Inhalation Toxicology Research Institute, Albuquerque, NM

Professional Registrations:

Board Certified as a Qualified Environmental Professional (QEP)
California Registered Environmental Assessor - I (REA)
Fellow of the American Institute of Chemists (FAIC)

Professional Affiliations:

Society for Risk Analysis
Air and Waste Management Association
American Chemical Society
American Association for the Advancement of Science
National Fire Protection Association

Technical Boards and Committee Memberships - Present:

Squaw Valley Technical Review Committee
(appointed 1986)

Technical Boards and Committee Memberships - Past:

July 1996 – March 2002
Member, Bay Area Air Quality Management District Hearing Board
(Chairman 1999-2002)
September 2000 – February 2001
Member, State Water Resources Control Board Noncompliant Underground Tanks Advisory Group
January 1999 – June 2001
Member, California Air Resources Board Advisory Committee on Diesel Emissions
January 1994 - September 1999
Vice-Chairman, State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee
September 1998
Member, US EPA Workgroup on Cumulative Risk Assessment
April 1997 - September 1997
Member, Cal/EPA Private Site Manager Advisory Committee
January 1986 - July 1996
Member, Bay Area Air Quality Management District Advisory Council
(Chairman 1995-96)
January 1988 - June 1995
Member: California Department of Toxic Substance Control Site Mitigation Program Advisory Group
January 1989 - February 1995
Member: Department of Toxics Substances Control Review Committee, Cal-EPA

October 1991 - February 1992
Chair: Pollution Prevention and Waste Management Planning Task Force of the Department of Toxics Substances Control Review Committee, Cal-EPA

September 1990 - February 1991
Member: California Integrated Waste Management Board Sludge Advisory Committee

September 1987 - September 1988
ABAG Advisory Committee on Regional Hazardous Waste Management Plan

March 1987 - September 1987
California Department of Health Services Advisory Committee on County and Regional Hazardous Waste Management Plans

January 1984 - October 1987
Member, San Francisco Hazardous Materials Advisory Committee

March 1984 - March 1987
Member, Lawrence Hall of Science Toxic Substances and Hazardous Materials Education Project Advisory Board

Jan. 1, 1986 - June 1, 1986
Member, Solid Waste Advisory Committee, Governor's Task Force on Hazardous Waste

Jan. 1, 1983 - June 30, 1985
Member, Contra Costa County Hazardous Waste Task Force

Sept. 1, 1982 - Feb. 1, 1983
Member, Scientific Panel to Address Public Health Concerns of Delta Water Supplies, California Department of Water Resources

Present Position

January 1983- present
Owner and principal with Risk Sciences Associates, a Marin County, California, environmental consulting company specializing in multi-media human health and ecological risk assessment, air pathway analyses, hazardous materials management-infrastructure security, environmental site assessments, review and evaluation of EIRs/EISs, preparation of public health and safety sections of EIRs/EISs, and litigation support for toxic substance exposure cases.

Previous Positions

Jan. 2, 1983 - June 12, 1984
Member, State of California Occupational Safety and Health Standards Board (Cal/OSHA), appointed by the Governor

Aug. 1, 1979 - Jan. 2, 1983
Assistant Deputy Chief for Health, California Occupational Safety and Health Administration

Feb. 1, 1979 - Aug. 1, 1979

Administrative Assistant to Chairperson of Finance Committee, Board of Supervisors, San Francisco

Jan. 1, 1976 - Feb. 1, 1979
Research Pharmacologist and Postdoctoral Fellow, Department of Pharmacology and Toxicology, School of Medicine, University of California, San Francisco

Jan. 1, 1975 - Dec. 31, 1975
Acting Assistant Professor, Department of Pharmaceutical Chemistry, University of California, San Francisco

Experience

General

Dr. Greenberg has been a consultant in Hazardous Materials Management and Security, Human and Ecological Risk Assessment, Occupational Health, Toxicology, Hazardous Waste Site Characterization, and Toxic Substances Control Policy for over 26 years. He has broad experience in the identification, evaluation and control of health and environmental hazards due to exposure to toxic substances. His experience includes Community Relations Support and Risk Communication through experience at high-profile sites and presentations at professional society meetings.

He has considerable experience in the review and evaluation of exposure via the air pathway - particularly to emissions from power plants, refineries, and diesel exhaust - and a thorough knowledge of the regulatory requirements through his experience at Cal/OSHA, the BAAQMD Hearing Board, as a consultant to the California Energy Commission, and in preparing such assessments for local government and industry. He has assessed exposures to diesel exhaust during construction and operations of stationary and mobile sources and has testified at evidentiary hearings numerous times on this subject.

He is presently assisting the California Energy Commission in assessing the risks to workers and the public of proposed power plants and LNG terminals in the state. His experience in hazard identification, exposure assessment, risk assessment, occupational safety and health, emergency response, and Critical Infrastructure Protection has made him a valuable part of the CEC team addressing this issue. He has reviewed and commented on the DEIS/DEIR for the proposed SES LNG Port of Long Beach terminal, focusing on security issues for the CEC and on safety matters for the City of Long Beach. He has presented technical information and analysis to the State of California Interagency LNG Working Group on thermal radiation public exposure criteria and safety/security at an east coast urban LNG terminal. (Both presentations are confidential owing to the nature of the material.) He has conducted numerous evaluations of the safety and hazards of natural gas pipelines for the CEC and has presented his findings and recommendations at public meetings and evidentiary hearings.

He served for over five years as the Vice-chair of the California State Water Resources Control Board Advisory Committee convened to address toxic substances in sediments in bays, rivers, and estuaries. He has been a member of the Squaw Valley Technical Review Committee since 1986 establishing chemical application management plans at golf courses to protect surface and

groundwater quality. He has also conducted numerous ecological risk assessments and characterizations, including those for marine and terrestrial habitats.

Dr. Greenberg has extensive experience in data collection and preparation of human and ecological risk assessments on numerous military bases and industrial sites with Cal/EPA DTSC and RWQCB oversight. He has also been retained to provide technical services to the Cal/EPA Department of Toxic Substances Control (preparation of human health risk assessments) and the Office of Environmental Health Hazard Assessment (review and evaluation of air toxics health risk assessments and preparation of profiles describing the acute and chronic toxicity of toxic air contaminants). He has also conducted several surveys of sites containing significant lead contamination from various sources including lead-based paint, evaluated potential occupational exposure to lead dust and fumes in industrial settings, prepared numerous human health risk assessments of lead exposure, and prepared safety and health plans for remedial investigation of lead contaminated soils. Dr. Greenberg is also a recognized expert on the requirements of California's Proposition 65 and has served as an expert on Prop. 65 litigation.

Sites with EPA, RWQCB and/or DTSC Oversight

Dr. Greenberg has specific experience in assessing human health and ecological risks at contaminated sites at the land/water interface, including petroleum contaminants, metals, mercury, and VOCs at several locations in California including Oxnard, Richmond, Avila Beach, Mare Island Naval Shipyard, San Diego, Hollister, San Francisco, Hayward, Richmond, the Port of San Francisco, and numerous other locations. He has used Cal/EPA methods, US EPA methods, and ASTM Risk Based Corrective Action (RBCA) and Cal/Tox methodologies. He is extremely knowledgeable about SWRCB and SF Bay RWQCB regulations on underground storage tank sites and with ecological issues presented by contaminated sediments including sediment analysis, toxicity testing, tissue analysis, and sediment quality objectives. Dr. Greenberg served on the State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee from 1994 until the end of the program in 1999.

Dr. Greenberg experience on many of these contaminated sites has been as a consultant to local governments, state agencies, and citizen groups. He assisted the City and County of San Francisco in developing local ordinance requiring soil testing (Article 20, Maher ordinance) and hazardous materials use reporting (Article 21, Walker ordinance). He served as the City of San Rafael's consultant to provide independent review and evaluation of the site characterization and remedial action plan prepared for a former coal gasification site. He was a consultant to a citizen group in northern California regarding exposure and risks due to accidental releases from a petroleum refinery and assisted in the assessment of risks due to crude petroleum contamination of a southern California beach. He has prepared a number of risk assessments addressing crude petroleum, diesel and gasoline contamination, including coordinating site investigations, environmental monitoring, and health risk assessment for the County of San Luis Obispo regarding Avila Beach subsurface petroleum contamination. That high-profile project lasted for over one year and Dr. Greenberg managed a team of experts with a budget of $750,000. Another high-profile project included the preparation of an extensive comprehensive human and ecological risk assessment for the Hawaii Office of Space Industry on rocket launch impacts and transportation/storage of rocket fuels at the southern end of the Big Island of Hawaii. Dr. Greenberg's risk assessments were part of the EIS for the project. Dr. Greenberg also worked on another high-profile project conducting Air Pathway Analysis of off-site and on-site impacts

from landfill gas constituents, including indoor and outdoor air measurements, air dispersion modeling, flux chamber investigations, and health risk assessment for the County of Santa Barbara. Dr. Greenberg has conducted RI/FS work, prepared health risk assessments, evaluated hazardous waste sites and hazardous materials use at numerous locations in California, Hawaii, Oregon, Minnesota, Michigan, and New York. He has considerable experience in the development of clean-up standards and the development of quantitative risk assessments for site RI/FS work at CERCLA sites, as well as site closures, involving toxic substances and petroleum hydrocarbon wastes. He is experienced in working with both Region IX EPA and the State of California DTSC in negotiating clean-up standards based on the application of both site-specific and non site-specific health and ecological based clean-up criteria. He has significant experience in the development of site chemicals of concern list, quantitative data quality levels, site remedial design, the site closure process, the design and execution of data quality programs and verification of data quality prior to its use in the decision making process on large NPL sites.

Examples

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)
The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Health Risk Assessment and Air Pathway Analysis for the Ballard Canyon Landfill, Santa Barbara County, Ca. (March 1999)

Screening Human Health Risk Assessment, Calculation of Soil Clean-up Levels, and Aquatic Ecological Screening Evaluation, Galilee Harbor, Sausalito, Ca. (May 1998)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

Health Risk Assessment for Residual Mercury at the Deer Creek Facility, 3475 Deer Creek Road, Palo Alto, California. (July 1997)

Phase 2 Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (February 1997)

Human Health Risk Assessment, Teledyne Ryan Aeronautical, McCormick Selph Ordnance. Hollister, California. (December 1996)

Initial Phase Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (October 1996)

Human Health Risk Assessment, Ecological Screening Evaluation, and Development of Proposed Remediation Goals for the Flair Custom Cleaners Site, Chico, California (January 1996)

Human Health Risk Assessment for the X-3 Extrudate Project at Criterion Catalyst, Pittsburg, Ca. (November 1994)

Screening Health Risk Assessment and Development of Proposed Soil Remediation Levels at Hercules Plant #3, Culver City, Ca. (July 1993)

Ecological Screening Evaluation for the Altamont Landfill, Alameda County, Ca. (June, 1993)

Focused Ecological Risk Characterization, Hawaiian Electric Company, Keahole Generating Station Expansion, Hawaii (June 1993)

Human Health Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawaii Office of Space Industry (April 1993)

Ecological Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawaii Office of Space Industry (March 1993)

Human Health Risk Assessment for Current and Proposed Expanded Class II and Class III Operations at the Altamont Sanitary Landfill, Alameda County, Ca.
(March, 1993)

Screening Health Risk Assessment for the Proposed Expansion of the West Marin Sanitary Landfill, Point Reyes Station, Ca.
(March, 1993)

Health Risk Assessment for the Proposed Expansion of the Forward, Inc. Landfill, Stockton, Ca.
(September 14, 1992)

Health Risk Assessment for the Rincon Point Park Project, San Francisco, Ca. Prepared for Baseline Environmental Consulting and the San Francisco Redevelopment Agency.
(August 10, 1992)

Health Risk Assessment for the South Beach Park Project, San Francisco, Ca. Prepared for Baseline Environmental Consulting and the San Francisco Redevelopment Agency.
(August 10, 1992)

Screening Health Risk Assessment and Development of Proposed Soil and Groundwater Remediation Levels, Kaiser Sand and Gravel, Mountain View, Ca. Prepared for Baseline Environmental Consulting (January 30, 1992)

Development of Proposed Soil Remediation Levels for the Marine Corps Air-Ground Combat Center, 29 Palms, California (May 30, 1991)

Preliminary Health Risk Assessment for the City of Pittsburg Redevelopment Agency, Pittsburg, California (May 29, 1991)

Military Bases

Dr. Greenberg has experience in conducting assessments at DOD facilities, including RI/FS work, preparation of health risk assessments, evaluation of hazardous waste sites and hazardous materials use at the following Navy sites in California: San Diego Naval Base; Marine Corps Air-Ground Combat Center, 29 Palms; Mare Island Naval Shipyard, Vallejo; Treasure Island Naval Station, San Francisco, Hunters Point Naval Shipyard, San Francisco, and the Marine

Corps Logistics Base, Barstow. He worked with the U.S. Navy and the U.S. EPA in the implementation of Data Quality Objectives (DQO's) at MCLB, Barstow.

Examples

Review and Evaluation of the Remedial Investigation Report and Human Health Risk Assessment for the U. S. Naval Station at Treasure Island, Ca. (June 1999)

Screening Health Risk Assessment for the Proposed San Francisco Police Department's Helicopter Landing Pad at Hunters Point Shipyard, San Francisco, Ca. (September 1997)

Development of Proposed Soil Remediation Levels for the Marine Corps Air-Ground Combat Center, 29 Palms, California (May 30, 1991)

Health Risk Assessment for the Chrome Plating Facility, Mare Island Naval Shipyard, Vallejo, California (October 24, 1988)

Background Levels and Health Risk Assessment of Trace Metals present at the Naval Petroleum Reserve No.1, 27R Waste Disposal Trench Area, Lost Hills, California (August 12, 1988)

RCRA Facility Investigation (RFI) Work Plan of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (August 14, 1989)

Hazardous Waste and Solid Waste Audit and Management Plan, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (July 3, 1989)

Water Quality Solid Waste Assessment Test (SWAT) Proposal RCRA Landfill, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (October 31, 1988)

Waste Disposal Facilities, Waste Haulers, Waste Recycling Facilities Report, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 22, 1988)

Sampling and Analysis Plan, Health and Safety Plan, Site Characterization of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 2, 1988)

Air Quality Solid Waste Assessment Test (SWAT) Proposal, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (August 25, 1988)

Liquefied Natural Gas (LNG)

Dr. Greenberg assisted the CEC in the preparation of the "background" report on the risks and hazards of siting LNG terminals in California ("LNG in California: History, Risks, and Siting" July 2003) and consulted for the City of Vallejo on a proposed LNG terminal and storage facility at the former Mare Island Naval Shipyard. He has also conducted an evaluation and prepared comments on the risks, hazards, and safety analysis of the DEIS/DEIR for the City of Long

Beach on a proposed LNG terminal at the Port of Long Beach (POLB) and conducted an analysis on vulnerability and critical infrastructure security for the CEC on this same proposed LNG terminal. He currently advises the CEC on the POLB LNG proposal on risks, hazards, human thresholds of thermal exposure, vulnerability, security, and represented the CEC at a U.S. Coast Guard briefing on the Waterway Suitability Assessment that included the sharing of SSI (Sensitive Security Information). He has presented technical information and analysis to the State of California LNG Interagency Working Group on thermal radiation public exposure criteria and safety/security at an east coast urban LNG terminal. (Both presentations are confidential owing to the nature of the material.) He has conducted numerous evaluations of the safety and hazards of natural gas pipelines for the CEC and has presented his findings and recommendations at public meetings and evidentiary hearings.

Infrastructure Security

Since 2002, Dr. Greenberg has been trained by and is working with the Israeli company SB Security, LTD, the most experienced and tested security planning and service company in the world. Since the events of 9/11, Dr. Greenberg has been the lead person for developing vulnerability assessments and power plant security programs for the California Energy Commission (CEC). In taking the lead for this state agency, Dr. Greenberg has interfaced with the California Terrorism Information Center (CATIC) and provided analysis, recommendations, and testimony at CEC evidentiary hearings regarding the security of power plants within the state. These analyses include the assessment of Critical Infrastructure Protection, threat assessments, criticality assessments, and the preparation of vulnerability assessments and off-site consequence analyses addressing the use, storage, and transportation of hazardous materials, recommendations for security to reduce the threat from foreign and domestic terrorist activities, perimeter security, site access by personnel and vendors, personnel background checks, management responsibilities for facility security, and employee training in security methods. Dr. Greenberg is the lead person in developing a model power plant security plan, vulnerability assessment matrix, and a security training manual for the CEC. The model security plan is used by power plants in California as guidance in developing and implementing security measures to reduce the vulnerability of California's energy infrastructure to terrorist attack. He has testified at several evidentiary hearings for the CEC on power plant security issues. He also leads an audit team conducting safety and security audits at power plants throughout California that are under the jurisdiction of the CEC. In addition to providing security expertise to the State of California, in August 2004, a team of experts led by Dr. Greenberg was awarded an 18-month contract by the State of Hawaii to update and improve the state's Energy Emergency Preparedness Plan and make recommendations for increased security of critical energy infrastructure on this isolated group of islands.

Air Pathway Analysis

Dr. Greenberg has prepared numerous Air Pathway Analyses and human health risk assessments, evaluating exposure at numerous locations in California, Hawai'i, Oregon, Minnesota, Michigan, and New York. He is experienced in working with Region IX EPA, the State of California DTSC, and the Hawai'i Department of Health Clean Air Branch in the application of both site-specific and non site-specific health risk assessment criteria.

Examples

Human Health Risk Assessment for the Open Burn/Open Detonation Operation at McCormick Selph, Inc., Hollister, Ca. (June 2003)

Air Quality and Human Health Risk Assessment for the Royal Oaks Industrial Complex, Monrovia, Ca. (January 2003)

Human Health Risk Assessment and Indoor Vapor Intrusion Assessment for the former Pt. St. George Fisheries Site, Santa Rosa, Ca. (October 2002)

Human Health Risk Assessment for the former Sargent Industries Site, Huntington Park, Ca. (July 2001)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)

The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Health Risk Assessment and Air Pathway Analysis for the Ballard Canyon Landfill, Santa Barbara County, Ca. (March 1999)

Human Health Risk Assessment, Teledyne Ryan Aeronautical, McCormick Selph Ordnance. Hollister, California. (December 1996)

Initial Phase Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (October 1996)

Human Health Risk Assessment for Current and Proposed Expanded Class II and Class III Operations at the Altamont Sanitary Landfill, Alameda County, Ca.
(March, 1993)

Focused Ecological Risk Characterization, Hawaiian Electric Company, Keahole Generating Station Expansion, Hawai'i (June 1993)

Human Health Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawai'i Office of Space Industry (April 1993)

Ecological Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawai'i Office of Space Industry (March 1993)

Human Health Risk Assessment Due to Emissions from a Medical Waste Incinerator, prepared for Kauai Veterans Memorial Hospital, Kauai, Hawai'i (1994)

Cancer Risk Assessment for the H-Power Generating Station, Campbell Industrial Park, Oahu, Hawai'i (1988)

Hazardous Materials Assessments, Waste Management Assessments, Worker Safety and Fire Protection Assessments, and Public Health Impacts Assessments

Dr. Greenberg also has significant experience as a consultant and expert witness for the California Energy Commission providing analysis, recommendations, and testimony in the areas of hazardous materials management, process safety management, waste management, worker safety and fire protection, and public health impacts for proposed power plant/cogeneration facilities. These analyses include the evaluation and/or preparation of the following:

- Off-site consequence analyses of the handling, use, storage, and transportation of hazardous materials,
- Risk Management Plans (required by the Cal-ARP) and Business Plans (required by H&S Code section 25503.5),
- Safety Management Plans (required by 8 CCR section 5189),
- Natural gas pipeline safety,
- Solid and hazardous waste management plans,
- Phase I and II Environmental Site Assessments,
- Construction and Operations Worker Safety and Health Programs,
- Fire Prevention Programs,
- Human health risk assessment from stack emissions and from diesel engines, and
- Mitigation measures to address PM exposure, including diesel particulates

Examples

- Almond 2 Power Plant Project, City of Ceres, Ca. 2009 – present. Public health.
- Watson Cogeneration Steam and Electric Reliability Project, Carson, Ca. 2009 – present. Public health.
- Hanford Combined-Cycle Power Plant (amendment), Kings County, Ca. 2008 – present. Public health.
- Henrietta Combined-Cycle Power Plant (amendment), Kings County, Ca. 2008 – present. Public health.
- Lodi Energy Center, Lodi, Cal. 2008 – present. Hazardous materials management, worker safety/fire protection.
- Marsh Landing Generating Station, City of Antioch, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection.
- Palmdale Hybrid Power Plant, Palmdale, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection, public health.
- Stirling Energy Systems Solar 1 Project, San Bernardino County, Ca. 2008 – present. Public health.
- Stirling Energy Systems Solar 2 Project, Imperial County, Ca. 2008 – present. Public health.
- San Joaquin Solar 1&2, Fresno County, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection, public health.
- GWF Tracy Combined Cycle Power Plant, Tracy, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection, public health.
- CPV Vaca Station Power Plant, Vacaville, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection.

- Willow Pass Generating Station, Pittsburg, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection, waste management.
- Avenal Energy Power Plant, Avenal, Ca. 2008 – 2009. Worker safety/fire protection, public health.
- Orange Grove Energy, San Diego County, Ca. 2008-2009. Public health.
- Riverside Energy Resource Center Units 3&4, Riverside, Ca. 2008 – 2009. Hazardous materials management.
- Canyon Power Plant, Anaheim, Ca. 2007 – present. Hazardous materials management, worker safety/fire protection, public health.
- Carlsbad Energy Center, Carlsbad, Ca. 2007 – present. Hazardous materials management, worker safety/fire protection, public health.
- Ivanpath Solar Electric Generating System, San Bernardino County, Ca. 2007 – present. Public health.
- Kings River Conservation District Community Power Project, City of Parlier, Ca. 2007 – 2009. Hazardous materials management, worker safety/fire protection.
- Chula Vista Energy Upgrade Project, Chula Vista, Ca. 2007 – 2009. Hazardous materials management, worker safety/fire protection.
- Chevron Richmond Power Plant Replacement Project, Richmond, Ca. 2007 – 2008. Hazardous materials management, public health.
- Humboldt Bay Generating Station, Eureka, Ca. 2006 – 2008. Hazardous materials management, worker safety/fire protection, waste management.
- El Centro Power Plant – Unit 3 Repower Project, El Centro, Ca. 2006 – 2007. Public health.
- San Francisco Energy Reliability Project, San Francisco, Ca. 2004 – 2006. Hazardous materials management, worker safety/fire protection, waste management, public health
- Inland Empire Energy Center, Romoland, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Malburg Generating Station Project, City of Vernon, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Blythe II, Blythe, Ca. 2002-3. hazardous materials, worker safety/fire protection,
- Palomar Energy Center, Escondido, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Cosumnes Power Project, Rancho Seco, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Tesla Power Project, Tesla, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- San Joaquin Valley Energy Center, San Joaquin, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management
- Morro Bay Power Plant, Morro Bay, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Potrero Power Plant Unit 7, San Francisco, Ca., 2001-2: hazardous materials, worker safety/fire protection
- El Segundo Power Redevelopment Project, El Segundo, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Rio Linda Power Project, Rio Linda, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health

- Pastoria II Energy Facility Expansion, Grapevine, Ca., 2001: hazardous materials, worker safety/fire protection
- East Altamont Energy Center, Byron, Ca., 2001-2: hazardous materials, worker safety/fire protection
- Magnolia Power Project, Burbank, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Russell City Energy Center, Hayward, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Woodbridge Power Plant, Modesto, Ca., 2001: hazardous materials, worker safety/fire protection, waste management
- Colusa Power Plant Project, Colusa County, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Valero Refinery Cogeneration Project, Benicia, Ca., 2001: hazardous materials, worker safety/fire protection
- Ocotillo Energy Project, Palm Springs, Ca., 2001: hazardous materials, worker safety/fire protection
- Gilroy Energy Center Phase II Project, Gilroy, Ca., 2001-2: hazardous materials, worker safety/fire protection
- Los Esteros Critical Energy Facility, San Jose, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Roseville Energy Facility, Roseville, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Spartan Power, San Jose, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Inland Empire Energy Center, Romoland, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- South Star Cogeneration Project, Taft, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Tesla Power Plant, Eastern Alameda County, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Tracy Peaker Project, Tracy, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Henrietta Peaker Project, Kings County, Ca., 2001: hazardous materials, worker safety/fire protection, waste management, public health
- Central Valley Energy Center, San Joaquin, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Cosumnes Power Plant, Rancho Seco, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Los Banos Voltage Support Facility, Western Merced County, Ca., 2001-2: waste management, public health
- Palomar Energy Project, Escondido, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Metcalf Energy Center, San Jose, Ca., 2000-1: hazardous materials
- Blythe Power Plant, Blythe, Ca., 2000-1: hazardous materials
- San Francisco Energy Co. Cogeneration Project, San Francisco, Ca., 1994-5: hazardous materials

- Campbell Soup Cogeneration Project, Sacramento, Ca., 1994: hazardous materials
- Proctor and Gamble Cogeneration Project, Sacramento, Ca., 1993-4: hazardous materials
- San Diego Gas and Electric South Bay Project, Chula Vista, Ca., 1993: hazardous materials
- SEPCO Project, Rio Linda, Ca., 1993: hazardous materials
- Shell Martinez Manufacturing Complex Cogeneration Project, Martinez, Ca., 1993: hazardous materials and review and evaluation of EIR

Occupational Safety and Health/Health and Safety Plans/Indoor Air Quality

Dr. Greenberg has significant experience in occupational safety and health, having directed the development, adoption, and implementation of over 50 different Cal/OSHA regulations, including airborne contaminants (>450 substances), lead, asbestos, confined spaces, and worker-right-to-know (MSDSs). He has conducted numerous occupational health surveys and has extensive experience in the sampling and analysis of indoor air quality at residences, workplaces, and school classrooms. He is currently the team leader conducting safety and security audits at power plants throughout California for the California Energy Commission. Safety issues audited include compliance with regulations addressing several safety matters, including but not limited to, confined spaces, lockout/tagout, hazardous materials, and fire prevention/suppression equipment.

Examples

Review and Evaluation of Public and Worker Safety Issues at the proposed SES LNG Facility, Port of Long Beach. prepared for the City of Long Beach. (November 2005)

Confidential safety and security audit reports for 18 power plants in California. prepared for the California Energy Commission. (January 2005 through March 2006)

Report on the Accidental release and Worker Exposure to Anhydrous Ammonia at the BEP I Power Plant, Blythe, Ca. prepared for the California Energy Commission. (October 2004)

Investigation of a Worker Death in a Confined Space, La Paloma Power plant. prepared for the California Energy Commission. (July 2004)

Preliminary Report on Indoor Air Quality in Elementary School Portable Classrooms, Marin County, Ca. (December 1999)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

Air Pathway Analysis for the Ballard Canyon Landfill. Submitted to the County of Santa Barbara, (March 1999)

Review and Evaluation of the Health Risk Assessment for Outdoor and Indoor Exposures at the Former Golden Eagle Refinery Site, Carson, Ca. (May 1998)

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)

The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Phase 2 Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (February 1997)

Determination of Occupational Lead Exposure at a Tire Shop in Placerville, Ca. (April 1993)

Development of an Environmental Code of Regulations for Hazardous Waste Treatment Facilities on La Posta Indian Tribal lands, San Diego County, Ca. (August 1992)

Sampling and Analysis Plan, Health and Safety Plan, Site Characterization of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 2, 1988)

Mercury Contamination

Dr. Greenberg has prepared and/or reviewed several human health and ecological risk assessments regarding mercury contamination in soils, sediments, and indoor surfaces. Dr. Greenberg served on the State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee from 1994 until the end of the program in 1999.

Examples

Review and evaluation of a human health risk assessment of ingestion of sport fish caught from San Diego Bay and which contain tissue levels of mercury and PCBs (November 2004 – present)

Screening Human Health Risk Assessment, Calculation of Soil Clean-up Levels, and Aquatic Ecological Screening Evaluation, Galilee Harbor, Sausalito, Ca. (May 1998)

Health Risk Assessment for Residual Mercury at the Deer Creek Facility, 3475 Deer Creek Road, Palo Alto, California. (July 1997)

Human Health Risk Assessment Due to Emissions from a Medical Waste Incinerator, prepared for Kauai Veterans Memorial Hospital, Kauai, Hawai'i (1994)

DECLARATION OF SHAELYN STRATTAN

I, **Marsha L. (Shaelyn) Strattan**, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division as a **Planner II**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Land Use, Recreation, and Wilderness** for the **Ridgecrest Solar Power Project,** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 3/23/10 Signed: Original signed by S. Strattan

At: Sacramento, California

Marsha L. (Shaelyn) Strattan
California Energy Commission Planner II
Siting, Transmission, and Environmental Protection Division

EXPERIENCE SUMMARY

Nine years experience in land use planning, recreation, environmental review and analysis, and project management with the California Energy Commission, California State Parks, and Calaveras County Planning Department. Twenty-five years of writing, editing, and research experience, focused on recreation, agriculture, and the environment, with the California Air Resources Board, California Department of Toxic Substances Control, California Department of Fish and Game, and as owner of *The Wordworker*, a writing, editing, and research company, specializing in environmental research, education, and public relations. Seven years experience as an Air Traffic Control Specialist with the Federal Aviation Administration and U.S. Air Force.

PROFESSIONAL EXPERIENCE

California Energy Commission
Planner II 2 yrs/3 mos[1]

Environmental Technical Specialist - Identify, describe, and analyze complex environmental issues related to the construction and operation of electrical energy production facilities, transmission corridors, alternative energy technologies and energy conservation, and Commission programs and policies. Prepare components of Staff Analyses to comply with requirements of the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), with emphasis on the identification and mitigation of environmental impacts to land use, traffic and transportation, visual resources, and environmental justice. Prepare and present Commission reports and expert technical testimony.

Project Manager - Plan, organize, and direct the work of an interdisciplinary environmental and engineering staff team engaged in the evaluation of complex/controversial energy facility siting applications and major commission programs.

California Energy Commission (CEC): Analyst for Eastshore Energy Power Plant (06-AFC-06; Land Use and Traffic & Transportation/Aviation); Victorville II Hybrid Power Project (07-AFC-01; Land Use); Humboldt Bay Generating Station (06-AFC-07); Traffic & Transportation); Ridgecrest Solar Power Project (09-AFC-9; Land Use/Recreation/ Wilderness); Rice Solar Energy Project (09-AFC-10; Land Use/Recreation/Wilderness); and Russell City Energy Center Amendment (01-AFC-7C; Land Use and Traffic & Transportation/ Aviation). Project Manager for Beacon Solar Energy Project (08-AFC-02); San Gabriel Generating Station (07-AFC-02); and Kings River Conservation District Community Power Project (07-AFC-07)

Calaveras County Planning Department 2 yrs/9 mos[2]
Planner III (Senior Planner)

Planning and evaluation of complex land use projects; environment review (CEQA/NEPA); project and contract manager for consultants (EIR, natural and cultural resource studies, and peer reviews); preparation/review of resource ordinances; preparation/coordination of conservation and utility easements; CEQA coordinator; liaison with Calaveras Council of Governments and county counsel on land use issues.

[1] Nov 2006 – Nov 2008 and Dec 2009 – present.
[2] Feb 2005 – Nov 2006 and Nov 2008 – Nov 2009

California Department of Parks & Recreation Jan 2001 - Jan 2005
Environmental Coordinator (Associate Park & Recreation Specialist)

Supervising Lead: Coordinate environmental review for DPR's Major Capital Outlay, Minor Capital Outlay, and Accessibility programs with Service Center and district staff. Consult with project managers, designers, and environmental specialists to refine project scope and identify potentially significant adverse environmental impacts for park projects in Northern and Central California. Prepare environmental documents (CEQA/NEPA) for DPR projects. Project and contract manager for consultants preparing environmental analysis. Prepare or work with consultants to prepare the environmental impact analysis for General Plans (GPs) and Resource Management Plans for State Park units. Prepare application(s) for project-specific state and federal environmental permits. Prepare grant proposal, application, and supporting documents for project-related federal funding (High Sierra Museum and Visitor Center at Donner Memorial State Park). Review environmental documents prepared by non-departmental entities to determine the potential impact on ongoing or proposed projects or programs. Prepare comments identifying potential impacts to the department's interests and/or effectiveness of proposed mitigation. Review and comment on pending legislation, as it relates to environmental issues, CEQA/NEPA, and Departmental policy/procedures.

Statewide Environmental Coordinator (January 2002 - June 2003): Develop and coordinate a standardized CEQA review process and establish criteria for evaluating project impacts and environmental compliance documents. Provide training for District and Service Center personnel involved in the preparation and processing of environmental documents. Develop training support materials. Conduct CEQA seminars at California Trails and Greenways Conference (September 2002 & 03) and Resource Ecologists' In-Service Training Seminar (2002). Act as Service Center liaison with the Environmental Stewardship Section of the Natural Resources Division regarding the effectiveness and improvement of the environmental review process.

California Air Resources Board (Research Division) Nov 1998-Nov 2000
Research Writer

Research, write, and/or edit technical documents, presentations, and related materials, with special emphasis on scientific and environmental writing for a general readership. These documents include Requests for Proposals; responses to public inquiries; consumer guidelines and fact sheets; articles for magazines and technical journals; brochures; webpage information (both internal and external); legislative bill analyses; briefing documents; proposals; and Board presentations and agenda items. Evaluate suitability of documents for publication.

The Wordworker May 1987-Nov 1999
Owner & Primary Researcher/Editor/Author

Work included narratives (including voice-overs), scripting, copy editing, transcription, and technical writing; proposals (grants, bids, and new business); legal briefs (environmental and family law); training and teacher's manuals; desktop publishing (brochures, newsletters, flyers, etc.); and adaptation of scientific information for general readership. Research, draft, review/edit, and comment on CEQA/NEPA environmental documents; coordinate preparation of materials among project scientists, lead and responsible agencies, and applicants. Promotional consultant and press liaison for several non-profit fundraisers, seminars, and symposiums.

Federal Aviation Administration 1975-1981
Air Traffic Control Specialist

Control air traffic at Salem Tower (Salem, OR) and the Oakland Air Traffic Control Center in Fremont, CA. Coordinate aviation-related search and rescue operations. Provide pilot weather briefings, flight

plan assistance, and in-flight information at Bellingham International Airport, Dannelly Field (Montgomery, AL) and Purdue University Airport (W. Lafayette, IN).

Tennessee Valley Authority 1974-75 (18 mos)
Engineering Aide

Set, monitor, and analyze dosimeters at Browns Ferry and Sequoia Nuclear Power Plants. Collect and analyze vegetation, silage, milk, water, and air samples from surrounding areas to establish background radiation levels and provide on-going radiation monitoring.

EDUCATION

- Colleges & Universities
  - American River College (Sacramento, CA)
  - Calhoun Community College (Huntsville, AL)
  - University of Alabama (Tuscaloosa, AL)
  - Whatcom Community College (Bellingham, WA)
  - California State University – Sacramento

- Certificate: Land Use and Environmental Planning (University of California – Davis)
- Certificate: Technical Writing (American River College)
- Certificate: Meteorology/Weather Observer (National Weather Service; 1975); Licensed 1975-1982

MILITARY SERVICE

- U.S. Air Force - Aircraft Control & Warning Operator (honorable discharge – August 1969)
- California Air National Guard – Air Traffic Controller (honorable discharge 1984)

DECLARATION OF
Erin Bright

I**, Erin Bright,** declare as follows:

1. I am presently employed by the California Energy Commission in the **Engineering Office** of the Siting Transmission and Environmental Protection Division as a **Mechanical Engineer**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Noise and Vibration** for the **Ridgecrest Solar Power Project** based on my independent analysis of the Application, supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: February 18, 2010 Signed: Original signed by E. Bright

At: Sacramento, California

Erin Bright
Mechanical Engineer

Experience Summary

One year of experience in the electric power generation field, including analysis of noise pollution, construction/licensing of electric generating power plants, and engineering and policy analysis of thermal power plant regulatory issues. One year of experience in the alternative energy field, including analysis of alternative fuel production and use.

Education

- University of California, Davis--Bachelor of Science, Mechanical Engineering and Materials Science
- University of California, Davis Extension Program--Renewable Energy Systems

Professional Experience

2007 to Present-- Mechanical Engineer, Energy Facilities Siting Division - California Energy Commission

Performed analysis of generating capacity, reliability, efficiency, noise, and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases.

2006 to 2007--Energy Analyst, Fuels & Transportation Division - California Energy Commission

Performed analysis of use potential and environmental effects of emerging non-petroleum fuels, including compressed natural gas, biomass, hydrogen and electricity, in heavy and light duty transportation vehicles. Contributor to Energy Commission's alternative fuels plan.

DECLARATION OF
SUE WALKER

I**, SUE WALKER** declare as follows:

1. I am presently employed by the California Energy Commission in the **SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION** of the Energy Facilities Siting Division as a **SENIOR TECHNICAL SPECIALIST**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE**, for the **SOLAR MILLENNIUM RIDGECREST SOLAR POWER PROJECT** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: March 19, 2010 Signed: Original signed by Sue Walker

At: Goleta, California

SUSAN S. WALKER

Senior Associate, Environmental Planning

ACADEMIC BACKGROUND

M.A., Applied Geography, City University of New York, 1988
B.A., Physical Geography, University of Colorado at Boulder, 1983

PROFESSIONAL EXPERIENCE

Ms. Walker joined Aspen Environmental Group in 2000, and has over 20 years of experience in environmental consulting. Ms. Walker primarily functions as a Project Manager for both large- and small-scale multidisciplinary environmental review documents under the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA). Ms. Walker additionally functions as a Senior Analyst and Issue Area Coordinator for land use and public policy analyses and related social science analyses. Ms. Walker also has expertise in regulatory permit acquisition, the development of permit compliance strategies, permit compliance implementation and tracking, agency coordination and relations, and, assistance with GIS planning and implementation. Ms. Walker's project-specific efforts are provided below.

Aspen Environmental Group — 2000 to present

- **California Valley Solar Ranch Project, County of San Luis Obispo Department of Planning and Building, Senior Analyst (2009 - Present).** Ms. Walker is currently serving as a senior analyst for an Environmental Impact Report (EIR) addressing a proposed 250-megawatt photovoltaic solar power plant in the Carrizo Plain of eastern San Luis Obispo County. The EIR also includes analysis of a proposed surface aggregate mine on property adjacent to the proposed solar project. Ms. Walker is preparing the document's land use and recreation analysis, including a comprehensive policy consistency analysis of San Luis Obispo County's General Plan and related zoning ordinances. Ms. Walker is additionally preparing a "stand alone" analysis of historic agricultural uses and patterns in the project area based upon examination and assessment of a suite of aerial photographs taken over an approximate 40 year time frame.

- **Topaz Solar Farm Project, County of San Luis Obispo Department of Planning and Building, Senior Analyst (2009 - Present).** Ms. Walker is functioning as a senior analyst for an EIR that is being prepared for a proposed 550-megawatt photovoltaic solar power plant in the Carrizo Plain of eastern San Luis Obispo County. The project includes two "options" ranging in size between 6,500 and 8,000 acres. Ms. Walker is preparing the EIR's land use and recreation analysis and is also completing an analysis of past agricultural uses and practices within the project area over an approximate 40 year period. Ms. Walker is also assisting with the facilitation of public workshops and meetings.

- **Ridgecrest Solar Power Project, California Energy Commission (CEC), Senior Analyst (2009 - Present).** Ms. Walker is currently preparing the socioeconomics and environmental justice analysis for a Staff Assessment/Environmental Impact Statement (SA/EIS) addressing a proposed 250-megawatt solar power plant near the City of Ridgecrest in northeast Kern County. Ms. Walker is responsible for the research and preparation of the project's "baseline" conditions for social and economic attributes, including public services, recreation and minority and below-poverty-level

populations, as well as an impact analysis addressing the proposed project, its alternatives and cumulative projects.

- **Upper San Antonio Creek Watershed Giant Reed Removal Project, Ventura County Watershed Protection District (VCWPD), Project Manager (2008 – 2009).** Ms. Walker served as the Project Manager for an Initial Study and Mitigated Negative Declaration (IS/MND) for the proposed removal of giant reed (*Arundo donax*) and the opportunistic removal of castor bean (*Ricinus communis*) in the tributaries that make up the upper San Antonio Creek watershed, which is located in the Ojai Valley of Ventura County, California. She was responsible for: completion of the Administrative Draft, Public Draft and Final IS/MNDs; preparation of several sections of the IS and MND, including their respective Project Descriptions, the IS General Plan policy consistency analysis and the MND's Mitigation Monitoring and Reporting Plan; completion of all public and agency CEQA noticing and IS/MND distribution; and, support at public hearings. Ms. Walker was additionally responsible for oversight of the project's regulatory permit application package for review and approval by the California Department of Fish and Game.

- **Baldwin Hills Community Standards District, City of Culver City, Senior Analyst (2008 – 2009).** Ms. Walker served as a senior analyst for technical review of an EIR addressing a proposed Community Standards District for onshore oil well drilling and production in the Baldwin Hills area of Los Angeles County, California. Ms. Walker was responsible for review and comment on the Draft EIR's Project Description, land use, recreation and environmental justice sections, and preparing responses to the Final EIR's responses to comments on the Draft EIR. She additionally prepared a stand-alone "white paper" on the onshore oil well drilling and operational regulations, permits, bonds and taxes required by the State and local jurisdictions (incorporated cities and counties) within southern California. She is currently providing senior review during the City of Culver City's development of a separate Community Standards District and permitting process for oil well drilling and operation within its jurisdictional boundaries.

- **Port of Los Angeles Channel Deepening Project, U.S. Army Corps of Engineers (Corps), Issue Area Coordinator for Social Sciences and Senior Analyst (2005 – 2009).** Ms. Walker served as the Issue Area Coordinator for the social sciences, and as a senior technical analyst for a Supplemental Environmental Impact Statement/Environmental Impact Report (Supplemental EIS/EIR) addressing proposed channel deepening within the Port of Los Angeles. Ms. Walker completed senior technical reviews of all resource/issue-specific analyses related to the social sciences, and also functioned as either the principal analyst or as a co-analyst for the Supplemental EIS/EIR's land use, visual resources, recreation, socioeconomic and environmental justice analyses.

- **Sylmar to Pacific Ocean DC Electrode Replacement Project, City of Los Angeles Department of Water and Power (LADWP), Project Manager (2006 – 2008).** Ms. Walker served as the Project Manager for preparation of an Initial Study for replacement of the onshore, underground segment of a direct current (DC) electrode located in the vicinity of West Los Angeles, Santa Monica, and Pacific Palisades, California. Ms. Walker was responsible for overall coordination and management of Aspen Environmental Group's (Aspen's) project team and its subcontractors, senior technical review of all resource/issue-specific analyses, oversight of document reproduction and distribution and development of a CEQA-related public property owner and agency distribution list, and, preparation of the Initial Study's Project Description, mandatory findings of significance, and land use and recreation analyses.

- **Lake Canyon Dam and Detention Basin, VCWPD, Project Manager (2006 – 2008).** Ms. Walker served as the Project Manager for a proposed flood control detention basin and dam located in Ventura County, California; the purpose of the project was to protect areas within the City of Ventura from flood waters associated with a 100-year storm event. Ms. Walker was responsible for the management of the project's Initial Study and all aspects of its public and agency noticing and distribution, as well as coordination and facilitation of the project's public and agency meetings. She was additionally responsible for all aspects of Aspen's initial efforts regarding preparation of the

project's Draft EIR; during preparation of the Draft EIR the project was suspended for the purpose of evaluating alternative means of flood control within the project area.

- **Ormond Beach Wetlands Restoration Feasibility Study, California State Coastal Conservancy, Project Manager (2006 – 2009).** Initiated by Aspen in 2003, Ms. Walker assumed management of the Ormond Beach Wetlands Restoration Feasibility Study in 2006. The project involves proposed wetlands restoration of more than 750 acres of land within the Oxnard Plain of Ventura County, California. The project includes: identifying restoration goals with the assistance of regional experts and local stakeholders; assessing various opportunities and constraints in the project area (biological, engineering, cultural, infrastructure, regulatory, land use, land availability, funding, soils and surface water contamination and remediation, water quality, geotechnical, socioeconomic, and recreation); developing a suite of potential restoration alternatives that range in breadth from development of a full tidal lagoon to enhancing existing non-tidal wetland habitats; evaluating and ranking these alternatives at a resource-specific level; and, providing short-term and long-term recommendations for project implementation.

- **Tehachapi Renewable Transmission Project, California Public Utilities Commission (CPUC), Issue Area Coordinator for Social Sciences and Senior Analyst (2007 – Present).** Ms. Walker is currently acting as the land use analyst and Issue Area Coordinator for the social sciences for the Tehachapi Renewable Transmission Project's EIR/EIS, and its associated resource/issue-specific Specialist Reports. The project involves a suite of new, replacement and modified transmission lines extending from a planned substation located southeast of the City of Tehachapi, Kern County, to a substation located in the City of Ontario, San Bernardino County; the project also involves one new and several expanded substations. Ms. Walker is responsible for the management, coordination and senior technical oversight of seven technical teams, including cultural resources, visual resources, socioeconomics, agricultural resources, recreation and wilderness, environmental justice, and public utilities. She is additionally responsible for preparation of the EIR/EIS's land use analysis. Her efforts have also included review of the Proponent's Environmental Assessment (PEA) for technical adequacy, the preparation of data adequacy comments and data requests, and assistance with development of the technical approach for the analysis of cumulative impacts.

- **Redmont Pump Station Replacement Project, LADWP, Project Manager and Senior Analyst (2007 – 2008).** Ms. Walker served as the Project Manager for an IS/MND addressing a proposed water supply pump station replacement project in the community of Sunland, which is located in the City of Los Angeles, California. Ms. Walker was responsible for preparation of the IS/MND's Project Description and Mitigation Monitoring Plan, completion of the IS/MND's land use and planning, recreation, aesthetics, and mandatory findings of significance, management of Aspen's project team, including its subcontractors, senior technical review of all resource/issue-specific analyses addressed in the IS/MND, and oversight of document reproduction. Ms. Walker was additionally responsible for completion of the project's CEQA notices for public and agency review and comment.

- **Tranquillon Ridge Oil and Gas Development Project, Santa Barbara County, Senior Analyst (2006 – 2008).** Ms. Walker served as a senior technical analyst for an EIR addressing proposed oil and gas development of the Tranquillon Ridge oil and gas field, located in State waters offshore northern Santa Barbara County, California. Ms. Walker completed the EIR's analyses for visual resources/aesthetics, land use and public policy, and recreation. Ms. Walker additionally assisted with development of the EIR's off- and on-shore cumulative project listings and descriptions, as well as completion of multiple resource/issue-specific technical analyses for the EIR's cumulative impacts assessment.

- **Owens River Gorge Restoration Project, LADWP, Project Manager and Senior Analyst (2005 – 2006).** Ms. Walker served as both the Project Manager and a senior technical analyst for a preliminary environmental review of proposed modifications to the water flows released into an approximate 10-mile reach of the Owens River Gorge, located in Mono and Inyo Counties, California. The analysis was completed for the Los Angeles Department of Water and Power for

habitat restoration and maintenance. Ms. Walker was responsible for all aspects of the project's management, coordination and senior technical review for an Initial Study level of analysis, and prepared the document's Project Description, as well as numerous resource/issue-specific technical sections, including land use and planning, recreation, and mandatory findings of significance.

- **Preliminary Environmental Profile of California's Imported Electricity, CEC, Senior Analyst (2005).** Ms. Walker served as a contributing author of a technical report addressing the primary sources of California's imported electricity, and the key biological and water-related impacts associated with that electricity's generation. The report was prepared for the CEC in support of its "Environmental Performance in 2005 Integrated Energy Policy Report." Ms. Walker's efforts were focused on issues associated with power generated from natural gas and hydroelectricity. In addition, Ms. Walker provided overall assistance to the report's Project Manager, including overall staff coordination and guidance, as well as senior technical reviews.
- **Antelope-Pardee 500-kV Transmission Project, CPUC, Senior Analyst (2005 – 2007).** Ms. Walker served as a technical analyst for an Alternatives Siting Report for the proposed Antelope-Pardee 500-kV Transmission Project (Segments 2 and 3). Her efforts included the identification of alternative above- and below-ground Right-Of-Way alignments, coordination with transmission engineers to evaluate the technical feasibility of the alternatives, and preliminary assessments of the potential impacts and key advantages and disadvantages of the alternatives. Ms. Walker additionally prepared several technical sections of the project's environmental review document, including its assessment of both growth inducing impacts and irreversible and irretrievable commitment of resources. She also prepared numerous responses to comments on the Draft EIR/EIS for the purposes of its finalization, and completed several of the resource/issue-specific technical analyses included in the Final EIR/EIS's "Findings of Fact."
- **Environmental Information Document and Coastal Consistency Determinations for Federal Oil and Gas Leases Offshore Santa Barbara, Ventura and San Luis Obispo Counties, U.S. Department of the Interior, Minerals Management Service, Project Manager (2004 – 2005).** Ms. Walker served as the Project Manager for preparation of a multidisciplinary Environmental Information Document (EID) and ten federal Coastal Consistency Determinations that evaluated the potential effects of future development of the undeveloped federal oil and gas leases offshore Santa Barbara, Ventura and San Luis Obispo Counties, California. The documents addressed both lease-specific and cumulative impacts for the period 2006 through 2030. In addition to overall project management and coordination, Ms. Walker was responsible for senior technical review and the preparation of text regarding near- and long-term activities that may occur on the Pacific Outer Continental Shelf, and was a principal author of the California Coastal Act policy consistency analyses prepared for each of the project's Lease/Unit-specific Coastal Consistency Determinations.
- **Simulation of Natural Flows in Middle Piru Creek California Department of Water Resources (DWR), Project Manager (2004 – 2005).** Ms. Walker served as the Project Manager for an EIR addressing a proposed dam flow release modification schedule into middle Piru Creek, located in Ventura and Los Angeles Counties, California. The purpose of the project was to mimic natural surface water flows. Ms. Walker was responsible for overall management and coordination of the project team, senior technical review of all resource-issue specific analyses, and preparation of several sections of the EIR, such as the description of the proposed project and its alternatives and the analyses for the environmentally preferred alternative, growth-inducing impacts, and cumulative impacts. Ms. Walker was also responsible for the writing and publication/distribution of all public and agency notices, and coordinated the content of, and led the project's public workshops and meetings.
- **Ventura River *Arundo* Removal Demonstration Project, VCWPD, Project Manager and Senior Analyst (2003).** Ms. Walker served as the Project Manager for the preparation of an EIR for the proposed removal of giant reed (*Arundo donax*), a highly invasive non-native plant species, using four different removal and revegetation techniques within the Ventura River, Ventura County, California. Ms. Walker additionally served as the overall Project Manager for the effort's regulatory permit acquisition

program. Ms. Walker prepared multiple chapters of the EIR, including its Project Description, completed numerous technical analyses of the document, such as pubic health, visual resources, land use and planning, recreation, and General Plan environmental policy consistency, provided senior technical review for all other sections of the EIR, prepared for and participated in the project's public hearings, and assisted with the project's public noticing requirements under CEQA.

- **Morro Bay Power Plant Project, CEC, Power Plant Coordinator and Senior Analyst (2001 – 2002).** Ms. Walker served as the Power Plant Coordinator and land use analyst for preparation of the Preliminary and Final Staff Assessments (PSA and FSA, respectively) for the Morro Bay Power Plant Project. Ms. Walker managed Aspen's staff and subcontractors' work efforts and schedules, coordinated with the CEC Project Manager regarding overall project logistics and schedule, and, completed the land use analysis for the PSA and FSA, including in-depth coordination with California Coastal Commission staff and participation in public workshops and evidentiary hearings.
- **Mountain View Power Plant Project, CEC, Senior Analyst (2000).** Ms. Walker assisted with preparation of the socioeconomics analysis during preparation of the PSA and FSA for the proposed Mountain View Power Plant Project. Efforts included data searches and reviews, agency contacts, and preparation of the analysis and text for the PSA and FSA.
- **Inland Empire Power Plant Project, CEC, Power Plant Coordinator and Senior Analyst (2001 – 2003).** Ms. Walker acted as the Power Plant Coordinator and socioeconomics and alternatives analyst for the CEC's environmental review of the Inland Empire Power Plant Project. Efforts included overall staff coordination, communications and scheduling during preparation of the project's data adequacy analyses, PSA, and FSA, as well as the coordination of, preparation for, and participation in the project's various public workshops and hearings.
- **Coastal Power Plant Evaluation, CEC, Senior Analyst (2002).** Ms. Walker functioned as a senior analyst during preparation of an evaluation focused on the key environmental and regulatory issues associated with the licensing and operation of coastally located power plants within California. Ms. Walker conducted agency interviews, researched power plant-specific licensing cases and other project-specific analyses and reports, and prepared written summaries of the findings of these efforts for inclusion in a draft and final report for review by the CEC.
- **Level 3 Communications Infrastructure Project, CPUC, Deputy Project Manager and Senior Analyst (2000).** Ms. Walker served as the Deputy Project Manager for the preparation of 21 Initial Studies and a master Subsequent MND for the Level (3) Communications Infrastructure Project. The project consisted of the installation of nearly 2,000 miles of fiber optic telecommunications cable throughout California, as well as the cable's related above-ground support facilities. Ms. Walker managed in-house technical and support staff during preparation of the Draft and Final Initial Studies and Subsequent MND, coordinated the completion and publication/distribution of all necessary public and agency noticing, and, oversaw final document editing, compilation and production. Additionally Ms. Walker prepared the 21 Project Descriptions for each Initial Study, prepared the master overview section of the Subsequent MND, and completed each Initial Study's Population and Housing analysis.
- **Visalia Landfill Master Development Plan, Tulare County Resource Management Agency, Senior Analyst (2000).** Ms. Walker provided management assistance during preparation of Draft and Final EIRs for a proposed expansion of the Visalia Landfill, located in Tulare County, California. Ms. Walker completed the Draft and Final "Project Description" and "Introduction" sections of the EIR, conducted the land use and planning analysis of the EIR, and assisted with completion of the document's "Impact Overview" section. In addition, Ms. Walker assisted Aspen's Project Manager with overall project coordination and management of technical staff.
- **Bull Creek Channel Ecosystem Restoration Project, Corps, Project Manager (2000 – 2003).** Ms. Walker functioned as the Project Manager for preparation of an Environmental Assessment (EA) and Ecosystem Restoration Report (ERR) for the Bull Creek Channel Ecosystem Restoration Project. The project was sponsored by the Corps with cooperation by the City of Los Angeles. The project

involved restoration of a degraded reach of Bull Creek, located within the Sepulveda Dam and Flood Control Basin, as well as development of a new park and wetlands habitat area. Ms. Walker provided overall management of, and direction to the project's technical team, completed senior technical reviews of a draft and final documents, and also prepared several technical sections of the ERR and EA, including recreation, lands use, socioeconomics and visual resources.

- **San Jose/Old San Jose Creek Restoration Project, Corps, Senior Analyst (2000 – 2001).** Ms. Walker provided technical analysis for preparation of an EA and ERR for proposed restoration of the final reaches of San Jose and Old San Jose Creeks, located in Santa Barbara County, California. Her efforts included completion of "baseline" and impact analyses for several resource-specific issues, including land use and planning, recreation, aesthetics, and cumulative impacts, as well a preparation of several sections of the two documents' overall content, such as their respective Project Descriptions and Project Purpose and Need.
- **Imperial Beach Shore Protection Project, Corps, Project Manager (2000 – 2002).** Ms. Walker served as the Project Manager for the Imperial Beach Shore Protection Project, a beach restoration effort sponsored by the Corps with participation by the City of Imperial Beach. The effort included preparation of a Draft and Final EIS/EIR for the project. Ms. Walker's efforts included: coordination with Corps staff and managers regarding overall project logistics and schedule; management of the project's in-house technical team and the project's various subcontractors; preparation of many of the EIS/EIR's non issue/resource-specific technical sections, such as the document's Project Description; oversight of all document editing, compilation and production; and, participation in local and California Coastal Commission public hearings.
- **Prado Basin and Vicinity Project, Corps, Senior Analyst (2001).** Ms. Walker functioned as an analyst during finalization of the Prado Basin and Vicinity Project EIS/EIR. The project consisted of a proposal to raise the Prado Dam, located in San Bernardino County, California, and install a series of flood control structures within Prado Basin to provide greater flood control of the downstream area of the Santa Ana River. Ms. Walker prepared numerous responses to comments submitted on the Draft EIS/EIR, and also assisted with over project management and coordination.
- **Bellevue Primary Center Interim Facility, Los Angeles Unified School District (LAUSD), Analyst (2000).** Ms. Walker served as the Project Manager for a revised IS/MND for the LAUSD's Bellevue Primary Center Interim Facility. The project consisted of the temporary relocation of a primary center located in the City of Los Angeles. Ms. Walker coordinated with LAUSD staff during preparation of the IS/MND, managed Aspen Environmental Group's staff, oversaw final document editing, compilation and production, and, prepared the revised Project Description.
- **Hamilton High School Master Addition, LAUSD, Project Manager (2001 – 2002).** Ms. Walker acted as the Project Manager for an IS/MND for a proposed expansion of the Hamilton High School, located in the City of Los Angeles. Ms. Walker was responsible for: overall coordination and communications with LAUSD staff and its consultants; management and coordination of Aspen's staff and its subcontractors; preparation of the documents' general sections, such as the Project Description; and, senior technical review of all sections and analyses contained within the draft and final documents. Ms. Walker also prepared materials for, and participated during, the project's public hearings and community outreach meetings.
- **Aldama Elementary School Master Addition, LAUSD, Project Manager (2001 – 2002).** Ms. Walker served as the Project Manager for an IS/MND addressing a proposed addition to the Aldama Elementary School, located in the City of Los Angeles. Ms. Walker was responsible for: overall coordination and scheduling of the project's environmental review; senior technical review of all technical analyses prepared for the documents; preparation of several of the documents' sections such as their Project Descriptions and the MND's Mitigation Monitoring Plan; and, participation during the project's public hearings.

- **Wonderland Avenue Elementary School Master Addition, LAUSD, Project Manager (2001 – 2003).** Ms. Walker served as the Project Manager for an IS/MND addressing a proposed addition to the Wonderland Avenue Elementary School, located in the City of Los Angeles. Ms. Walker was responsible for overall coordination and scheduling of the project's environmental review, review of all environmental review documents produced for the project, completion of several of the Initial Study's technical analyses, preparation of all of the responses to comments received on the Draft IS/MND, and, completion and distribution of the project's public and agency notices.
- **Reseda High School Master Portable Addition, LAUSD, Project Manger (2002 – 2003).** Ms. Walker served as the Project Manager for an IS/MND addressing proposed portable classroom additions to Reseda High School, located in the City of Los Angeles. Ms. Walker was responsible for overall management of Aspen's internal staff and subcontractors, senior technical review of all draft and final technical analyses, and preparation of several sections of the two documents, including the Initial Study's and MND's respective Project Descriptions, the MND's Mitigation Monitoring Plan, and the Initial Study's recreation, aesthetics, agricultural resources, hazards and hazardous materials, land use and planning, and mandatory findings of significance analyses.
- **Hughes Middle School Re-Opening, LAUSD, Project Manager (2003 – 2004).** Ms. Walker served as the Project Manager for the preparation of an Initial Study for a proposed re-opening of a middle school as a "span" school (6th through 12th grade students) in Woodland Hills, California. The analysis involved two separate school campuses, including a relocation of an existing Adult School. Ms. Walker was responsible for: overall management and coordination of the project team; preparation of numerous technical sections of the Initial Study; senior technical review of all other technical analyses; and, preparation for, and facilitation of the project's public scoping meeting. Ms. Walker was also responsible for the preparation, publication and distribution of all of the project's public and agency noticing.
- **LAUSD New Construction Program EIR, LAUSD, Senior Analyst (2003 – 2004).** Ms. Walker served as the senior analyst for an extensive public outreach and demographic analysis of the LAUSD's District-wide Program EIR for new school construction over a 15- to 20-year period. Ms. Walker was responsible for an in-depth assessment of numerous demographic and economic attributes of the District's population, both regionally and locally, and additionally assisted with sections of the document's "Program Description."
- **Morro Bay Sampling and Chemical Analysis Project, Corps, Project Manager (2001).** Ms. Walker acted as the Project Manager for a water sampling and chemical analyses project within Morro Bay. The purpose of the project was to sample selected locations of the Bay for the necessary approvals needed for proposed dredging activities. Principal agency approvals include the U.S. Environmental Protection Agency and California Coastal Commission. Ms. Walker's involvement included the coordination and scheduling of activities between the Corps and Aspen's subcontractors, and senior technical review of all documents submitted to the Corps.
- **Kern County Oil and Gas Development Permitting Evaluation, California Division of Oil, Gas and Geothermal Resources (DOGGR), Senior Analyst (2001 – 2003).** Ms. Walker served as a senior analyst for an evaluation of the local and State permitting processes for new oil and gas development projects within Kern County, California. Ms. Walker provided technical analyses of various regulatory, policy, and resource-specific issues, and also assisted with overall facilitation of the project during agency, industry, and special interest group meetings and workshops.
- **DOGGR Regulatory Compliance Initial Study (2003).** Ms. Walker served as a senior analyst for an Initial Study evaluating the California Division of Oil, Gas and Geothermal Resources' (DOGGR) proposed program for compliance with CEQA for oil and gas drilling in Kern County, California. Ms. Walker revised DOGGR's regulations for CEQA compliance for review by DOGGR counsel and the Deputy Attorney General, and prepared the agricultural resources and land use and planning analyses

of the project's Initial Study. Ms. Walker also assisted with overall project management, and provided senior technical review for several of the Initial Study's resource/issue-specific analyses.

- **Combined Array for Research in Millimeter-wave Astronomy Project Special Use Permit Application, California Institute of Technology, Senior Analyst (2000 – 2001).** Ms. Walker prepared several sections of a Special Use Permit (SUP) application package for submittal to the U.S. Forest Service for a proposed astronomy facility in the Inyo National Forest, California. Ms. Walker's efforts included an analysis of the federal, State and local regulatory permits and approvals required for the proposed facility, an evaluation of the facility's consistency with the U.S. Forest Service's SUP Screening Criteria, and technical editing and review of the project's final SUP application package.

PREVIOUS EXPERIENCE – 1989 THROUGH 1999

Prior to joining Aspen Environmental Group Ms. Walker served as a Project Manager at Dames & Moore (1989 – 1997), and as a contract planner with the Energy Division of the Santa Barbara County (California) Planning and Development Department (1997 – 1999). A selection of the projects she worked on during this period is provided below.

Environmental Impact Reports, Statements, and Analyses

- **Point Pedernales Project Modification.** Ms. Walker was responsible for completion of an Initial Study and EIR Addendum, and coordination of a Quantitative Risk Analysis for a proposed hydrogen sulfide concentration increase in the 23-mile off- to onshore natural gas pipeline of the Point Pedernales Project located in northern Santa Barbara County.
- **Santa Barbara County Groundwater Element.** Ms. Walker served as the project manager for a Public Draft revision and Final Programmatic EIR addressing the proposed adoption and implementation of a Groundwater Element into the Santa Barbara County Comprehensive General Plan.
- **Vista Del Mar School Relocation and Water Supply Pipeline.** Ms. Walker served as the Project Manager for preparation of a series of Supplemental and Addenda EIRs for construction of a proposed elementary school and water supply pipeline located in central Santa Barbara County.
- **Arroyo Las Posas Channel Improvements Project.** Ms. Walker served as the Project Manager for preparation of a Draft and Final EIR addressing a phased series of stream channel improvements to the Arroyo Las Posas, Ventura County. She additionally served as a technical analyst for land use and visual resources and participated in the project's public hearings.
- **Los Angeles Department of Water and Power Land Exchange.** Ms. Walker served as the Project Manager for Finalization of an EA and Senate Briefing Report for a proposed exchange of properties in Clarke County, Nevada, and Los Angeles County, California, by the Los Angeles Department of Water and Power and Bureau of Land Management.
- **Port of Oakland Feasibility Study.** Ms. Walker prepared an environmental feasibility analysis for proposed rail access to the Port of Oakland by the Atchison, Topeka & Santa Fe Railroad Company. The analysis included assessments of traffic and transportation, air quality, land use, and risk.
- **Mobil M-70 Pipeline Replacement.** Ms. Walker assisted with the overall coordination and preparation of an EIS/EIR addressing the replacement of a 92-mile crude oil pipeline located between Lebec and Torrance, California.
- **California Offshore Oil and Gas Resources Study.** Ms. Walker served as the Assistant Project Manager for the preparation of an extensive inter-disciplinary study evaluating the potential environmental, engineering, and socio-economic constraints associated with various levels of offshore oil and gas development in Ventura, Santa Barbara, and San Luis Obispo Counties.

- **Las Vegas Valley Flood Control Master Plan.** Ms. Walker assisted with the preparation of a Programmatic EIS for a long-range Master Plan of the Las Vegas Valley Flood Control District's phased Flood Control Improvements Project. Her efforts included overall project coordination and analysis of land use and facilities infrastructure.
- **Molycorp Wastewater Pipeline Replacement Project.** Ms. Walker prepared a detailed Project Description for regulatory permitting and inclusion in a joint EA/MND for replacement of a wastewater pipeline system operated for a rare earths mine located in the Mojave Desert.
- **Elsmere Solid Waste Facility.** Ms. Walker prepared of an extensive, multidisciplinary "standalone" Executive Summary for public review detailing the findings of an EIS/EIR for development of a regional landfill for Los Angeles County.
- **Atchison-Topeka Remediation Project.** Ms. Walker prepared an Initial Study and MND for a proposed remediation project in support of truck/train intermodal operations within the City of Vernon, California.
- **Bureau of Land Management Land Exchange.** Ms. Walker prepared socioeconomic and prime farmlands analyses for an EA addressing a series of proposed land exchanges within southern and central Nevada. Analysis included completion of a Farmland Protection Policy Act assessment and U.S. Natural Resource Conservation Service 1006 "Farmland Conversion Impact Rating Forms."

Environmental Regulatory Permitting and Compliance Planning

- **Mead-Adelanto Transmission Project.** Ms. Walker served as Project Manager for the multidisciplinary federal, State, and local regulatory permitting and construction-phase permit compliance planning and implementation of a 210-mile 500 kV transmission line extending from Boulder City, Nevada, to Adelanto, California.
- **Vista Del Mar Water Supply Pipeline.** Ms. Walker served as the Project Manager for the multidisciplinary regulatory permit acquisition and construction-phase compliance planning and implementation of an elementary school and water supply pipeline located in Santa Barbara County.
- **Point Pedernales Project Condition Effectiveness Review.** Ms. Walker completed a comprehensive Preliminary Screening Analysis assessing the effectiveness of the 192 conditions associated with the Santa Barbara County Final Development Plan for the Pt. Pedernales Project, an on- and offshore oil and gas development project.
- **Point Pedernales Project Permit Modifications.** Ms. Walker completed the analysis and regulatory processing of Final Development Plan Substantial Conformity Determinations and a Final Development Plan Director's Amendment for proposed modifications to the Pt. Pedernales Project's oil and gas processing facility located in northern Santa Barbara County, California.
- **Point Pedernales Project Regulatory Compliance.** Ms. Walker was responsible for the compliance tracking and enforcement of the 192 Final Development Plan conditions associated with the Pt. Pedernales Project, an on- and offshore oil and gas development project located in northern Santa Barbara County.
- **Torch Lompoc Gas Processing Facility.** Ms. Walker was responsible for the oversight and coordination of the final regulatory technical reviews and approvals required for commissioning and operation of a natural gas processing plant located in northern Santa Barbara County.
- **Los Medanos Energy Facility.** Ms. Walker served as the Assistant Project Manager during preparation of multiple amendments to an approved CEC Application For Certification for a series of proposed modifications to a power plant located in Contra Costa County.
- **Pastoria Energy Facility.** Ms. Walker served as a Principal Investigator and technical editor during preparation of a CEC Application For Certification for a proposed power plant located in southern

Kern County. Resource-specific investigations included assistance with completion of the application's socioeconomic, cumulative impacts, water supply, and "Applicable Laws, Ordinances, Regulations and Standards" analyses.

- **Kern River Natural Gas Pipeline.** Ms. Walker served as a Principal Investigator during the preconstruction preparation of compliance implementation plans, as well as construction-phase development and implementation of multiple databases tracking the environmental monitoring and regulatory permit compliance of a 904-mile natural gas pipeline traversing the states of Wyoming, Utah, Nevada, and California.
- **Hercules Remediation Project.** Ms. Walker assessed the federal, State, and local regulatory permit acquisition requirements for the remedial clean-up of an extensive petrochemical spill associated with the Hercules Oil and Gas Development Project located in Santa Barbara County.

Land Use and Public Policy Analyses and GIS Applications

- **Santa Barbara North County Siting Study.** Ms. Walker completed the land use analysis and oil and gas facility infrastructure "baseline" section for a siting and constraints study focused on the potential alternatives available for the construction and operation of a new consolidated oil and gas processing facility in northern Santa Barbara County, California.
- **Miramar Railroad Realignment.** Ms. Walker served as the Principal Investigator for the land use and public policy baseline, impacts, and constraints analyses for a rail line straightening and expansion project located in the northern portion of the City of San Diego. Analyses were completed for inclusion in both a "stand alone" environmental constraints study and EIR.
- **Mobil M-70 Pipeline Replacement Project.** Ms. Walker served as the Principal Investigator for the land use analysis, mapping, and impact assessment of a proposed 92-mile crude oil pipeline and alternatives between Lebec and Torrance, California. The effort included local and County public policy analysis of pipeline placement and operation requirements.
- **Las Vegas Valley Water District Cooperative Use Project.** Ms. Walker Principal conducted an image processing and spatial analysis of a series of LANDSAT satellite images to classify natural habitats and land use for the preliminary siting of an extensive network of water supply wells and pipelines throughout southern Nevada.
- **Kern County Valley Floor Habitat Conservation Plan.** Ms. Walker conducted an extensive habitat and land use air photo interpretation, mapping, and analysis of the western half of Kern County for inclusion in the Kern County Valley Floor Habitat Conservation Plan. The effort included mapping and analysis of the County's General Plan Land Use Element Goals and Policies, and County Zoning Ordinances.
- **Borax Mine Expansion.** Ms. Walker served as the Principal Investigator for the Project Description, Project Alternatives, and socioeconomic and land use analyses portions of an EA addressing a proposed expansion of the U.S. Borax Boron Mine facility, Kern County, California.
- **Clark County (Nevada) Flood Control District Master Plan EIS.** Ms. Walker prepared the Project Description, cumulative impacts, and land use analyses of the Clark County Flood Control District Master Plan EIS.
- **QAD Facility Expansion.** Ms. Walker Prepared the noise and land use analyses for a preliminary environmental assessment/screening for a proposed facility expansion of a light-industrial enterprise in Carpinteria, California. The task included local and Santa Barbara County analysis of General Plan and Zoning regulations related to land use development.
- **Santa Clara River Flood Control Improvements.** Ms. Walker served as the Principal Investigator for a detailed air photo interpretation, mapping, and quantification of predominant habitat types, land uses, and stream network patterns associated with the Santa Clarita Valley, California. Analysis

included impact assessment of a proposed series of regional flood control improvements of the Santa Clara River.

- **Dominigoni Valley Development Project.** Ms. Walker conducted an air photo interpretation, mapping, and analysis tracking the historic land uses, natural habitats, and stream network patterns associated with the Dominigoni Valley, California. The analysis was conducted to evaluate potential land development and its affects on local stream networks.
- **Geographic Information System Applications.** Ms. Walker has managed and/or implemented the design, development, and analysis of numerous multidisciplinary Geographic Information System (GIS) efforts, including: California Offshore Oil and Gas Energy Resources Study; Kern County Habitat Conservation Plan; Chevron Hawaii Refinery Pipeline Data Management System; Union Pacific–Southern Pacific Merger Application Environmental Analysis; Caltrans Route 41 Environmental Assessment Project; and, Nellis Air Force Base Integrated Natural Resources Management Plan.

PROFESSIONAL AFFILIATIONS

- Association of Environmental Professionals

CERTIFICATES/AWARDS

- Darkenwald Award for outstanding academic achievement by a first year graduate student (City University of New York, Department of Geography and Geology, 1987).

DECLARATION OF
Michael P. Donovan, P.G., C.Hg.

I, **Michael P. Donovan**, declare as follows:

1. I am presently under contract with Aspen Environmental Group to provide environmental technical assistance to the California Energy Commission. I am serving as a Senior Hydrogeologist and to provide Peak Workload Support for the Energy Facility Siting Program and for the Energy Planning Program.

2. My professional qualifications and experience are attached hereto and incorporated by reference herein.

3. I helped prepare the Staff Testimony and errata on **Soil and Water Resources** sections for the Ridgecrest Solar Power Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony and errata is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and errata and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: March1, 2010 Signed:

At: Santa Ana, California

Education

BS/1978/Geology/Oregon State University

Computer Modeling of Groundwater Flow and Contaminant Transport by Jacob Bear/University of California, Irvine

Registration

1986/California Registered Geologist #4112 (Expires 06/30/11)

2000/California Certified Hydrogeologist #701 (Expires 06/30/11)

Experience

With Psomas 5 years; with other firms for 24 years.

Background

Mr. Donovan is a professional hydrogeologist with over 29 years of experience in project management, hydrology and hydrogeological assessments, conceptual model development, groundwater modeling studies, water quality assessments, and groundwater resource development. He has extensive skills with monitoring well design, water quality sampling and analytical techniques, quality assurance/quality control, CEQA, environmental impact assessment, ecohydrology, agency negotiations, risk assessment, and expert witness.

Related Projects

San Juan Basin Authority (2004-Present): Senior Hydrogeologist – Hydrogeologic characterization and monitoring of groundwater extraction as part of desalination facility. Project includes implementation of groundwater monitoring plan including water quality sampling and analytical testing, groundwater modeling, monitoring of surface and groundwater levels and flow and assessments in change in storage to the alluvial groundwater basin from ongoing extraction wells. In addition, evaluated recharge of alluvial groundwater system using diverted stream channels and percolation basins for ongoing desalination project.

Metropolitan Water District of Southern California: Senior Hydrogeologist – Hydrogeologic characterization of bedrock geology in vicinity of proposed Pipeline No. 6 water conveyance tunnel. Work included development of monitoring plan including sampling protocols, laboratory analytical techniques, and quality assurance and quality control procedures.

Private Developer, Hydrogeologic Assessment (2004 to Present): Senior Hydrogeologist - Hydrogeologic characterization of Shaver Valley (east of Indio, CA) for potential conjunctive use project as part of major residential, commercial, and golf resort development in Eastern Riverside County. Work includes workplan development, geophysical investigation, well installation, aquifer testing, water quality assessment, groundwater modeling, conceptual design of groundwater recharge/extraction program, and providing documentation for Specific Plan and EIR.

Mission Springs Water District, Groundwater Modeling Study (2005-Present): Senior Hydrogeologist –The work included potential historical impacts to regional groundwater system, potential reuse sites for recycled water, and recommendations for a Groundwater Management Plan.

Poseidon Resources, Hydrogeological Assessment: Senior Hydrogeologist – Preparation of Hydrogeological Assessment and Feasibility for the use of vertical extraction wells to supply feedwater for a desalination plant in Southern California. Evaluation included characterization of nearshore hydrogeological regime and design of extraction wells and potential drawdown field created by maximum feasible yield.

Mission Springs Water District, Preliminary Water Balance: Senior Hydrogeologist - Hydrogeologic characterization and water supply assessment for the Mission Springs Water District (MSWD) service area. The objective of this project is to develop a long term Integrated Water Resource Management Plan that can be used by MSWD to optimize the use of their groundwater basins and evaluate alternative water supplies. The alternatives developed must minimize impacts to biological and wildlife of concern by the local environmental community. As part of this project, Mr. Donovan completed a preliminary water balance study for the Mission Creek sub-basin. The results of the study would be used to direct future investigations for the Mission Creek sub-basin.

City of San Juan Capistrano (2007): Senior Hydrogeologist – Assisted the City of San Juan Capistrano in the evaluation of proposed well production sites including installation and testing of pilot test wells at two location. Evaluation included advancement of test borings using Sonic Drilling, well completion, aquifer test, water quality sampling, and preparation of Pilot Test Well Report that included suitability of each location and expected production from a production well placed at each location.

Elsinore Valley Municpal Water District (2006-2007): Senior Hydrogeologist - Meeks & Daley Water Company (M&D) and the City of Riverside constructed two new wells (in City of San Bernardino and Colton). Psomas was responsible for designing and preparing a preliminary design report, construction documents and project specifications for: two new +700-Foot deep wells with a vertical turbine pump assembly at an estimated flow rate of 3,000 GPM and associated piping. Mr. Donovan prepared a Mitigated Negative Declaration, Mitigation Monitoring and Reporting Program, required forms for submittal to State Clearing House, response letter to comments, and presentations to lead agency/public forum on the project.

East Orange County Water District (2008): Senior Hydrogeologist – EOCWD planned to construct a 900-foot deep well (in City of Tustin). Psomas was responsible for designing and preparing a preliminary design report, construction documents and project specifications for the new +900-Foot deep well with a vertical turbine pump assembly at an estimated flow rate of 2,000 GPM and associated piping. Mr. Donovan prepared a Mitigated Negative Declaration, Mitigation Monitoring and Reporting Program, required forms for submittal to State Clearing House, response letter to comments, and presentations to lead agency/public forum on the project.

Surface and Groundwater Assessment, Eastern Utah: Principal investigator for baseline surface water and groundwater assessment and impact monitoring of White

River Shale Corporation major oil shale mining project in eastern Utah. Responsible for locating over 8 surface water monitoring stations, streamflow monitoring (including static and continuous monitoring), development of rating curves for stream cross-sections, water quality sampling, reduction and analysis of data and development of a comprehensive data management system designed after the USGS WASTORE system over a period of seven years. In addition, developed a data quality management system that monitored and corrected deficiencies in the collection and reporting of the surface water quality data and later developed a statistical approach for evaluating mitigation monitoring for naturally-occurring compounds including metals and selected nutrients..

Surface Water Quality Monitoring, Southeast Alaska: Principal investigator for baseline surface water quality monitoring program for the Quartz Hill Molybdenum Project. Responsible for locating over 17 surface water monitoring stations, streamflow monitoring (including static and continuous monitoring), development of rating curves for stream cross-sections, water quality sampling (including storm-activated samplers), reduction and analysis of data and development of a comprehensive data management system designed after the USGS WASTORE system over a period of five years. In addition, developed a data quality management system that monitored and corrected deficiencies in the collection and reporting of the surface water quality data.

Surface Water Quality Monitoring, Thompson Creek Molybdenum Mine, Idaho: Principal investigator for baseline surface water quality monitoring program for a proposed fluorite mine project. Responsible for locating over 12 surface water monitoring stations, streamflow monitoring, water quality sampling, data analysis and reporting of the information over a period of two years.

Surface Water Quality Monitoring, Ima Mine, Idaho: Principal investigator for baseline surface water quality monitoring program for tungsten mine project. Responsible for locating over 5 surface water monitoring stations, streamflow monitoring, water quality sampling, data analysis and reporting of the information over a period of two years.

Surface Water Quality Monitoring, Bayhorse Creek Mine, Idaho: Principal investigator for baseline surface water quality monitoring program for a proposed fluorite mine project. Responsible for locating over 12 surface water monitoring stations, streamflow monitoring, water quality sampling, data analysis and reporting of the information over a period of two years.

Surface and Groundwater Quality Monitoring Program, Equity BX In-situ Oil Shale Mine, Colorado: Principal investigator for mitigation monitoring of surface water and groundwater quality during operation of a pilot test program for steam injection removal of oil from oil shale. Responsible for locating over 4 surface water and 8 groundwater monitoring stations, streamflow monitoring, water quality sampling, data analysis, impact evaluation and reporting of the information.

Surface Water Quality Monitoring, Creede, Colorado: Principal investigator for baseline surface water quality monitoring program for Chevron's proposed silver mine project. Responsible for locating over 12 surface water monitoring stations,

streamflow monitoring, water quality sampling, data analysis and reporting of the information.

Private Developer (2007): Principal Hydrogeologist. Evaluated the feasibility of constructing a golf course and adjacent housing complex on a closed landfill in Riverside County, California. The work included reviewing technical documents, meeting with regulators and developing issues environmental constraints list with recommendation for further study.

Valley Center Residential Project, CA (2005): Senior Hydrogeologist for hydrogeological characterization that included aquifer tests, water quality sampling and analysis, and numeric groundwater flow model development for a proposed residential development project in Valley Center. The project required analyzing the effect of wastewater effluent on the local groundwater aquifer and developing mitigation measures as required.

Sacramento Regional County Sanitation District, Peer Review – Hydrogeological Assessment: Project Manager/Senior Hydrogeologist – Conducted a review documents associated with the dewatering activities conducted during construction activities that occurred at the New Natomas Pump Station and evaluate whether "actual conditions are more adverse than baselines" were present. The evaluation included site walk, review of aquifer testing data and methods, dewatering activities, existing hydrogeological data and preparation of a report on findings.

Mission Springs Water District, Urban Water Management Plan: Senior Hydrogeologist – Preparation of the Hydrogeological portions of an Urban Water Management Plan in compliance with The California Water Management Planning Act of 1983, which required water purveyors to develop water management plans to achieve conservation and efficient use.

Remedial Investigation, Los Angeles, California: Senior Hydrogeologist and Project Manager responsible for interpreting existing information and developing a geologic and hydrogeologic evaluation program for a former chromium-plating facility. The facility is adjacent to a former major manufacturing facility that used chlorinated solvents and hexavalent chromium in its manufacturing operations. Responsibilities included reviewing historical site investigation activities, preparing a remedial investigation workplan, implementation of the workplan, commenting on adjacent facilities' workplans, California Environmental Protection Agency DTSC meetings and negotiations, and formulating arguments/briefs for impending mediation.

Superfund Oversight, City of Industry, California: Senior Hydrogeologist responsible for participating as the client's technical representative to the Puente Valley Operable Unit Steering Committee. Responsibilities included reviewing historical site investigation activities and preparing a de minimis argument for the client's facility, assessing offsite liability stemming from adjacent responsible parties, reviewing proposed activities of the Steering Committee's consultant, and formulating arguments/briefs for impending mediation.

Remedial Investigation, Redlands, California: Principal investigator for Lockheed Corporation, a rocket motor manufacturing and testing facility. The purpose was to identify potential source areas of TCE contamination. Areas evaluated included burn

pits, leachfields, vapor degreasing units, evaporation ponds, solid propellant mixing areas, rocket motor testing areas, and painting areas. The evaluation involved ranking the potential of various manufacturing activities to act as a source of TCE and evaluating available pathways into existing groundwater systems.

Site Investigation for Southern Pacific Pipeline. Palm Springs, California: Senior project manager for a site investigation of a fuel leak for this major fuel product transport line. The site investigation included developing soil sampling and field screening techniques, shallow probe installation and groundwater monitoring well installation and sampling. The initial investigation culminated in development of potential remedial alternatives.

Xerox Corporation, Pomona, California: Senior Hydrogeologist for the design, implementation, and interpretation of a remedial investigation of a 12-acre former electronics manufacturing facility. Responsibilities included design and implementation of remedial investigations at the site, operation and maintenance of groundwater treatment system, groundwater monitoring, soil and groundwater cleanup evaluation, regulatory interaction, preparation of demolition specifications, bid documents, selection of subcontractor, and monitoring execution of the demolition program. In addition, provided technical support to outside legal counsel for civil liability lawsuit filed in association with the aforementioned site.

Recovery of Past Investigation Cost Claims, San Diego, California: Senior hydrogeologist for a client who was seeking reimbursement from a previous site operator for site investigation and remedial action costs. Reviewed with legal counsel the costs associated with various activities and segregated into costs that were viable for cost recovery. Provided testimony in court case and was successful in recovering 80% of past costs.

Redevelopment Project, San Diego, California: Project Manager responsible for the environmental assessment associated with the demolition of a bus maintenance facility and construction of multi-story apartment complex at a site severely impacted with petroleum hydrocarbons. The activities included reviewing prior site investigations conducted by five previous consulting firms, delineating areas of concern for excavation activities, conducting focused site investigations on the property, and formulating proposed alternatives for handling petroleum-contaminated soils during site construction.

Xerox Corporation, Santa Clara, Sunnyvale, & Hayward, California: Senior Hydrogeologist for the successful development and implementation of a site closure plan. Responsibilities included interpretation of hydrogeology and contaminant transport, groundwater monitoring, preparation of a site closure plan including hydrogeologic evaluation, fate and transport of chlorinated volatile organic compounds, and negotiations with the regulatory agencies.

Remedial Investigation, Carson, California: Program manager for remedial investigation/feasibility study at a 30-acre chemical-manufacturing site in southern California. The activities conducted at the site included soil vapor surveys, soil sampling, and groundwater sampling (three separate aquifer systems). The program also involved development of a feasibility study work plan, risk assessment evaluation, and public participation plan.

Remedial Investigation, Sacramento, California: Principal investigator for preliminary endangerment assessment and remedial investigation at a large aerospace facility. The 4,000- acre former rocket test facility is currently undergoing soil and groundwater investigations for potential releases of chlorinated solvents and metals. Responsible for developing the remedial investigation tasks and implementation.

Remedial Investigation/Feasibility Study, San Diego, California: Senior hydrogeologist responsible for design and implementation of all site characterization activities including design and implementation of the RI/RFI at a major gas turbine manufacturing facility. The work included assessment of soil and groundwater impacted with chlorinated solvents, metals, benzene, petroleum hydrocarbons and PCBs. Assisted in preparation of a comprehensive RI/RFI work plan that included a historical summary of facility operations, site geology and hydrogeology, and contaminants of concern, and the proposed site characterization activities to be undertaken. Site characterization activities included advancement of borings and completion of wells using hollow-stem auger and casing hammer reverse air circulation drilling; soil vapor surveys; geophysical investigations including electrical and seismic; continuous water level monitoring to correct for tidal influence; and laboratory analysis using CLP protocols.

Six Flags Magic Mountain, Hydrogeological Assessment (2005-2006): Senior Hydrogeologist – Assistance with permitting requirements associated with construction of a bank protection structure along the Santa Clara River in northern Los Angeles County. Work included assessment of hydrogeological regime including water quality, preparation of creekside dewatering permit and negotiations with RWQCB.

Fate and Transport Evaluation, San Diego, California: Senior hydrogeologist for the RI/RFI fate and transport evaluation to determine the necessity for implementing interim remedial measures for the transport of chlorinated volatile organic compounds and metals off-site into marine waters.

Feasibility Study, United States Navy, British Indian Ocean Territories, Indian Ocean (1984): Principal Investigator for enhancing development of groundwater resources on the island of Diego Garcia for the U.S. Rapid Deployment Force. The study included design and placement of horizontal infiltration galleries for development of a fresh groundwater lens.

Publications & Presentations

"Application Of Ecohydrology In Analysis And Minimization Of Development Impacts" Groundwater Resources Association of California 17th Annual Conference & Meeting; GROUNDWATER: Challenges to Meeting Our Future Needs. Sep. 25, 2008

"Hydrogeology of the San Diego Region on CD-ROM"
EnviroConcepts, Inc., March 2004.

"Hydrogeology of the Coastal Plain of Los Angeles on CD, Vol. II"
EnviroConcepts, Inc., March 2004.

"Hydrogeology of the San Fernando Valley on CD-ROM"
EnviroConcepts, Inc., August 2003.

"Hydrogeology of the Inland Plain of Los Angeles on CD-ROM"
EnviroConcepts, Inc., January 2003.

"Hydrogeology of the Coastal Plain of Los Angeles on CD, Vol. I"
EnviroConcepts, Inc., May 2002.

"Environmental Consultants' Resource Handbook (California Edition)." 600 pp.
EnviroConcepts, Inc., March 1998.

"Environmental Consultants' Resource Handbook (California Edition)." 561 pp.
EnviroConcepts, Inc., April 1995.

DECLARATION OF
Michael E. Daly, P.E

I, **Michael E. Daly**, declare as follows:

1. I am presently under contract with Aspen Environmental Group to provide environmental technical assistance to the California Energy Commission. I am serving as a Senior Engineer and to provide Peak Workload Support for the Energy Facility Siting Program and for the Energy Planning Program.

2. My professional qualifications and experience are attached hereto and incorporated by reference herein.

3. I helped prepare the Staff Testimony and errata on **Soil and Water Resources** sections for the Ridgecrest Solar Power Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony and errata is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and errata and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: February 18, 2010 Signed:

At: Tucson, AZ

Education

BS/1992/Hydrology and Water Resources/College of Engineering and Mines, University of Arizona

Registration

1999/Arizona Registered Professional Engineer/33984
2002/California Registered Professional Engineer/63340

Affiliations

American Water Works Association
Tucson Utilities Contractors Association

Experience

With Psomas for 12 years, with other firms for 5 years.

Background

Mike Daly has more than 17 years of experience in the field of water resource design. He currently manages a five-person team, which completes a variety of project types including watershed and floodplain studies, flood control mitigation studies, sanitary sewer and storm drain planning and design, potable water system planning and design, and utility coordination modifications.

Projects

North Park Improvement Plans, Town of Sahuarita Public Works Department, Sahuarita, Arizona: Mike was project manager for this effort which included preparation of improvement plans for four new effluent infiltration ponds and an adjacent public park consisting of soccer and baseball facilities, playground, and large parking area. A key component of the project was the analysis of offsite flows which were modeled using the FLO-2D due to the topography of the floodplain. The results of the analysis were used to aid the design of the improvements and a proposed conditions model was created and to verify no adverse impacts to adjacent properties due to floodplain encroachment.

Pantano Wash/Kolb Road Permanent Soil Cement Bank Protection, Pima County Regional Flood Control District, Tucson, Arizona: Mike was the Project Manager for this project to develop and compile a basis of design report with alternatives analysis for a permanent bank protection and channel stabilization on the Pantano Wash (Q_{100}=32,00 cfs) between Speedway Boulevard and Tanque Verde Road. Services included hydrologic, hydraulic, and sediment transport analysis and documentation for each alternative, as well as geotechnical and structural stability analyses. Soil cement grade control structures were also designed to mitigate and stabilize the Pantano Wash channel and invert from continued head cutting within the project area. Mike is also managing the formal soil cement bank protection design for the project which is currently 90% complete.

Mission West Wash Flood Control Study, Pima County Regional Flood Control District, Pima County, Arizona: As Project Manager, Mike oversaw the hydrologic and hydraulic analysis to assess existing flooding conditions and examine several alternatives to mitigate potential flooding of the San Xavier Estates subdivision. The existing conditions HEC-2 model developed as part of the study was modified to look at the effectiveness of such alternatives as raising an existing berm, widening an existing diversion channel, and constructing a levee to FEMA standards. The option of employing upstream detention was also addressed. Preliminary cost estimates for the various mitigation alternatives were also provided.

Alamo Wash, City of Tucson, Arizona: As Project Manager, Mike's responsibilities included overseeing the re-mapping of the existing floodplain within the project limits using revised 100-year peak discharges. Finished floor elevations (FFEs) were collected at all inhabitable structures within the existing FEMA floodplain to determine which structures could be removed from the effective floodplain based on their FFE. The results of the revised mapping and hydrologic analysis were submitted to FEMA in an application for a Letter of Map Revision (LOMR). Mike was also responsible for the preparation of formal design documents for the construction of bank protection for Alamo Wash from just upstream from the confluence with Van Buren Wash to the south side of Grant Road.

Drainage Erosion Mitigation Plan, Pima County Regional Flood Control District, Green Valley, Arizona: As Project Manager Mike contracted with Pima County Regional Flood Control District to provide an erosion mitigation plan at 16 distinct locations within Green Valley. The existing drainage system consists of numerous constructed drainage channels to convey large flows from natural upstream watersheds through developed areas and to the Santa Cruz River. Due to a lack of consideration of sediment transport characteristics during the original design, significant channel downcutting and bank mitigation has occurred in many of the drainageways. Psomas' scope of services included collection of survey data and the formulation of conceptual and formal design plans to be used by contractors to construct mitigation measures and correct existing erosion problems.

Master Drainage Plan, Phases I & II, Town of Sahuarita, Sahuarita, Arizona: As Project Manager, Mike was responsible for this multi-phased effort to identify, characterize, and establish mitigation alternatives for existing drainage problems within the town limits. The study focused on areas where development is occurring or is likely to occur and on the relationship between existing drainage patterns and the future infrastructure required to support this development. Specific tasks included peak discharge analysis, field reconnaissance, assessment of existing drainage infrastructure, conceptual plan development, and preliminary cost estimates.

San Xavier District Master Basin Study, Tohono O'ohdam Nation Pima County Flood Control District, Pima County, Arizona: As Project Hydrologist, Mike was responsible for the cooperative effort between Pima County and the Tohono O'ohdam Nation to identify and provide alternatives to mitigate widespread flooding and erosion problems at the reservation. The project scope of work included identification and documentation of existing problems, calculation of peak discharges using HEC-1 methodology, mapping of existing floodplains using HEC-2 methodology, and the

formulation of both structural and non-structural flood control alternatives, which were consistent with the Nation's long term goals and farm rehabilitation plan.

DECLARATION OF
John R. Thornton P.E.

I, **John R. Thornton**, declare as follows:

1. I am presently under contract with Aspen Environmental Group to provide environmental technical assistance to the California Energy Commission. I am serving as a Senior Water Resource Engineer and to provide Peak Workload Support for the Energy Facility Siting Program and for the Energy Planning Program.

2. My professional qualifications and experience are attached hereto and incorporated by reference herein.

3. I helped prepare the Staff Testimony and errata on **Soil and Water Resources** sections for the Ridgecrest Solar Power Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony and errata is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and errata and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: March1, 2010 Signed:

At: Santa Ana, California

Education

MS/1978/Civil and Environmental Engineering/California State University, Long Beach

BS/1969/Civil Engineering/California State Polytechnic University, Pomona

Registration

1974/Civil Engineer/California/#24251
1976/Agricultural Engineer/California/#145
1982/Civil Engineer/Nevada/#6160
1986/Civil Engineer/Idaho/#5379
1996/Civil Engineer/Arizona/#29954
2007/Civil Engineer/Utah/# 6674175-2202

Affiliations

Water Environment Federation
American Water Works Association
Orange County Water Association
Water Reuse (Vice President of Orange County Chapter)
Urban Water Institute (Member of Board of Directors)
Association of California Water Agency (Member of Groundwater Committee)

Experience

With Psomas for 14 years; with other firms for 27 years.

Background

Mr. Thornton has over 40 years of experience in the development and management of water resource projects ranging in scope and magnitude. He is an expert in the development and management of groundwater development and management projects. He has been in responsible charge of the preparation of feasibility studies and facilities master plans; preliminary and final design documents (construction drawings, specifications, and cost estimates); and construction supervision of canals, pipelines, wells, pump stations, reservoirs, reclaimed water use systems, and agricultural crop and landscaping irrigation facilities. He has also provided technical studies and expert witness testimony in complex water rights matters. The following are examples of projects he has been in principal charge:

Projects

San Juan Basin Authority, San Juan Capistrano, Ca (1990 to Present): District Engineer and Project Manager for the San Juan Basin Authority. Principal author of the 1994 groundwater management plan and water rights application that lead to obtaining a water Rights Permit to develop groundwater from the San Juan and Arroyo Trabuco Creeks and construction of the City of San Juan Capistrano's brackish water desalination plan. Successfully applied for and obtained four grants from CSWRCB. One of the grants was used to develop the Integrated Vegetation and Groundwater Monitoring Plan which was reviewed and accepted by the Division of Water Rights as meeting all of the

monitoring conditions of the water rights permit not only for the SJBA but also the requirements of the South Coast Water District Water Rights Permit. Implemented and provided overall management of the implementation of the Integrated Vegetation and Groundwater Monitoring Plan since its inception in 2004. Have successfully modified and or reduced several of the monitoring protocols as they were not applicable to the conditions within the monitoring area. Have provided water resource and engineering consulting expertise to the SJBA on numerous project since 1990.

Mission Springs Water District, Integrated Water Resource Plan: Principal in Charge to assist MSWD staff in the preparation of an Integrated Water Resource Plan and further develop a conceptual understanding of the conjunctive use and groundwater banking options potentially available in various locations within their service area. The first phase of the project focused on the development of a hydrologic water balance for the Mission Creek Sub-basin. Psomas' initial review resulted in the development of a comprehensive field investigation plan and implementation plan for a variety of alternatives that incorporated the water resource supply needs for future projected demands. The objective of the work effort was to address specific groundwater management options for the utilization and conservation of existing and potential water resources available to MSWD.

South Orange County Integrated Water Shed Management Plan: Principal in Charge of developing an IRWMP for South Orange County as part of the California Prop 50 and 84 bond financing program. The plan included the coordination of over 20 public agencies and stakeholders, the development of a plan with over 40 million dollars in projects largely related to water and wastewater development.

Antelope Valley Groundwater Banking Feasibility Study: Project Manager for investigating the feasibility of developing a conjunctive use project to facilitate the sale of State Project waters exchanged for banked groundwater in the westerly Antelope Valley of Los Angeles County. The banked groundwater would be sold to Los Angeles Department of Water and Power to replace water used for dust mitigation at the Owens Lake. The study reviewed the geologic, hydrogeologic, water supply, water quality, costs, environmental and institutional issues associates with the project; determined appropriate water supply, recharge, recovery and storage criteria; sized the facility and prepared cost estimates. A preliminary MODFLO model was developed. Operational criteria was developed for 20,000 to 40,000 acre feet per year of recharge, up to 40,000 acre feet of extraction, 200,000 acre feet of cumulative storage and service to and from both water supply facilities.

Hemet/San Jacinto Recharge and Recovery Program, Eastern Municipal Water District, CA: Project Director/Principal-in-Charge for the Eastern Municipal Water District Integrated Recharge and Recovery Program. Psomas worked with the EMWD and local stakeholders to evaluate the feasibility of using EMWD-owned property in the San Jacinto River bed as an integrated groundwater storage site. The feasibility program includes the analysis and evaluation of hydrogeologic properties, development of a regional groundwater model, preliminary design and location of proposed recharge basins and necessary facility infrastructure including extraction wells. In addition, coordination

coordination was provided for environmental support services for the EMWD overall Habitat Conservation Plan for this project and discussing the project with appropriate regulatory agencies such as the Army Corps of Engineers and United States Fish and Wildlife. The purpose of the proposed Program is to provide groundwater storage within the eastern portion of EMWD's service area (i.e., the Hemet/San Jacinto area).

Olancha Water Project, CA, Western Water Co: Project Manager for developing facilities and evaluating the feasibility of a water transfer project from the Southern Owens Valley, Owens Lake area. The project includes the development of a groundwater flow model (ModFlow) for approximately a fifty square mile area of the southern Owens Lake, evaluation of groundwater hydrogeology, evaluation of impacts to natural and cultural resources, location and preliminary design of facilities, including wells, pipelines and connection to the City of Los Angeles Owens Valley Aqueducts and overall project feasibility. Approximately 10,000 acre feet per year were estimated as feasible to extract from the groundwater without impacting farming, domestic water and natural resources. A complete EIR was developed including all necessary biological and cultural studies and initial processing through the planning department of Inyo County. A groundwater resource-monitoring plan was developed and implemented for monitoring water level and quality for over 20 wells in the surrounding area. The project was performed under careful review of the Inyo County Water Department.

Cadiz/Fenner Conjunctive Use and Storage Program, San Bernardino County, CA, Cadiz Land Co.: Project Manager for the development of preliminary engineering and economic analysis for a conjunctive use, water storage and transfer program located in Cadiz and Fenner Valleys of San Bernardino County. The project included 30 miles of large diameter pipeline. The Core Program could provide a dry-year water supply to the Metropolitan Water District of Southern California of up to 100,000-acre feet per year. The program concept is to convey Colorado River water from the Colorado River Aqueduct (CRA) to the Cadiz/Fenner area during periods of excess supply. The imported water would be stored in the local groundwater aquifer system. This water and indigenous groundwater would be extracted by wells and returned to the CRA during periods of drought.

DECLARATION OF
Robert Fiore

I**, Robert Fiore** declare as follows:

1. I am presently employed by the California Energy Commission in the **Community Resources Unit** of the Energy Facilities Siting Division as a **Planner II**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Traffic and Transportation**, for the **Ridgecrest Solar Power Project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 3/18/10 Signed: Original signed by R. Fiore

At: Sacramento, California

Robert Fiore

EXPERIENCE & QUALIFICATIONS

Aug. 2008 - Present

PLANNER II **CALIFORNIA ENERGY COMMISSION**

- Transportation, Visual Resource, Land Use and Socioeconomic Planning for the siting of power plant projects and transmission facilities;
- Prepare complex analysis of power plant projects and transmission facilities;

Oct. 2002 - March 2008

SENIOR PLANNING PROJECT MANAGER **FRAYJI DESIGN GROUP**

- Assemble and lead project teams consisting of planners, engineers, architects, consultants and technicians to develop large-scale master planned communities;
- Direct projects from pre-acquisition, through site assessment and project approval, to construction by coordinating external and internal acquisition, planning, design and construction departments or consultants; Perform due diligence and site assessments;
- Calculate development costs and manage multi-million dollar project budgets;
- Solve problems related to site and infrastructure design, soils, traffic, environmental impacts, utility placement, housing, recreation, architecture, landscaping, rights-of-way, etc;

June 1998 – Aug. 2002

PLANNER/ FINANCIAL ANALYST **BERRYMAN & HENIGAR**

- Power plant expansion, planning and permitting;
- Facility assessments and survey, total ownership costs, life cycle costs, alternatives evaluation and recommendations;
- Calculate costs/ apportionments and integrate databases;
- Ensure Federal, State and Local regulatory compliance;
- Perform trend analysis and forecasting, socio-economic data research, needs assessments, fiscal studies, infrastructure inventory analysis, fee studies and feasibility studies;

Jan. 1990 – Jan. 1998

PRINCIPAL REGIONAL PLANNER **LOS ANGELES COUNTY**

- Wrote elements of the County's General Plan, Zoning Regulations and Development Standards; Wrote portions of EIR's and EIS's;
- Manage and/ or prepare reports analyzing impacts from development projects and ensure compliance with CEQA and NEPA and the CA Map Act;
- Major public infrastructure projects and expansion;
- Oversee the proper development of large-scale and multi-use development projects;
- Initiate and/ or oversee policy document development and prepare and interpret ordinances;
- Make presentations, manage meetings and engage community, staff and stakeholders;
- Problem solve through sound reason, judgment and expertise;
- Manage department budget and assign tasks; Hire and train junior staff and enable junior staff to meet goals; Ensure production and accountability;
- Capital improvement, aviation and emergency planning;
- Manage specific plan, land development regulation and design guideline preparation;
- Prepare reports for decision makers to report findings and make recommendations;
- Traffic studies, biological reports, cultural and historic reports and site and architectural design;
- Redevelopment near existing incorporated cities;

EDUCATION

Florida State University, 1985
B.S. Political Science and Urban Planning

Robert Fiore - 2133 Knapton Way, Roseville, CA 957474
925-989-0735 - goldriverrunnin@gmail.com

DECLARATION OF

Dr.Obed Odoemelam

I, **Obed Odoemelam** declare as follows:

1. I am presently employed by the California Energy Commission in the Facilities Siting, Transmission, and Environmental Protection Division as a Staff Toxicologist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Transmission Line safety and Nuisance** for the Ridgecrest Solar Power Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 03/15/10 Signed: Original signed by O. Odoemelam

At: Sacramento, California

RESUME

DR. OBED ODOEMELAM

EDUCATION:

1979-1981 University of California, Davis, California. Ph.D., Ecotoxicology

1976-1978 University of Wisconsin, Eau Claire, Wisconsin. M.S., Biology.

1972-1976 University of Wisconsin, Eau Claire, Wisconsin. B.S., Biology

EXPERIENCE:

1989
The Present: California Energy Commission. Staff Toxicologist.

Responsible for the technical oversight of staffs from all Divisions in the Commission as well as outside consultants or University researchers who manage or conduct multi-disciplinary research in support of Commission programs. Research is in the following program areas: Energy conservation-related indoor pollution, power plant-related outdoor pollution, power plant-related waste management, alternative fuels-related health effects, waste water treatment, and the health effects of electromagnetic fields. Serve as scientific adviser to Commissioners and Commission staff on issues related to energy conservation. Serve on statewide advisory panels on issues related to multiple chemical sensitivity, ventilation standards, electromagnetic field regulation, health risk assessment, and outdoor pollution control technology. Testify as an expert witness at Commission hearings and before the California legislature on health issues related to energy development and conservation. Review research proposals and findings for policy implications, interact with federal and state agencies and industry on the establishment of exposure limits for environmental pollutants, and prepare reports for publication.

1985-1989 California Energy Commission.

Responsible for assessing the potential impacts of criteria and noncriteria pollutants and hazardous wastes associated with the construction, operation and decommissioning of specific power plant projects. Testified before the Commission in the power plant certification process, and interacted with federal and state agencies on the establishment of environmental limits for air and water pollutants.

1983-1985 California Department of Food and Agriculture.

Environmental Health Specialist.

Evaluated pesticide registration data regarding the health and environmental effects of agricultural chemicals. Prepared reports for public information in connection with the eradication of specific agricultural pests in California.

DECLARATION OF

I, **Michael Clayton** declare as follows:

1. I am presently employed by the California Energy Commission in the Facilities Siting Office of the Systems Assessments and Facilities Siting Division as a Visual Resources Specialist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony and errata on **Visual Resources** for the **Ridgecrest Solar Power Project** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony and errata is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and errata and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 2/22/2010 Signed: Original signed by M. Clayton

At: Portland, Oregon

Michael Clayton & Associates

Visual Impact Assessment - Energy and Utility Planning - Environmental Impact Analysis

7645 SW Whitford Drive, Portland, OR 97223
Tel: (503) 244-9454 Fax: (503) 244-9455 E-mail: mc.mca@comcast.net

Resume for
Michael Clayton

Michael Clayton has more than 30 years of experience in the fields of Visual Impact Assessment, Energy and Utility Planning, and Environmental Impact Analysis. Over the course of his experience, Mr. Clayton has conducted over 200 visual impact assessments using a variety of visual assessment methodologies for application to infrastructure and energy and resource development projects on both federal and non-federal public and private lands. Michael has extensive experience with the Bureau of Land Management's Visual Resource Management (VRM) System including conducting visual resource inventories, developing Interim VRM Classes, and conducting Contrast Rating analyses; the Forest Service's Visual Management System; the Forest Service's new Scenery Management System; and the California Energy Commission's Visual Resources Methodology. He has also developed and implemented the Visual Sensitivity – Visual Change (VS-VC) methodology for use on non-BLM and non-Forest public and private lands, which he has used on numerous electric transmission and product pipeline projects on behalf of the California Public Utilities Commission. Mr. Clayton also provides expert witness testimony with regard to Visual Resources Analysis on behalf of the State of California.

Mr. Clayton has conducted visual resource impact assessments for a variety of project types in varied landscapes including desert terrain; forested, mountainous areas; valleys of grazing land and agricultural uses; open plains; and urban and suburban areas. Visual impact assessments have been conducted for electric transmission lines and substations, power plants, projects involving substantial terrain modification, water conveyance and storage facilities, hydroelectric projects, pipelines, roads, telecommunications projects, and wastewater treatment plants, to name a few examples. In addition to conducting visual analyses, Mr. Clayton also prepares visual simulations to aid in the understanding of project impacts.

In 1991, the California Energy Commission (CEC) presented Michael Clayton with an *Outstanding Performance Award* for his preparation of twelve power plant project Visual Resources Staff Assessments as a consultant to the CEC. As part of that effort, Mr. Clayton reviewed power plant application visual studies and applicant-prepared VRM inventories. In 2004, Mr. Clayton was presented with an *Outstanding Environmental Analysis Document* award by the Association of Environmental Professionals for the Visual Resources analysis he prepared for the Jefferson-Martin 230 kV Transmission Line Project Environmental Impact Report.

EDUCATION

1996 M.A., Asia Pacific Environmental Affairs, University of San Francisco
1983 M.S., Environmental Management, University of San Francisco
1976 B.A., Biology, University of California at Los Angeles

VISUAL IMPACT ASSESSMENT REPRESENTATIVE PROJECTS

For the following representative projects, Michael Clayton was the sole author and visual analyst. Each study included a combination of information review and verification, agency consultation, field reconnaissance and analysis, establishment of key viewpoints, data mapping, photography (in most cases), data evaluation, and (in most cases) the preparation of visual simulations. Responsibilities also include the development of alternative routing options and tower locations (for transmission line projects) as well as the development of effective mitigation measures. For some projects involving federal lands administered by the U.S. Bureau of Land Management (BLM), Michael Clayton also prepared Visual Resource Management Inventories using the BLM's VRM methodology.

- **Solar Millennium Ridgecrest Solar Power Project.** Kern County, CA.
- **Haiwee Geothermal Lease Area VRM Inventory.** Kern County, CA.
- **Solar Millennium Blythe Solar Power Project.** Riverside County, CA.
- **Solar Millennium Palen Solar Power Project.** Riverside County, CA.
- **Sunrise Powerlink 500 kV/230 kV Transmission Line Project EIS/EIR Visual Analysis and VRM Inventory.** Imperial and San Diego Counties, CA.
- **Devers-Palo Verde 2 500 kV Transmission Line Project EIR/EIS Visual Analysis and VRM Inventory.** Riverside and San Bernardino Counties, CA; and Arizona.
- **Yuha Desert / West Mesa VRM Inventory.** Imperial County, CA.
- **El Casco Transmission System EIR Visual Analysis.** Riverside County, CA.
- **Emidio Lateral Pipeline Project SEIR/SEIS Visual Analysis.** Mojave, Los Angeles County, CA.
- **Ocotillo Energy Project Visual Resources Assessment.** Palm Springs, CA.
- **Combined Array for Research in Millimeter-Wave Astronomy (CARMA) Project EIS/EIR Visual Analysis.** White Mountains, Inyo County, CA.
- **Greater Chuckwalla Valley VRM Inventory.** Riverside County, CA.
- **Blythe I Power Plant Project Visual Analysis.** Blythe, CA.
- **La Rumorosa Wind Project Visual Analysis.** San Diego County, CA and Mexico.
- **North Umpqua Hydroelectric Project Aesthetics Management Plan Implementation.** Umpqua River, OR.
- **Alturas 345 kV Transmission Line Project EIR/EIS Visual Analysis.** Modoc and Lassen Counties, CA.
- **Yellowstone Pipeline Project EIS Visual Resources Specialist Report.** Montana and Idaho.
- **Stirling Energy Systems (SES) Solar Two Project Visual Analysis.** Imperial County, CA.
- **Blythe II Power Plant Project Visual Resources Assessment.** Blythe, CA.
- **Jefferson-Martin 230 kV Transmission Line Project EIR Visual Analysis.** San Francisco and San Mateo Counties, CA.
- **Mountainview Power Plant Project Visual Resources Assessment.** San Bernardino County, CA.

- **Borrego Springs Solar Thermal Project Visual Analysis.** San Diego County, CA.
- **Path 15 500 kV Transmission Line Project Supplemental Environmental Impact Report Visual Resources Analysis**. Merced and Fresno Counties, CA.
- **Coyote Creek 120 kV Powerline Extension Project Environmental Assessment Visual Resources Analysis.** Nevada.
- **Carma Project EIS/EIR Visual Analysis.** Inyo County, CA.
- **Palomar Energy Project Visual Resources Assessment.** Escondido, CA.
- **Pacific Pipeline Project EIR/EIS Visual Resources Impact Assessment.** Santa Barbara, Ventura, and Los Angeles Counties, CA.
- **Newmont Gold Company Mill No. 4, 120 kV Transmission Line/Substation Project NEPA Environmental Assessment Visual Resources Study.** Nevada.
- **Northeast San Jose Electric Transmission Reinforcement Project EIR Visual Resources Analysis.** Alameda and Santa Clara Counties, CA.
- **Viejo Transmission System Project Visual Analysis**. Orange County, CA.
- **Tri-Valley 230 kV 2002 Electric Transmission Capacity Increase Project EIR.** Alameda County, CA.
- **Barrick Mine 120 kV Transmission Line Project EA Visual Analysis.** Nevada.
- **Novato 60kV Transmission Line Relocation Project.** Marin County, CA.
- **SMUD Cosumnes Power Plant Project Visual Resources Assessment.** Sacramento County, CA
- **Atlantic-Del Mar Electric Transmission Reinforcement Project.** Sacramento County, CA.
- **FRM Getchell 120 kV Transmission Line Project Visual Resources Analysis.** Nevada.
- **Potrero Power Plant Project Visual Resources Assessment.** San Francisco, CA.
- **AMAX Mine 60 kV Transmission Line Project Visual Resources Analysis.** Nevada.
- **Level 3 Communications Project Statewide Initial Study Visual Resources Analysis.** California Statewide.
- **Morro Bay Power Plant Project Dry Cooling Visual Analysis.** Morro Bay, CA.
- **Hercules Wastewater Treatment Plant EIR Visual Assessment.** Hercules, CA.
- **Marinship Water Storage Tank Relocation Project Visual Impact Assessment.** Sausalito, CA.
- **Pastoria Power Plant Project Visual Resources Assessment.** Kern County, CA.
- **Inland Empire Power Plant Project Visual Resources Assessment.** Riverside County, CA.
- **Wind Mountain Mining, Inc. 60 kV Transmission Line Project Visual Analysis.** Nevada.
- **Blythe II Power Plant Project Visual Resources Assessment.** Blythe, CA.
- **Sprint Telecommunications Project Environmental Assessment Visual Analysis.** Nevada.
- **East Altamont Energy Center Visual Resources Assessment.** Alameda County, CA.
- **Zone 4 Water Distribution Project Visual Analysis.** Petaluma, CA.

- **Los Esteros Critical Energy Facility Visual Resources Assessment.** San Jose, CA.
- **MID Woodland No. 2 Power Plant Project Visual Resources Assessment.** Modesto, CA.
- **U.S. Air Force Claiborne Range EA Visual Analysis.** Louisiana and Texas.
- **ENPEX Power Plant Project Visual Analysis.** San Diego, CA.
- **Borrego Springs Peaker Power Plant Project Visual Analysis.** Borrego Springs, CA.

ENERGY AND UTILITY PLANNING

- Effective energy and utility planning promotes the development of long-range approaches for the sustainable use of energy, while facilitating the appropriate siting of energy facilities. Energy planning typically must consider energy need, available energy resources, facility siting constraints, and environmental protection. Michael Clayton has extensive experience in the preparation of energy planning and policy documents, and the conduct of facility siting studies.

- **Regional Energy Infrastructure Plans.** From 1985 to 1993, Mr. Clayton served as the Project Consultant for the *Western Regional Corridor Study*--the largest regional energy and telecommunications infrastructure inventory and analysis undertaken in the U.S. As Project Consultant, he was the Study's principal author and he coordinated the participation of 60 electric and gas utility, pipeline, and telecommunication companies, and over 250 jurisdictions of the U.S. Bureau of Land Management and U.S. Forest Service in the western U.S.

- **Energy Plans and Policy.** As the Project Consultant for the *Butte County General Plan Energy Element*, Mr. Clayton directed the development of long-range goals and policies for the development and conservation of energy resources. He also prepared the *Lassen County Energy Element,* which addresses the County's potential sources, production, transmission, use, and conservation of energy resources. This policy document also provides energy facility siting guidelines for the County evaluation of projects. Both of these energy elements were prepared under the auspices of the **California Energy Commission** Grant Program.

- **Energy Infrastructure Siting and Analysis.** Michael Clayton has also assisted in the siting and/or environmental analysis of more than 20 major energy generation and transmission projects in the U.S. including: *Keno-Cottonwood 500 kV Transmission Line Feasibility Study, FRM Getchell Transmission Line EA, Third Pacific Intertie 500 kV Transmission Line Feasibility Study, Trans-Sierra 500 kV Intertie Feasibility Study, Newmont Mill No. 4 120 kV Transmission Line Project,* and *California-Oregon Transmission Line Project.*

Additional examples of Energy and Utility Projects include the following:

- **Northern California Corridor Study.** Michael Clayton was the Project Manager and Principal Author for a study of approximately 2,400 miles of potential utility corridors in northern California, crossing the Sierra Nevada Mountains to Nevada and the Central Valley and Cascade Mountains to southern Oregon. Mr. Clayton had primary responsibility for all phases of the project including: identification of permit requirements; federal, state, and local agency consultations; evaluation of the existing land use and environmental characteristics of each corridor; and report preparation.

- **Gulf Coast Geopressured-Geothermal Resource Analysis.** Michael Clayton was the Ecosystem Analysis Project Manager for the U.S. Department of Energy Gulf Coast Geopressured Geothermal Resource Development Environmental Evaluation Texas and Louisiana Gulf Coastal Area Project. Mr. Clayton was responsible for the ecosystem impact

analysis, which focused on the cause and effect relationships among surface subsidence phenomena, surficial processes and key indicator organisms. The study covered four extraction sites within the Texas and Louisiana Gulf coastal region. Areas of particular concern included: loss of wetland habitat due to inundation, impoundment, drainage, and alteration of sedimentation patterns; loss or alteration of critical breeding and nursery habitat for commercial wetland and estuarine species; and reduced storm buffering potential due to loss of chenier-ridge and barrier strandplain habitat.

- **Central California Environmental and Land Use Inventory.** Michael Clayton was retained by Pacific Gas and Electric Company to develop a technical methodology for the compilation, evaluation, and mapping of a comprehensive environmental and land use inventory of the entire San Joaquin Valley in central California. The Inventory was designed to serve as an environmental database of sufficient detail to support the environmental analysis of a variety of project types, including major bulk electric transmission line projects, small electric transmission line feasibility studies, and siting of substations, service centers, and other utility facilities. Michael Clayton was the Project Manager and Principal Author.

- **Sprint Telecommunications Project Environmental Assessment.** Michael Clayton was the Project Manager and Principal Author for an Environmental Assessment on the construction of four power lines to US Sprint telecommunications repeater stations. The powerlines ranged from 200 feet to 20 miles in length. All proposed routes paralleled the Union Pacific Railroad. The major concerns addressed in the EA were adverse visual impacts on a Wilderness Study Area, loss of rare plant species, collision and electrocution of raptors, and impacts to cultural resources.

ENVIRONMENTAL IMPACT ANALYSIS

- Michael Clayton has managed more than 80 multi-disciplinary environmental impact assessments for a wide variety of projects including hydroelectric facilities; electric transmission lines; oil and gas pipelines; water storage and conveyance facilities; wastewater treatment plants; harbor facilities; roads; and residential, commercial and industrial facilities. He has authored Environmental Impact Statements (EIS), Reports (EIR) and Assessments (EA), Feasibility Studies and Mitigation Monitoring Programs. Project Examples include:

- **Coyote Creek Substation / 120 kV Transmission Line Project NEPA EA.** Michael Clayton prepared an Environmental Assessment for a 10-mile, 120 kV electric transmission line and construction of the Coyote Creek Substation. The line was needed to provide additional electrical power to an expanding load center in northern Nevada. The EA evaluated four alternative routes and the substation site. Major issues addressed in the EA included land use compatibility, visual resources, and loss and degradation of wildlife habitat. Mr. Clayton also prepared an environmental document for the Nevada Public Services Commission that described the purpose and need for the project and identified the potential impacts of the proposed substation.

- **Hydroelectric Project Licensing.** Mr. Clayton coordinated the preparation of a Federal Energy Regulatory Commission (FERC) Application for New License for the Haas-Kings River Project in California. The project included two dams and storage reservoirs, three power houses, diversion dams, penstocks, 70 kV and 230 kV transmission lines, and access roads. His responsibilities included: review of all agency letters of deficiency on a previous Application; development of a strategy for successful reapplication/licensing; development of the outline for the Environmental Report; preparation of technical author guidelines; analysis and integration of all contributor input, department comments, and agency recommendations into the Environmental Report; and review of all sections for adequacy.

- **Lakeville Highway NEPA Environmental Assessment.** Michael Clayton was retained to prepare an EA for a highway improvement project. The major issues addressed in the Environmental Assessment included: loss of wetland habitat, hazardous materials within the right of way, impacts on existing traffic during construction, incompatibility with adjacent sensitive uses, and visual impacts.

- **Las Positas College Expansion Project EIR and Environmental Compliance Monitoring.** Michael Clayton was retained by the Chabot-Las Positas Community College District (District) to prepare and EIR for the expansion of Las Positas College. The proposed project consisted of classroom and administrative facilities, an indoor/outdoor physical education complex, storage and service facilities, and supportive road and utility infrastructure. Key issues evaluated in the EIR included visual resources, drainage, biological resources, public services and utilities, and traffic and circulation. Michael Clayton also conducted all environmental permitting and agency consultation activities for the District including obtaining USACOE 404 Permit, RWQCB Water Quality Certification, CDF&G Streambed Alteration Agreement, USFWS Consultations under the Endangered Species Act, and implemented the Las Positas College Expansion Project Mitigation Monitoring Program.

- **Los Banos - Gates 500 kV Transmission Line Project EIR/EIS.** Michael Clayton was retained by Pacific Gas and Electric Company to provide technical management services for the preparation of an EIR/EIS for the Los Banos-Gates 500 kV Transmission Line Project--an 80-mile electric transmission line project developed as part of the California-Oregon Transmission Line Project. Mr. Clayton prepared the corridor and routing evaluation guidelines and environmental document preparation guidelines; coordinated preparation of constraint/opportunity maps and analyses; and authored the sections on Alternatives Analysis, Regulatory Compliance, Water Resources, and Recreation.

- **U.S. Air Force Strategic Training Range Complex NEPA Environmental Assessment.** Michael Clayton was retained by a defense contractor to prepare an environmental baseline inventory and environmental assessment for the modification of 15 low-level flight routes for B-52, B-1B, and FB-111 aircraft in the Strategic Training Range Complex in North Dakota, South Dakota, Nebraska, and Wyoming. Michael Clayton was the principal author of the EA, which involved collecting, compiling, and analyzing a large volume of resource information across four states. The EA process also involved extensive consultation with federal and state agency personnel.

- **West Marin Landfill EIR Project Description.** Michael Clayton was retained by West Marin Landfill to prepare an extensive Project Description and Permit Application for a major expansion of the landfill. This effort required the assimilation of an extensive project record including permit and environmental documentation, permit and land use histories, and design and operation plans. In this role, Mr. Clayton was also responsible for coordinating consultations with, and review by, state and local permitting agencies and compiling a Site Conditions Report to support a subsequent Environmental Impact Report.

- **Zone 14 Water Distribution Project Expanded Initial Study.** Michael Clayton was retained to prepare an Expanded Initial Study for a water pipeline project to improve water pressure to the City of Petaluma, California. The project involved three pipeline corridors, two pumping stations, and two water reservoirs. The major concerns addressed in the Initial Study were adverse visual impacts of the water tanks and pumping stations; right of way limitations; removal of marsh vegetation; disturbance to wildlife; generation of dust and

DECLARATION OF
SHAHAB KHOSHMASHRAB

I**, SHAHAB KHOSHMASHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Facilities Siting Division as a **MECHANICAL ENGINEER**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I participated in the preparation of the staff testimony on **Facility Design** for the **Ridgecrest Solar Power Project** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: February 18, 2010_____ Signed: Original signed by: S. Khoshmashrab

At: Sacramento, California

DECLARATION OF
SHAHAB KHOSHMASHRAB

I**, SHAHAB KHOSHMASHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Facilities Siting Division as a **MECHANICAL ENGINEER**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I participated in the preparation of the staff testimony on **Power Plant Efficiency** for the **Ridgecrest Solar Power Project** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: February 18, 2010_____ Signed: Original signed by: S. Khoshmashrab

At: Sacramento, California

DECLARATION OF
SHAHAB KHOSHMASHRAB

I**, SHAHAB KHOSHMASHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Facilities Siting Division as a **MECHANICAL ENGINEER**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I participated in the preparation of the staff testimony on **Power Plant Reliability** for the **Ridgecrest Solar Power Project** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: February 18, 2010_____ Signed: Original signed by: S. Khoshmashrab

At: Sacramento, California

Shahab Khoshmashrab
Mechanical Engineer

Experience Summary

Nine years experience in the Mechanical, Civil, Structural, and Manufacturing Engineering fields involving engineering and manufacturing of various mechanical components and building structures. This experience includes QA/QC, construction/licensing of electric generating power plants, analysis of noise pollution, and engineering and policy analysis of thermal power plant regulatory issues.

Education

- California State University, Sacramento-- Bachelor of Science, Mechanical Engineering
- Registered Professional Engineer (Mechanical), California

Professional Experience

2001-2004--Mechanical Engineer, Systems Assessment and Facilities Siting– California Energy Commission

Performed analysis of generating capacity, reliability, efficiency, noise and vibration, and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases.

1998-2001--Structural Engineer – Rankin & Rankin

Engineered concrete foundations, structural steel and sheet metal of various building structures including energy related structures such as fuel islands. Performed energy analysis/calculations of such structures and produced structural engineering detail drawings.

1995-1998--Manufacturing Engineer – Carpenter Advanced Technologies

Managed manufacturing projects of various mechanical components used in high tech medical and engineering equipment. Directed fabrication and inspection of first articles. Wrote and implemented QA/QC procedures and occupational safety procedures. Conducted developmental research of the most advanced manufacturing machines and processes including writing of formal reports. Developed project cost analysis. Developed/improved manufacturing processes.

DECLARATION OF

Testimony of Dal Hunter, Ph.D., C.E.G.

I, **Dal Hunter, Ph.D., C.E.G.,** declare as follows:

1. I am presently employed as a subcontractor to Aspen Environmental Group, a contractor to the California Energy Commission, Systems Assessment and Facilities Siting Division, as an Engineering Geologist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **GEOLOGY AND PALEONTOLOGY** for the **Ridgecrest Solar Power Project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: February 16, 2010 Signed: 2.16.10

At: Black Eagle Consulting, Inc.
Reno, Nevada

REGISTERED GEOLOGIST
ROBERT DALTON HUNTER
No. 1411
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

exp 3.31.11

Robert D. Hunter, Ph.D., C.E.G.
Engineering Geologist
Vice President

Education

- Ph.D. – Geology – 1989 – University of Nevada, Reno
- M.S. – Geology – 1976 – University of California - Riverside
- B.S. – Geology – 1972 – California State University, Fullerton

Registrations

- Professional Geological Engineer – Nevada
- Registered Geologist – California
- Certified Engineering Geologist – California

Experience

1997 to Present: Black Eagle Consulting, Inc.; Vice President. Dr. Hunter is in charge of all phases of geochemical, geological, and geotechnical projects and is responsible for conducting, coordinating, and supervising geotechnical investigations for public and private sector clients. He is very familiar with design specifications and state and federal requirements.

Dr. Hunter has also provided geological, geotechnical, and paleontological review and written and oral testimony for California Energy Commission (CEC) power plant projects including:

- El Segundo Power Redevelopment Project (Coastal)
- Magnolia Power Project (including compliance monitoring
- Ocotillo Energy Project (Wind Turbines)
- Vernon-Malburg Generating Station
- Inland Empire Energy Center (including testimony and compliance monitoring)
- Palomar Energy Project
- Henrietta Peaker Project
- East Altamont Energy Center
- Avenal Energy Center
- Teayawa Energy Center monitoring
- Walnut Energy Center (including compliance monitoring
- Riverside Energy Resource Center
- Salton Sea Unit 6 (Geothermal Turbines)
- National Modoc Power Plant
- Pastoria Energy Center
- Otay Mesa Generating Project (compliance monitoring)
- Montainview Power Plant Project (compliance)
- Consumes Power plant (compliance monitoring)
- Sunrise Power Project (compliance monitoring)

Attended Expert Witness Training Sponsored by CEC.

1978 to 1997: SEA, Incorporated; Geotechnical Manager, Engineering Geologist. Dr. Hunter was in charge of all phases of geotechnical projects for SEA, including project coordination and supervision, field exploration, geotechnical analysis, slope stability analysis, soil mechanics, engineering geochemistry, mineral and aggregate evaluations, and report preparation. Numerous investigations were undertaken on military, commercial, industrial, airport, residential, and roadway projects. He worked on many geothermal power plants, providing expertise in foundations design, slope stability, seismic assessment, geothermal hazard evaluation, expansive clay, and settlement problems. Project types included high-rise structures, airports, warehouses, shopping centers, apartments, subdivisions, storage tanks, roadways, mineral and aggregate evaluations, slope stability analyses, and fault studies.

1977 to 1978: Fugro (Ertec) Incorporated Consulting Engineers and Geologists; Staff Engineering Geologist; Long Beach, California.

Affiliations

- Association of Engineering Geologists

Publications

- Hunter, 1988, *Lime Induced Heave in Sulfate Bearing Clay Soils*, Journal of Geotechnical Engineering, ASCE, Vol. 14, No. 2, pp. 150-167.

- Hunter, 1989, *Applications of Stable Isotope Geochemistry in Engineering Geology*: Proceedings of the 25th Annual Symposium on Engineering Geology and Geotechnical Engineering.

- Hunter, 1993, *Evaluation of Potential Settlement Problems Related to Salt Dissolution in Foundation Soils*: Proceedings of the 29th Annual Symposium on Engineering Geology and Geotechnical Engineering.

DECLARATION OF
AJOY GUHA

I**, Ajoy Guha,** declare as follows:

1. I am presently employed by the California Energy Commission in the **Transmission System Engineering unit** of the Siting, Transmission and Environmental Protection Division as an Associate Electrical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Transmission System Engineering**, for the **Ridgecrest Solar Power Project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 3/19/10 Signed: Original signed by A. Guha

At: Sacramento, California

RESUME

AJOY GUHA

Associate Electrical Engineer
California Energy Commission
1516 Ninth Street, MS 46
Sacramento, CA 95814

EDUCATION:

MSEE, POWER SYSTEMS ENGINEERING, PURDUE UNIVERSITY, INDIANA
BSEE, ELECTRICAL ENGINEERING, CALCUTTA UNIVERSITY, INDIA

CERTIFICATIONS:

REGISTERED PROFESSIONAL ENGINEER, CALIFORNIA, INDIANA & ILLIINOIS
MEMBER OF IEEE; MEMBER OF THE INSTITUTION OF ENGINEERS OF INDIA

SUMMARY OF PROFESSIONAL BACKGROUND:

Ajoy Guha, P. E. has 34 years of electric utility experience with an extensive background in evaluating and determining current and potential transmission system reliability problems and their cost effective solutions. He has a good understanding of the transmission issues and concerns. He is proficient in utilizing computer models of electrical systems in performing power flow, dynamic stability and short circuit studies, and provide system evaluations and solutions, and had performed generator interconnection studies, area transfer and interconnected transmission studies, and prepared five year transmission alternate plans and annual operating plans. He is also experienced in utilizing Integrated Resource Planning computer models for generation production costing and long term resource plans, and had worked as an Executive in electric utilities and experienced in construction, operation, maintenance and standardization of transmission and distribution lines.

WORK EXPERIENCE:

CALIFORNIA ENERGY COMMISSION, ENERGY FACLITIES SITING AND ENVIRONMENTAL DIVISION, SACRAMENTO, CA, 11/2000-Present.
Working as Associate Electrical Engineer in the Transmission System Engineering unit on licensing generation projects. Work involves evaluating generation interconnection studies and their impacts on transmission system, and providing staff assessments and testimony to the commission, and coordination with utilities and other agencies.

ALLIANT ENERGY, DELIVERY SYSTEM PLANNING, MADISON, WI, 4/2000-9/2000.
Worked as Transmission Services Engineer, performed Generator Interconnection studies and system planning studies.

IMPERIAL IRRIGATION DISTRICT, POWER DEPT., Imperial, California, 1985-1998.
Worked as Senior Planning Engineer in a supervisory position and in Transmission, Distribution and Integrated Resource planning areas. Performed interconnection studies for 500 MW geothermal plants and developed plan for a collector system, developed methodologies for transmission service charges , scheduling fees and losses. Worked as the Project Leader in the 1992 Electricity Report (ER 92) process of the California Energy Commission. Worked as the Project Leader for installation of an engineering computer system and softwares. Assumed the Project Lead in the standardization of construction and materials, and published construction standards.

CITY LIGHT & POWER, Frankfort, Indiana, 1980 – 1985.
Worked as Assistant Superintendent and managed engineering, construction and operation depts.

WESTERN ILLINOIS POWER CO-OP., Jacksonville, Illinois, 1978 – 1980.
Worked as Planning Engineer and was involved in transmission system planning.

THE CALCUTTA ELECTRIC SUPPLY CORPORATION LTD. (CESC), Calcutta, India, 1964 –1978.
Worked as District Engineer and was responsible for managing customer relations, purchasing and stores, system planning, construction, operation and maintenance departments of the most industrialized Transmission and Distribution division of the Utility. Worked as PROJECT MANAGER for construction of a 30 mile Double Circuit 132 kV gas-filled Underground Cable urban project. During 1961-63, worked as Factory Engineer for design, manufacturing and testing of transformers, motor starters and worked in a coal-fired generating plant.

DECLARATION OF
Mark Hesters

I, **Mark Hesters**, declare as follows:

1. I am presently employed by The California Energy Commission in the **Siting, Transmission and Environmental Protection Division** as a Senior Electrical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Transmission System Engineering**, for the **Ridgecrest Solar Power Plant**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 3/19/10 Signed: Original signed by M. Hesters

At: Sacramento, CA

Mark Hesters

916-654-5049
mark.hesters@energy.state.ca.us

Qualifications

- Analyzed the reliability impacts of electric power plants for nine years.
- As an expert witness, produced written and oral testimony in numerous California Energy Commission proceedings on power plant licensing.
- Expertise in power flow models (GE PSLF and PowerWorld), production cost models (GE MAPS), Microsoft word-processing, spreadsheet and database programs.
- Contributing author to many California Energy Commission reports.
- Represented the Energy Commission in the development of electric reliability and planning standards for California.

Experience

Senior Electrical Engineer

2005-Present California Energy Commission, Sacramento, CA

- Program manager of the transmission system engineering analysis for new generator Applications of Certification.
- Lead the development of transmission data collection regulations.
- Overhauled the transmission data adequacy regulations for the Energy Commission's power plant certification process.
- Participated in the analysis of regional transmission projects.
- Technical lead for Commission in regional planning groups.
- Energy Commission representative to the Western Electric Coordinating Council Operations Committee.

Associate Electrical Engineer

1998–2005 California Energy Commission, Sacramento, CA

- Lead transmission systems analyst for power plant licensing under 12-month, 6-month and 21-day licensing processes.
- Provided expert witness testimony on the potential transmission impacts of new power plants in California Energy Commission licensing hearings.
- Authored chapters for California Energy Commission staff reports on regional transmission issues.
- Studied the economics of transmission projects using electricity production simulation tools.
- Analyzed transmission systems using the GE PSLF and PowerWorld load flow models.
- Collected and evaluated transmission data for California and the Western United States

Electric Generation Systems Specialist

1990–1998 California Energy Commission, Sacramento, CA

- Lead generation planner for southern California utilities.
- Analyzed electric generation systems using complex simulation tools.
- Provided analysis on the impact of resource plans on air quality and electricity costs for California Energy Commission reports.
- Developed modeling characteristics for emerging technologies.
- Evaluated resource plans.

Education

1985–1989 University of California at Davis Davis, CA

- B.S., Environmental Policy Analysis and Planning

DECLARATION OF
Dale Rundquist

I, Dale Rundquist declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Compliance Project Manager.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on the General Conditions Including Compliance Monitoring and Closure Plan for the Ridgecrest Solar Power Project (09-AFC-9) Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 3/19/10 Signed: Original signed by D. Rundquist

At: Sacramento, California

DALE RUNDQUIST

Compliance Project Manager

EXPERIENCE SUMMARY

Over 30 years in project and staff management experience with the California Energy Commission (CEC), Bel Air Markets, and the US Army. Extensive experience in managing people and projects, and resolving difficult situations.

PROFESSIONAL EXPERIENCE AND EDUCATION

ENERGY COMMISSION COMPLIANCE PROJECT MANAGER 09/07 to Present
Worked as a Compliance Project Manager (CPM) for the California Energy Commission, in the Compliance Unit of the Siting, Transmission and Environmental Protection Division. Monitored the construction of two power plant projects (Inland Empire (01-AFC-17C) and Panoche Energy Center (06-AFC-5C)), and the operation of several other power plants(ACE (86-AFC-1C), Bottle Rock Geothermal(79-AFC-4C), Crockett Cogeneration(92-AFC-1C), Midway Sunset Cogeneration (85-AFC-3C), and Palomar Energy Project (01-AFC-24C)).

MANAGER/SUPERVISOR FOR BEL AIR MARKETS 11/74 to 09/07
Worked for Bel Air Markets for over thirty-two years starting on Night Stock Crew. Worked in a management capacity for twenty-eight years. Worked at several stores throughout the greater Sacramento area, managing 4 stores. Involved in scheduling employees, projecting sales on a weekly, monthly and yearly basis, resolving employee/customer disputes, controlling labor, developing business plans, ordering merchandise, and overall operation of the entire store.

US ARMY 02/69 to 02/71
Infantry Sergeant; Fort Lewis, Washington, Viet Nam.

EDUCATION 09/63 to 06/74
Bachelor of Arts Degree in Biological Sciences and a Minor Degree in Business Administration from California State University, Sacramento (1974).

APPENDIX 1
SCOPING REPORT

APPENDIX 1

United States Department of the Interior
Bureau of Land Management
Ridgecrest Field Office

Solar Millennium LLC
Ridgecrest Solar Power Project
BLM File # CACA-049016

SCOPING REPORT

RESULTS OF SCOPING

January 2010

Ridgecrest Field Office
300 S. Richmond Road
Ridgecrest, CA 93555
Hector Villalobos
Field Manager

Solar Millennium
Ridgecrest Solar Power Project

I. Introduction

A. Brief Description of the Project

The project proposed by Solar Millennium, LLC, (applicant) is to construct, operate, maintain and terminate, the Ridgecrest Solar Power Project (RSPP), a utility scale parabolic trough solar thermal electric generating station. The proposed development is to provide approximately 250 megawatt (MW) capable of supplying enough renewable electricity for approximately 75, 000 homes or about 300,000 people.

If approved, the RSPP would be located on Bureau of Land Management (BLM) administered land five-miles west of the city of Ridgecrest, in Kern County, California. The actual proposed project site is located north and south of Brown's Road and southwest of U.S. Route 395.

The applicant applied for an amended right-of-way (ROW) to include approximately 1,448 acres for the facility footprint, which encompasses the area within the facility fence line. The disturbance area, which includes areas inside and outside of the facility fence line, is approximately 1,944 acres within an overall Project ROW area of 3,995 acres. The current access for the project is Brown Road. (See Figure 1: Project Location Map).

The project would interconnect with Southern California Edison's (SCE) existing 230 kV transmission line. A 230 kV switchyard (substation) is proposed to be constructed near the transmission lines on the south side of Brown Road at the Northwest corner of the Southern Solar field.

The Project would utilize solar parabolic trough technology to generate electricity. With this technology, arrays of parabolic mirrors collect radiant energy from the sun and refocus the energy on a receiver tube located at the focal point of the parabola. Through this process, a heat transfer fluid (HTF) is heated to high temperature (approx. 750°F) and piped through heat exchangers where it is used to generate high-pressure steam. The steam is then fed to a traditional steam turbine generator to generate electricity.

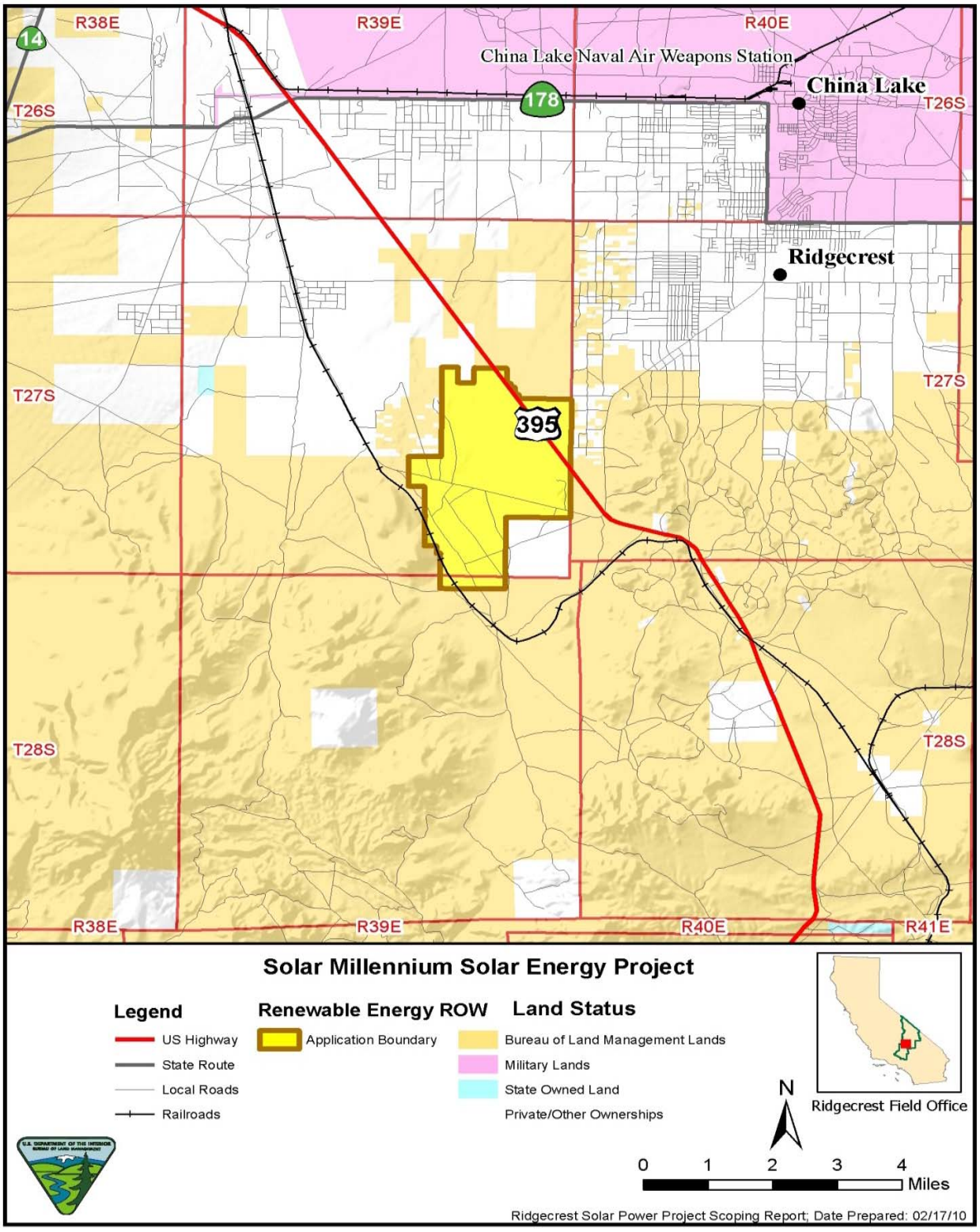

Figure 1: Project Location

B. Potential Land Use Plan Amendment to the California Desert Conservation Area Plan

The Project would be located on land that is subject to the BLM's California Desert Conservation Area (CDCA) Plan. All of the public lands in the CDCA under BLM management and have been designated geographically as Multiple Use Class's (MUC) as follows: Controlled Use (C), Limited Use (L), Moderate Use (M), and Intensive Use (I). Scattered and isolated parcels of public land in the CDCA which have not been placed within multiple-use classes are unclassified land. These parcels will be managed on a case-by-case basis. The proposed Project would be located on both unclassified lands and class L lands. For class L lands, wind and solar electric generation facilities may be allowed after National Environmental Policy Act (NEPA) requirements are met. The CDCA also states that sites associated with power generation or transmission not identified in the CDCA will be considered through the Plan Amendment process. The Project site is currently not identified in the CDCA. Therefore prior to ROW grant issuance, the Project would require a Land Use Plan Amendment to the CDCA.

C. Purpose and Need for the Project

The Proponent proposes to assist the State of California in meeting the State of California Renewable Portfolio Standard Program goals and reduce greenhouse gases by developing a 242 (250) megawatt solar parabolic energy production plant and related facilities in Kern County, California on Bureau of Land Management (BLM) administered lands.

BLM's purpose and need for the Solar project is to respond to the Proponent's application under Title V of the Federal Land Policy and Management Act of 1976 (43 USC 1761) for a right-of-way grant to construct, operate and decommission a solar parabolic facility on BLM lands. BLM will consider alternatives to the Proponent's proposed action and will include terms and conditions. If BLM decides to approve issuance of a ROW grant to the Proponent, BLM's actions would include amending the California Desert Conservation Area Plan concurrently. BLM will take into consideration the provisions of the Energy Policy Act of 2005 in responding to the Proponent's application.

D. Agency Coordination

D.1 Lead Agency

The California Energy Commission (CEC) is responsible for licensing solar parabolic projects that are 50 MW and larger. Therefore, the Project is also under the jurisdiction of the CEC. The Applicant submitted an Application for Certification (AFC) for the Project to the CEC on September 1, 2009 and a Supplement to the AFC was submitted on October 26, 2009. The CEC and the BLM entered into a MOU on August 8, 2007

and as lead agencies under CEQA and NEPA agreed that a single environmental report can meet both agencies environmental requirements. It is assumed that any future EIS data and analysis will be incorporated into the CEC's AFC documentation and processes.

D.2 Cooperating Agency

The cooperating agency (CA) role derives from the National Environmental Policy Act (NEPA) of 1969, which calls on federal, state, and local governments to cooperate with the goal of achieving "productive harmony" between humans and their environment. The Council on Environmental Quality's (CEQ) regulations implementing NEPA allow federal agencies (as lead agencies) to invite tribal, state, and local governments, as well as other federal agencies, to serve as CAs in the preparation of environmental impact statements. In 2005, the BLM amended its planning regulations to ensure that it engages its governmental partners consistently and effectively through the CA relationship whenever land use plans are prepared or revised.

State agencies, local governments, tribal governments, and other federal agencies may serve as CAs. CEQ regulations recognize two criteria for CA status: jurisdiction by law and special expertise. The BLM regulations incorporate these criteria.

40 CFR 1508.5 (CEQ) Defining eligibility. "Cooperating agency" means any Federal agency other than a lead agency which has "jurisdiction by law" or "special expertise" with respect to any environmental impact….A State or local agency of similar qualifications or, when the effects are on a reservation, an Indian Tribe, may by agreement with the lead agency become a cooperating agency.

The BLM has invited approximately 4 tribes and multiple state and local agencies to participate in the planning process as Cooperating Agencies. The Department of Energy may be a Cooperating Agency.

II. Scoping Process Summary

A. Notice of Intent

The BLM published a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) on November 23, 2009 in the Federal Register. Publication of the NOI began a 30-day comment period which ended on December 21, 2009. BLM provided a website with Project information that also described the various methods of providing public comment on the Project including an e-mail address where comments could be sent electronically.

B. Public Notification

Notification for a public Scoping Meeting held on January 6, 2010 appeared in the Riverside Press Enterprise on November 24, 2009 and the Ridgecrest Daily Independent on December 26, 2009. Notification was also published on the BLM website on November 23, 2009.

C. Public Scoping Meeting

A public Scoping Meeting was held on January 5th and 6th, 2010 at the Ridgecrest City Hall located at 100 W. California Ave., Ridgecrest, California. A presentation describing the Project was made by Solar Millennium, LLC with presentations describing the environmental review process presented by members of the BLM and CEC. Approximately one-hundred twenty attendees were present during the scoping meetings.

D. Written Comments

Fifty-Eight comment letters were received between both agencies within the original comment period ending on December 21, 2009. The public was permitted fifteen days after the last Public Scoping Meeting on January 6, 2010. The comment period ended January 21, 2010. Another 15 letters were submitted (through January 21, 2010). Most of the comments were received prior to the deadline and are summarized below. It should be noted additional letters were filed with the agency and CEC after this date and most are available on the CEC web site for the Ridgecrest Solar project. Many of those letters raised similar concerns to the letters and comments we have officially examined in this report.

III. Comment Summary and Analysis

Issues were identified by reviewing the comment documents received. Many of the comments identified similar issues; all of the public comment documents were reviewed and the following section provides a summary of the issues, concerns, and/or questions raised. For this report, the issues have been grouped into one of the three following categories:

- Issues or concerns that could be addressed by effects analysis;
- Issues or concerns that could develop an alternative and/or a better description or qualification of the alternatives;
- Issues or concerns outside the scope of the EIS.

The comments discussed below are paraphrased from the original comment letters. To a minor degree, some level of interpretation was needed to identify the specific concern to be addressed. Many of the comments identified similar issues; to avoid duplication and redundancy similar comments were grouped together and then summarized.

Original comment letters may be reviewed up on request at the BLM California Desert District at 22835 Calle San Juan De Los Lagos, Moreno Valley, California, 92553, during normal business hours, from 8:00 a.m. to 4:00 p.m.

A. Effects Analysis

Comments in this category will be described in detail in the affected environment section of the EIS or addressed in the effects analysis for each alternative

Purpose and Need

- Project description should not be narrowly defined to rule out feasible alternatives

Air Resources (Air sheds)

- Greenhouse gas emissions/climate change impacts on plants, wildlife, and habitat adaptation
- Planning for species adaptation due to climate change
- Discussion of how projected impacts could be exacerbated by climate change such as water supply and reliability
- Quantify and disclose anticipated climate change benefits of solar energy
- Discussion of trenching/grading/filling and effects on carbon sequestration of the natural desert

Soils Resources

- Baseline conditions should be described and if the site is disturbed or impaired
- Impacts to desert soils
- Site area is prone to flooding; analysis must address how this may change
- Increased siltation during flooding and dust (see public health as well)
- Disturbance of soils in desert locations can lead to the introduction of invasive weeds
- Preparation of a drainage, erosion, and sediment control plan

Water Resources (Surface and Ground water)

- Effects of additional groundwater pumping in conjunction with other groundwater issues
- Groundwater impacts
- A description of the water rights permitting process and the status of water rights in the basin, including an analysis of whether the water has been over allocated

- An analysis of water reduction alternatives and alternative water sources
- Mitigation options require careful preparation and monitoring
- Water supply impacts related to dust control, fire prevention and containment, vegetation management, sanitation, equipment maintenance, construction, and human consumption

Biological Resources

- If there are threatened or endangered species present, recommend BLM consult with USFWS and prepare a Biological Opinion under Section 7 of the ESA
- Impacts to all known species, not just special status, should be analyzed to assure ecosystem level protection—permanent loss of 4,000 acres of habitat and associated species is significant and cannot be mitigated
- Define and discuss the condition of threatened species in terms or recovery or decline and how use of this site affects these circumstances
- Eliminate all grazing in the area and add fencing to exclude OHV trails and use
- Maximize options to protect habitat and minimize habitat loss and fragmentation
- Impacts associated with constructing fences
- Seasonal surveys should be performed for sensitive plant and animal species
- The proposed site is too important to the Desert Tortoise survival; alternative site is required
- The potential impact to the Mojave ground squirrel at this location cannot be mitigated
- Acquisition of lands for conservation should be part of mitigation strategy
- Mitigation should be 5:1 ratio for habitat removed
- Adaptive management should be considered in program design
- Mitigation should consider the removal of grazing land in habitat designated areas
- Impacts regarding habitat fragmentation and loss of connectivity
- Impact on washes
- Assess if Ravens or other predators will be attracted to mitigation sites.

Vegetation Resources (Vegetative communities, priority and special status species)

- Identify all petitioned and listed threatened and endangered species and critical habitat that might occur within the Project area
- Include a full floral inventory of all species encountered on-site
- Seasonal surveys should be performed for sensitive plant species—lack of fall surveys may under represent onsite plants

- If transplantation is to be a part of the mitigation strategy, a detailed plan must be included as part of the EIS/SA
- Assess Project impacts affecting plant taxa occurring within the Project area that are considered rare within California but more common elsewhere
- Impacts to existing plant communities

Wildlife Resources (Priority species, special status species)

- Desert tortoise; high population density translocation proposed results in high mortality;
- Southern portion of site designated as critical habitat for the MGS (Mojave ground Squirrel).
- Impacts to the following species:
    - Western Burrowing owl
    - Loggerhead shrike
    - Le Conte's thrasher
- Impacts to wildlife movement corridors
- Preserve large landscape-level migration areas

Cultural Resources

- Have archaeological sites been evaluated pursuant to the National Register of Historic Places criteria?
- Site has significant Native American history
- Evaluate impacts affecting Sacred Sites and sacredness.
- Evaluate potential impacts on archeological, cultural, and historical resources in the vicinity of the Project, including, but not limited to: (1) Native American resources, burial sites, and artifacts; and (2) historical mining operations and related artifacts.

Visual Resources

- Visual impacts to wilderness areas; increased light pollution on Desert night sky
- Avoid impacts affecting visually sensitive areas
- Analyze the Project's aesthetic and visual impacts that could affect desert star gazing and Native American practices

Land Use/Special Designations (ACECs, WAs, WSAs, etc.)

- Applicant implies that biological resources within project area are not sensitive because not located within Areas of Critical Concern (ACEC) or Desert Wildlife

Management Area (DWMA), but many areas outside such designated areas do contain significant biological resources

- Use private land not public lands
- Describe reasonably foreseeable future land use and associated impacts resulting from additional power supply

Public Health and Safety

- Evaluate the effects of Valley Fever from disturbed soils.
- Describe the HTF, potential remediation if spilled, remediation plans and offsite disposal

Noise/Vibration

- Consider wildlife as sensitive receptors
- Dry cooling process noise/vibration impacts on wildlife

Recreation (RMAs, facilities, LTVAs, dispersed recreation opportunities, etc.)

- Evaluation should include impacts regarding off-highway vehicle use (OHV), camping, photography, hiking, wildlife viewing, and rock hounding.
- Evaluation should include number of users, value of affected land for recreational purposes, and need to locate and acquire replacement venues for lands lost
- Indirect impacts caused by displacing recreational users
- Cumulative loss of land available for OHV recreation

Social and Economic Setting

- Evaluation of economic impacts due to construction, implementation, and operation.
- Economic impacts regarding loss of commerce due to recreational use losses.

Environmental Justice (minority and low-income communities)

- Evaluation whether diminished recreational access would be placed disproportionately on minorities and low-income communities.

Cumulative Impacts

- Identify impacts from other projects occurring in the vicinity, including solar, wind, geothermal, roads, transit, housing, ORV use, military maneuvers, and other development
- Include reasonably foreseeable Projects; include all the solar and wind applications within vicinity of Ridgecrest

- Identify cumulative impacts of the addition of numerous renewable energy projects on the desert
- Include discussion of cumulative impacts to ground water supply
- Analyze the potential for development and population growth to occur in those areas that receive the generated electricity
- Describe the reasonably foreseeable future land use and associated impacts that will result from the additional power supply; i.e., recreation, grazing, OHV.
- Examine the potential for ecosystem fragmentation associated with the cumulative effects of large-scale industrial development occurring in the California Desert areas
- Analyze the Project's cumulative impacts affecting biological resources
- The cumulative impacts analysis should address species migration needs and other ecological processes that maybe caused by global climate change

B. Alternative Development and/or Alternative Design Criteria

Comments in this category will be considered in the development of alternatives or can be addressed through design criteria in the alternative descriptions.

- Project description should not be narrowly defined to rule out feasible alternatives
- Describe how each alternative was developed, how it addresses each Project objective, and how it would be implemented
- The preferred alternative should consider conjunctive use of disturbed private land in combination with adjacent lower value federal land
- Consider reduced Project size
- Alternatives should include: sites not under BLM jurisdiction such as fallowed alfalfa fields north of the city
- Alternatives should describe rationale used to determine whether impacts of an alternative are significant or not
- Local high winds in the valley will affect design and cooler temperatures at the site will likely require more energy to keep the HTF warm and fluid in the winter months
- Consider reconfiguration alternatives proposed by F&WS to minimize impacts to wildlife movement and sensitive biological resources and washes
- Consider cost and efficiency of energy for different technologies
- Consider alternative technologies that require significantly less water
- Consider the no-action alternative

C. Issues or Concerns Outside the Scope of the EIS

Comments in this category are outside the scope of analysis and will not be addressed in the EIS. Rationale for considering these comments out-of-scope is included.

- Consider development wherein solar and wind is focused first on lands which have lower resource value due to fragmentation, type conversion, edge effects, and other factors
- Consider abandoning the “fast track” approach because it does not allow enough time for an adequate analysis of impacts affecting natural, historical and cultural resource on and around the Project site

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION
For the *RIDGECREST SOLAR POWER PROJECT*

Docket No. 09-AFC-9

PROOF OF SERVICE
(Revised 3/2/2010)

APPLICANT
*Billy Owens
Director, Project Development
Solar Millenium
1625 Shattuck Avenue, Suite 270
Berkeley, CA 94709-1161
owens@solarmillennium.com

*Alice Harron
Senior Director, Project Development
1625 Shattuck Avenue, Suite 270
Berkeley, CA 94709-1161
harron@solarmillennium.com

Elizabeth Copley
AECOM Project Manager
2101 Webster Street, Suite 1900
Oakland, CA 94612
elizabeth.copley@aecom.com

Scott Galati
Galati/Blek, LLP
455 Capitol Mall, Suite 350
Sacramento, CA 95814
sgalati@gb-llp.com

Peter Weiner
Matthew Sanders
Paul, Hastings, Janofsky & Walker LLP
55 2nd Street, Suite 2400-3441
San Francisco, CA 94105
peterweiner@paulhastings.com
matthewsanders@paulhastings.com

INTERVENORS
California Unions for Reliable Energy (CURE)
Tanya A. Gulesserian
Elizabeth Klebaner
Marc D. Joseph
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080
tgulesserian@adamsbroadwell.com
eklebaner@adamsbroadwell.com

Desert Tortoise Council
Sidney Silliman
1225 Adriana Way
Upland, CA 91784
gssilliman@csupomona.edu

Basin and Range Watch
Laura Cunningham
Kevin Emmerich
P.O. Box 70
Beatty, NV 89003
bluerockiguana@hughes.net

Western Watersheds Project
Michael J. Connor, Ph.D.
California Director
P.O. Box 2364
Reseda, CA 91337-2364
mjconnor@westernwatersheds.org

INTERESTED AGENCIES
California ISO
E-mail Preferred
e-recipient@caiso.com

Janet Eubanks, Project Manager,
U.S. Department of the Interior
Bureau of Land Management
California Desert District
22835 Calle San Juan de los Lagos
Moreno Valley, California 92553
Janet_Eubanks@ca.blm.gov

ENERGY COMMISSION

JAMES D. BOYD
Vice Chair and Presiding Member
jboyd@energy.state.ca.us

ANTHONY EGGERT
Commissioner and Associate Member
aeggert@energy.state.ca.us

Kourtney Vaccaro
Hearing Officer
kvaccaro@energy.state,ca.us

Eric Solorio
Project Manager
esolorio@energy.state.ca.us

Tim Olson
Advisor to Commissioner Boyd
tolson@energy.state.ca.us

Jared Babula
Staff Counsel
jbabula@energy.state.ca.us

Jennifer Jennings
Public Adviser
publicadviser@energy.state.ca.us

*indicates change

DECLARATION OF SERVICE

I, April Albright, declare that on, March 26, 2010, I served and filed copies of the attached Staff Assessment and Draft Environmental Impact Statement and Draft California Desert Conservation Area Plan Amendment. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: **[http://www.energy.ca.gov/sitingcases/solar_millennium_ridgecrest]**.

The document has been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(*Check all that Apply*)

For service to all other parties:

✓ sent link of electronic document to all email addresses on the Proof of Service list;

_____ by personal delivery;

✓ CD copies delivered on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailed. **Hard copies are available upon request.**

AND

For filing with the Energy Commission:

✓ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (preferred method);

OR

_____ depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 09-AFC-9
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512

docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

Original signed by: _____
April Albright