Rio Mesa Solar Electric Generating Facility

Preliminary Staff Assessment - Part A

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RIO MESA SOLAR ELECTRIC GENERATING FACILITY (11-AFC-04)
PRELIMINARY STAFF ASSESSMENT – Part A

EXECUTIVE SUMMARY

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INTRODUCTION

This Preliminary Staff Assessment (PSA) is being published by California Energy Commission staff for the Rio Mesa Solar Electric Generating Facility (Rio Mesa SEGF). This PSA contains staff's independent, objective evaluation of the BrightSource Energy, Inc. (applicant) Rio Mesa SEGF Application for Certification (11-AFC-04). The PSA is being filed in two parts, this being Part A, and Part B anticipated for publication October 15, 2012. The PSA examines engineering, environmental, public health, and safety aspects of the proposed Rio Mesa SEGF project, based on the information provided by the applicant, government agencies, interested parties and other sources available at the time the PSA was prepared. This PSA includes staff's environmental and engineering evaluation of the Rio Mesa SEGF project in the following technical areas: **Air Quality**, **Hazardous Materials Management**, **Noise and Vibration**, **Public Health**, **Socioeconomics**, **Water Supply**, **Soil and Surface Water**, **Traffic and Transportation**, **Transmission Line Safety and Nuisance**, **Visual Resources**, **Waste Management**, **Worker Safety and Fire Protection**, **Facility Design**, **Geology and Paleontology**, **Efficiency**, **Reliability**, and **Transmission System Engineering**.

PSA Part B will contain staff's **Alternatives** analysis as well as environmental and engineering evaluation of the Rio Mesa SEGF project for the balance of remaining technical sections: **Biological Resources**, **Cultural Resources**, and **Land Use**.

The PSA contains analyses similar to those normally contained in an Environmental Impact Report (EIR) required by the California Environmental Quality Act (CEQA). When considering a project for licensing, the Energy Commission is the lead state agency under CEQA, and its process provides the environmental analysis that satisfies CEQA requirements as a certified regulatory program. The Energy Commission staff provides an independent assessment of the project's engineering design and its potential effects on the environment, the public's health and safety, and whether the project conforms with all applicable local, state, and federal laws, ordinances, regulations and standards (LORS). Energy Commission staff also recommends measures to mitigate potential significant adverse environmental effects, which take the form of conditions of certification for construction, operation, maintenance and eventual decommissioning of the project, if approved by the Energy Commission.

This PSA is not the decision document for these proceedings, nor does it contain findings of the Energy Commission related to environmental impacts or the project's compliance with local, state, and federal legal requirements. The PSA (including the forthcoming Part B) will serve as a pre-cursor to the Final Staff Assessment (FSA), which will act as staff's testimony in evidentiary hearings to be held by an assigned Committee of two Energy Commissioners and a Hearing Officer. The Committee will hold evidentiary hearings and will consider the recommendations presented by staff, the applicant, intervenors, governmental agencies, and the public prior to proposing its recommended decision (Presiding Member's Proposed Decision (PMPD)) to the full Commission. Following a public hearing(s), the full five-member Energy Commission will make a final decision.

STATE AND FEDERAL JURISDICTION

The Energy Commission has exclusive permitting jurisdiction for the siting of thermal power plants of 50 MW or more and related facilities in California. The Energy Commission also has responsibility for ensuring compliance with the California Environmental Quality Act (CEQA) through the administration of its certified regulatory program and is the lead agency under CEQA.

However, because the project transmission tie line, emergency and construction electrical power supply line, and primary access road will be located on public lands managed by the BLM, approval of a Right of Way Grant, issued by the BLM, is required as well. A Right of Way Grant authorizes rights and privileges for a specific use on administered lands for a set period of time and subject to certain terms and conditions. The BLM will be conducting its own environmental review of the entire project – as a connected action – even though only a relatively small portion is on public lands. This environmental review process falls under the requirements of the National Environmental Policy Act (NEPA) and will result in the publication of an Environmental Impact Statement (EIS). The BLM's federal process under NEPA is anticipated to occur concurrently with the Energy Commission's siting and environmental review process. A Notice of Intent to prepare a draft EIS was filed by the BLM, Palm Springs South Coast Field Office on August 29, 2012.

PROPOSED PROJECT LOCATION AND DESCRIPTION

The Rio Mesa SEGF is proposed for development by Rio Mesa I, LLC and Rio Mesa II, LLC. Each entity would hold an equal one half ownership interest of certain shared facilities while separately owning each respective power plant. Both entities are wholly owned subsidiaries of Rio Mesa Holdings, LLC, which in turn is a wholly owned subsidiary of BrightSource Energy, Inc. The site is located in eastern Riverside County, approximately 13 miles southwest of Blythe, California (see **Project Description Figure 1**). The project site is generally bounded on the east by the 161 kV Western Area Power Authority (WAPA) transmission lines, with undeveloped desert lands and active agriculture further east, on the south by undeveloped desert lands located in Imperial County, on the west by undeveloped desert lands and the Mule Mountains, and on the north by undeveloped public desert lands administered by the U.S. Bureau of Land Management (BLM).

As proposed, the Rio Mesa SEGF would encompass a total of approximately 3,805 acres. This area would include the two proposed power plants, associated heliostat fields, and support facilities located within a common area. Off-site project components, including a temporary construction area, transmission line corridors, and access roads encompass approximately 2,188 acres, for a total of approximately 5,993 acres. The component areas of the proposed development are shown in **Table 3-1** of the **Project Description** section. Approximately 3,805 acres, on which the two power plants are proposed, would be on land leased from the Metropolitan Water District of Southern California (MWD). The Right of Way corridor for the gen-tie transmission lines primarily traverse public lands administered by the BLM, although some properties within the gen-tie transmission corridor are private lands.

The Rio Mesa SEGF would comprise two solar concentration thermal power plants, associated solar fields, and an approximate 19.5-acre common area to accommodate a combined administrative, control, maintenance, and warehouse building; evaporation ponds; groundwater wells; a water treatment plant; and a common switchyard. An approximate 103-acre construction logistics area (CLA) would be established to accommodate construction parking, office equipment, and conference trailers; equipment staging assembly and material storage; a tire cleaning station; and other construction support facilities.

Each solar plant would generate 250 megawatts (MW) (net), for a total net output of 500 MW and would use heliostats – elevated mirrors guided by a tracking system mounted on a pylon – to focus the sun’s rays on a receiver located atop a 750-foot-tall solar power tower near the center of each solar field. Each solar field would use approximately 85,000 heliostats. Rio Mesa I, the southernmost plant site, would occupy approximately 1,828 acres, and Rio Mesa II, the northernmost plant site, would occupy approximately 1,977 acres.

Each power plant would use a solar power boiler, located atop a dedicated concrete tower, and a solar field based on heliostat mirror technology developed by BrightSource Energy, Inc. The heliostat fields would focus solar energy on the solar power boiler, referred to as “solar receiver steam generator” (SRSG), which converts the solar energy into superheated steam.

Each power plant would generate electricity using solar energy as its primary fuel source. However, auxiliary boilers would be used to operate in parallel with the solar fields during partial load conditions and occasionally in the afternoon when power is needed after the solar energy has diminished to a level that no longer would support solar-only generation of electricity. These auxiliary boilers would also assist with daily start-up of the power generation equipment and night time preservation.

Auxiliary equipment supporting each power plant’s SRSG, solar field, and turbine/generator would include the following:

- Boiler feed water and condensate pumps
- Feed water heaters
- Deaerator
- Condensate polisher
- Wet-surfaced air cooler (WSAC) (hybrid auxiliary cooler)
- Air-cooled condenser for main process steam
- Transformers
- Emergency diesel generators
- Diesel and motor-driven fire pumps

The Rio Mesa SEGF is proposed to be interconnected to the Southern California Edison (SCE) grid through a new 220kV line that would be built as part of the project and would run north approximately 9.7 miles to connect to the Colorado River Substation.

Access to both plants would be via Bradshaw Trail (primary) – paved or unpaved and a new secondary access road directly north and parallel to 34th Avenue off of State Route 78. The portion of Bradshaw Trail that would be used for the primary access route is currently a two-lane, east-west paved road for one mile west of Rannells Avenue. Beyond the paved segment it becomes a graded dirt road. The applicant proposes to improve the segment to a point where it connects to the northerly boundary of the northern plant, however, that portion of Bradshaw Trail traverses BLM land and how it is improved is at the discretion of BLM. The secondary access route would be improved and provide access to the southerly power plant north of the proposed metering station. In addition to the access roads, each plant would have perimeter access/maintenance.

PUBLIC AND AGENCY COORDINATION AND OUTREACH EFFORTS

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). However, the Energy Commission typically seeks comments from and works closely with other regulatory agencies that administer LORS that may be applicable to proposed projects. These agencies may include, but are not limited to, the U.S. Bureau of Land Management, the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, State Water Resources Control Board/Regional Water Quality Control Board, California Department of Fish and Game, the California Air Resources Board, the Mojave Desert Air Quality Management District, and Riverside County.

On October 28, 2011, the Energy Commission staff sent a notice of receipt and a copy of the Rio Mesa SEGF Application for Certification (AFC) to all local, state, and federal agencies that might be affected by the proposed project, as well as to a comprehensive list of agencies and libraries. Additionally, the notice of receipt of the AFC was sent to property owners within 1,000 feet of the proposed project and those located within 500 feet of the linear facilities. In addition to providing notice of receipt of the AFC, the notices provided a brief description of the project, discussion of the Energy Commission's siting certification process, and information on how agencies and the public can comment and participate in the proceeding. Staff continues to seek cooperation and/or comments from regulatory agencies that administer LORS which are applicable to the proposed project as well as comments from the public.

On July 23, 2012, the applicant submitted an amended AFC, described by the applicant as an "Environmental Enhancement Proposal". The primary differences between the original AFC and the amended AFC included: eliminating a proposed power plant north of the current project, located on BLM lands; moving the location of the project switchyard and common area facilities to another area within the same overall project site; and moving the location of the natural gas tap/meter station. On August 6, 2012, the Energy Commission staff sent the Rio Mesa SEGF amended AFC to the same comprehensive list of agencies and libraries alluded to above, as well as notice of receipt of the amended AFC to members of the public within 1,000 feet of the project or 500 feet of linear facilities.

PUBLIC WORKSHOPS

Energy Commission staff conducted several public workshops and/or hearings to facilitate public, agency, and intervenor participation. Furthermore, these workshops allowed a transparent and comprehensive discussion of several technical issues related to the proposed project and allowed for further staff, agency, and public understanding. The Energy Commission issued notices for all these workshops and hearings prior to each meeting. These workshops and hearings were conducted on the following dates:

- January 6, 2012 (Workshop on Biological Resources)
- February 1, 2012 (Informational Hearing, Environmental Scoping Meeting and Public Site Visit)
- February 13, 2012 (Data Request and Issues Resolution Workshop)
- March 1, 2012 (Data Request and Issues Resolution Workshop)
- March 13, 2012 (Data Request and Issues Resolution Workshop)
- March 19, 2012 (Status Conference Hearing)
- May 24, 2012 (Data Response Workshop)
- June 20, 2012 (Status Conference Hearing)
- August 2, 2012 (Workshop on Cultural and Paleontological Resources)
- August 28, 2012 (Joint Workshop with Hidden Hills Solar Electric Generating System Project to Discuss Potential Impacts Associated with Solar Power Convective Heat and Radiant Flux)

LIBRARIES

As alluded to above, copies of the AFC and amended AFC were sent to the following libraries in the vicinity of the project site for public inspection:

Palo Verde Valley District Library 125 West Chanslor Way Blythe, CA 9225-1245	**Riverside Main Library** 3581 Mission Inn Avenue Riverside, CA 92501
Lake Tamarisk Library 43880 Lake Tamarisk Drive Desert Center, CA 92239	**Coachella Branch Library** 1538 Seventh Street Coachella, CA 92236
Imperial County Free Library 1125 Main Street El Centro, CA 92243	

In addition to the above-noted local libraries, copies of the AFC and amended AFC were made available at the Energy Commission's library in Sacramento, the California State library in Sacramento, and state libraries in Eureka, Fresno, Los Angeles, San Diego, and San Francisco.

NOTIFICATION TO THE LOCAL NATIVE AMERICAN COMMUNITY

On January 4, 2012, a request was sent to the Native American Heritage Commission (NAHC) advising them of submittal of the project AFC and requesting that they provide a list of Native American groups or individuals in the project area who may have information regarding the project site. In response to staff's request, on January 25, 2012, the NAHC provided a list of local tribes and interested Native Americans that they advised Energy Commission staff consult with in order to determine if the proposed project might impact Native American cultural resources.

On February 22, 2012, Energy Commission staff provided notice to all the tribes and individuals listed in the NAHC's response letter noted above, advising them of the proposed project and how they could participate in the Energy Commission's licensing process. Since then, Energy Commission staff has met with and continues to meet with tribal representatives and individuals regarding potential impacts to cultural resources. Details of ongoing tribal consultuation will be presented in **Cultural Resources** section of the PSA Part B.

PUBLIC ADVISER'S OFFICE

The Energy Commission's outreach program is primarily facilitated by its Public Adviser's Office (PAO). This is an ongoing process that provides a consistent level of public outreach, regardless of outreach efforts conducted by the applicant or other parties.

The PAO's public outreach work is an integral part of the Energy Commission's AFC review process. The PAO reviewed information provided by the applicant and also conducted its own outreach efforts to identify certain local officials, as well as interested entities, within a six-mile radius of the proposed site for the project. These entities included, but were not limited to, schools, local service organizations (e.g. Rotary Clubs, Kiwanis, and Soroptomists), cultural/ethnic groups, special service districts, environmental organizations and certain staff and elected officials from the City of Blythe, Riverside County, Imperial County, and La Paz County (Arizona).

The PAO provided notification by letter and enclosed notice of the February 1, 2012 Informational Hearing and Site Visit, held at the Blythe City Hall Council Chambers in Blythe, California. Notices were distributed to local residences and entities referenced above. Additionally, the notice was placed in the Palo Verde Valley Times.

ENVIRONMENTAL JUSTICE

California law defines justice as "the fair treatment of people of all races, cultures, and income with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies" (Government Code Section 65040.12 and Public Resources Code Section 72000).

All Departments, Boards, Commissions, Conservancies and Special Programs of the Resources Agency must consider environmental justice in their decision-making process if their actions have an impact on the environment, environmental laws, or policies. Such actions that require environmental justice consideration may include:

- adopting regulations;
- enforcing environmental laws or regulations;
- making discretionary decisions or taking actions that affect the environment;
- providing funding for activities affecting the environment; and
- interacting with the public on environmental issues.

In considering environmental justice in energy facility siting cases, staff uses demographic screening analysis to determine whether a low-income and/or minority population exists with the potentially affected area of the proposed site. The demographic screening is based on information contained in two documents: *Environmental Justice: Guidance Under the National Environmental Policy Act* (Council on Environmental Quality, December, 1997) and *Guidance for Incorporating Environmental Justice Concerns in EPA's Compliance Analyses* (U.S. Environmental Protection Agency, April, 1998). Due to the change in the sources and methods of collection used by the U.S. Census Bureau, the screening process relies on Year 2010 U.S. Census data to determine the number of minority populations and data from the 2006-2010 American Community Survey (ACS) to calculate the population below-poverty-level. Staff's demographic screening is designed to determine the existence of a minority or below-poverty-level population or both within a six-mile area of the proposed project site.

Environmental Justice: Guidance Under the National Environmental Policy Act, defines minority individuals as members of the following groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. A minority population is identified when the minority population of the potentially affected area is:

1. greater than 50%;
2. or when 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.

In addition to the demographic screening analysis, staff follows the steps recommended by the U.S. EPA's guidance documents in regard to outreach and involvement; and if warranted, a detailed examination of the distribution of impacts on segments of the population.

Staff has followed each of the above steps for the following twelve sections in the PSA, of which those sections underlined are included in this PSA Part A: **<u>Air Quality</u>**, **Cultural Resources**, **<u>Hazardous Materials Management</u>**, **Land Use**, **<u>Noise and Vibration</u>**, **<u>Public Health</u>**, **<u>Socioeconomics</u>**, **<u>Water Supply</u>**, **<u>Traffic and Transportation</u>**, **<u>Transmission Line Safety and Nuisance</u>**, **<u>Visual Resources</u>**, and **<u>Waste Management</u>**. Over the course of the analysis for each of these technical disciplines, staff considered potential impacts and mitigation measures, and whether there would be a significant impact on an environmental justice population. As a result of this analysis staff determined there are no environmental justice issues for the proposed Rio Mesa SEGF because as **Socioeconomics Figure 1** shows, there is no environmental justice or minority population within a six-mile buffer of the proposed project. Therefore there would not be a disproportionate environmental impact resulting from construction and operation of the proposed project to an environmental justice population.

CUMULATIVE EFFECTS

Staff conducted a search of past, present, and reasonably foreseeable “probable” future projects in the area of the proposed project (see **Cumulative Effects Figures 1**). Staff reviewed recent environmental reports and various resources, including focusing on projects along the I-10 corridor near the project as well as projects provided by the applicant in the AFC. **Executive Summary Table 1** below presents a master list of the projects considered as part of the Rio Mesa SEGF cumulative setting.

CEQA Guidelines define cumulative impacts as “two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.” (Cal. Code Regs., tit. 14, § 15355.) The Guideline continues: (a) “[t]he individual effects may be changes resulting from a single project or a number of separate projects” and (b) “[t]he cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.” (*Ibid*.)

Accordingly, staff in each technical section of this PSA determined which of the projects from the Cumulative Projects list could create impacts specific to their technical area. Using unique sets of criteria specific to each area, staff then evaluated whether the cumulative effect were significant, and if so, whether the project’s contribution to that combined effect would be “cumulatively considerable[1]”. Therefore, this PSA will identify and analyze the impacts of all aspects and phases of the proposed project, including the combined effect the proposed project will have in conjunction with other projects.

[1] “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. (Cal.Code Regs., tit. 14, section 15064, subd. (h)(1).)

Executive Summary Table 1
Rio Mesa Solar Electric Generating Facility Cumulative Projects

Project Name	Location	Ownership	Status	Project Description
Four Commercial Projects	Blythe	Various	Approved	Four commercial projects have been approved by the Blythe Planning Department, including the Agate Road Boar & RV Storage, Riverway Ranch Specific Plan, Subway Restaurant and Motel, and Agate Senior Housing Development. Dates of construction are unknown at this time
Intake Shell	Blythe	Shell	Under Construction	Reconstruction of a Shell facility located at Intake & Hobson Way
Three Residential Developments	Blythe	Various	Under Construction	3 residential development projects are under construction: River Estates at Hidden Beaches, The Chanslor Place, Mesa Bluffs. 125 single family homes are currently being built
Twelve Residential Developments	Blythe	Various	Approved or under construction	12 residential development projects have been approved by the Blythe Planning Department: Vista Palo Verde, Van Weelden, Sonora South, Ranchette Estates, Irvine Assets, Chanslor Village, St. Joseph's Investments, Edgewater Lane, The Chanslor Place Phase IV, Cottonwood Meadows, Palo Verde Oasis. A total of 1,005 single family residences are proposed
Devers-Palo Verde No. 2 Transmission Line Project	From the Midpoint Substation to Devers Substation	SCE	CPUC petition to modify request to construct CA-only portion approved by CPUC 11/2009 Under Construction	New 500 kV transmission line parallel to the existing Devers-Palo Verde Transmission Line from Midway Substation, approximately 10 miles southeast of Blythe, to the SCE Devers Substation, near Palm Springs. The ROW for the 500 kV transmission line would be adjacent to existing DPV ROW
Colorado River Substation Expansion	10 miles southwest of Blythe	SCE	Approved 7/2011 Under Construction	500/230kV substation, constructed in an area approximately 1000 ft by 1900 ft
Desert Southwest Transmission Line	118 miles primarily parallel to DPV	Imperial Irrigation District	Approved	118 mile 500kV transmission line from a new substation/switching station near the Blythe Energy Project to the existing Devers Substation located approximately 10 miles north of Palm Springs.
Blythe Energy Project II	Near Blythe Airport	Blythe Energy	Approved	520 MW combined-cycle power plant located entirely within the Blythe Energy Project site boundary, located on 30 acres of a 76-acre site.

Project Name	Location	Ownership	Status	Project Description
Eagle Mountain Pumped Storage Project	Eagle Mountain iron ore mine, north of Desert Center	Eagle Crest Energy	FERC draft EIS published 12/2010	1,300 MW pumped storage project on 2,200 acres of public and private land, designed to store off-peak energy to use during peak hours.
Palen Solar Energy Project	North of I-10, 10 miles east of Desert Center	Solar Millennium Project Purchased by BrightSource	Approved Amendment anticipated to be filed to convert the project to a power tower	500 MW solar trough project on 5,200 acres Project will be converted to a power tower
Blythe Solar Power Project	North of I-10, north of Blythe Airport	Solar Millennium	Approved Amendment anticipated to be filed to convert the project to a power tower	1,000 MW solar trough facility on 7,540 acres Project will be converted to photovoltaic
NextEra (FPL) McCoy	13 miles northwest of Blythe	McCoy Solar	NOI to prepare an EIS 8/29/11	Up to 750 MW solar PV project on 7,700 acres of BLM land, 470 acres of private land, with a 16 mile gen-tie
McCoy Soleil Project	10 miles northwest of Blythe	EnXco	Plan of Development to Palm Springs BLM	300 MW solar power tower project located on 1,959 acres. Requires a 14 mile transmission line to proposed SCE Colorado Substation south of I-10
Genesis Solar Energy Project	North of I-10, 25 miles west of Blythe, 27 miles east of Desert Center	NextEra (FPL)	Approved, under construction	250 MW solar trough power project on 1,950 acres north of the Ford Dry Lake. 6 mile natural gas pipeline and 5.5 mile gen-tie line to the Blythe Energy Center to Julian Hindes Transmission Line
Rice Solar Energy Project	Rice Valley, Eastern Riverside County	Rice Solar Energy	Approved, construction date unknown at this time	150 MW solar power tower project with liquid salt storage. Project located on 1,410 acres; includes a power tower approximately 650 feet tall and 10- mile long interconnection with the WAPA Parker-Blythe transmission line
Blythe Airport Solar I Project	Blythe Airport	Riverside County	Approved	100 MW solar PV project located on 640 acres of Blythe airport land
Desert Quartzite	South of I-10, 8 miles southwest of Blythe	First Solar	POD in to BLM	600 MW solar PV project located on 7,724 acres, adjacent to DPV transmission line and SCE Colorado Substation
Desert Sunlight Project	6 miles north of Desert Center	First Solar	Approved	550 MW PV project on 4,144 acres of BLM land, requiring a 12-mile transmission line to the planned Red Bluff Substation

Project Name	Location	Ownership	Status	Project Description
SCE Red Bluff Substation	South of I-10 at Desert Center	SCE	Approved	A proposed new 500/220 kV substation, 2 new parallel 500 kV transmission lines of about 2,500 to 3,500 feet each
Desert Center 50	Desert Center	US Solar Holdings	Under review	A planned 49.5 MW fixed flat panel photovoltaic solar power plant
Sol Orchard	Desert Center	Sol Orchard	Approved	A planned 1.5 MW fixed flat panel PV solar power plant north of I-10, east of SR-177, west of Desert Center Airport
Blythe Mesa Solar I	Blythe	Renewable Resources Group	Under review	A planned 485 MW solar PV project on private land in Blythe
Blythe Solar Power Generation Station 1	Blythe	Southwestern Solar Power	Approved	A planned 4.76 MW solar PV facility, including 69 PV panels that stand 50 feet tall and 72 feet wide
Eagle Mountain Landfill Project	Eagle Mountain , North of Desert Center	Mine Reclamation Corporation and Kaiser Eagle Mountain	Court of Appeals	Project proposed to be developed on a 4,000 acre portion of the Kaiser Eagle Mountain Mine in Riverside County
Wiley's Well Communication Tower	East of Wiley's Well Road just south of I-10	Riverside County	Final EIR	Expansion of Riverside County's fire and law enforcement agencies approximately 20 communication sites to provide voice and data transmission
Eagle Mountain Wind Project Met Towers	South of Eagle Mountain, north of Joshua Tree National Park	LH Renewable	Wind testing pending	Met towers for wind testing
Gestamp Asetym Solar	Northwest of Blythe	Gestamp Asetym Solar	EPA review	37 MW solar power plant
Blythe Energy Project Transmission Line	From the Blythe Energy Project to Devers Sub	Blythe Energy	Under Construction	67.4 miles of new 230 kV transmission line between Buck Sub and Julian Hinds Sub
Green Energy Express Transmission Line Project	Eagle Mountain Sub to So. California	Green Energy Express	Approved	70 mile double circuit 500 kV transmission line from Eagle Mt. Sub to So. California
EnXco	North of Wiley's Well Rd, east of Genesis Solar Project	EnXco	POD in to BLM	300 MW solar PV project
Desert Lily Soleil Project	6 miles north of Desert Center	EnXco	POD in to BLM	100 MW PV plant on 1,216 acres of BLM land
Big Maria Vista Solar Project	North of I-10, 12 miles nw Blythe	Bullfrog Green Energy	POD in to BLM	500 MW PV project on 2,684 acres

Project Name	Location	Ownership	Status	Project Description
Chuckwalla Solar I	1 mile north of Desert Center	Chuckwalla Solar I	POD in to BLM	200 MW solar PV project on 4,083 acres
Mule Mountain Solar Project	South of I-10, 4 miles west of Blythe	Bullfrog Green Energy	POD in to BLM	500 MW solar PV project located on 2,684 acres
Quartzsite Solar Energy	10 miles north of Quartzsite	Solar Reserve	Draft EIS released	100MW, 653 foot tall power tower located on 1,500 acres of BLM land
Desert Harvest	6 miles north of Desert Center	EnXco	DEIS published	100MW PV project located on 930 acres
Ogilby Solar	Chocolate Mountain	Pacific Solar Investments	Revised POD 8/26/11	1,500 MW Solar Thermal Trough
Mule Montain III	Chuckwalla Valley	EnXco	Pending	200 MW Solar PV
La Posa Solar Thermal	Stone Cabin, AZ	Pacific Solar Investments	Pending	2,000 MW Solar
Nexlight Quartzsite	Quartzsite, AZ	Nextlight Renewable Power	Pending	50 MW CSP Trough
Quartzsite Solar	Quartzsite, AZ	Quartzsite Solar Energy	Pending	600 MW CSP Trough
Wildcat Quartzsite	Quartzsite, AZ	Wildcat Quartzsite Solar	Pending	800 MW CSP Tower
Oro Valley Wind	Black Mountain, CA	Oro Valley Power	Pending	180 MW Wind Project
IMPERIAL WIND	BLACK MOUNTAIN, CA	IMPERIAL WIND	AUTHORIZED	48-65 MW
LH Renewables Riverside County Type II	Eagle Mountain, CA	LH Renewables	Pending	Unknown
Graham Pass Wind Project	Riverside County	Graham Pass Inc.	Pending	175 MW Wind Project
Palo Verde Mesa Solar Project	N/W of Blythe	Renewable Resources Group	NOP Filed	486 MW Solar PV

PRELIMINARY STAFF ASSESSMENT CONCLUSIONS /ADDITIONAL INFORMATION STAFF REQUIRES FROM THE APPLICANT IN ORDER TO COMPLETE THE FSA

Based upon the information provided, discovery achieved and analyses completed to date, with key exceptions described below, staff concluded that the project complies with all laws, ordinances, regulations and standards (LORS), and with the implementation of its recommended mitigation measures (described in each technical section's conditions of certification), potential environmental impacts of the Rio Mesa SEGF project would be mitigated to levels of less than significant for those technical areas presented in Part A of the PSA. Below is a brief discussion on each technical area where compliance with LORS is not achieved, specific information is not available at this time to reach an environmental significance conclusion, or staff concludes that an impact is significant and unmitigable to a less than significant level. Please refer specifically to each technical section for a more detailed discussion. **Executive Summary Table 2**, below, summarizes these conclusions in a tabular format.

GEOLOGY and PALEONTOLOGY

- There are no significant geologic hazards and no known viable geologic or mineralogical resources on the project site. The applicant would be able to comply with all applicable LORS, provided that the proposed conditions of certification are followed. Therefore, the proposed design and construction of the project would have no adverse impact to geologic and mineralogical resources.
- Significant Paleontological resources have been identified on the project site. Proposed conditions of certification would mitigate potential impacts to paleontological resources where conventional grading and excavation construction is conducted. However, the applicant is proposing a predrilled and vibratory insertion construction method for installation of heliostat pedestals, which would preclude any opportunity for identification, recovery, or scientific interpretation of these paleontological resources. Due to the lack of physical definition of the paleontological resources, staff is unable to adequately assess the potential impacts from heliostat pedestal construction.

<u>Additional Information Staff Requires from the Applicant in Order to Complete the FSA</u>

- The applicant has been requested to submit a copy of the Supplemental Paleontological Resources Delineation Report to provide the three dimensional orientation of the fossil bearing geologic units that would be impacted by heliostat pedestal installation.
- The applicant has been requested to submit the Supplemental Paleontological Resources Delineation Report no later than December 3, 2012 if the schedule for publication of the FSA is to be maintained.

SOIL and SURFACE WATER

- The applicant has not provided staff with site-specific plans detailing the best management practices that would be used on the project site to manage storm water erosion and sedimentation impacts. The applicant has submitted a Drainage Erosion and Sediment Control Plan (DESCP) and a Storm Water Pollution Protection Plan (SWPPP) for another one of the applicant’s projects as an example of the plan that would be prepared for the Rio Mesa SEGF. While these plans demonstrate the applicant can identify the appropriate design and management practices necessary for completion of a plan for the Rio Mesa SEGF, staff needs site specific plans to complete its analysis for the FSA.
- The potential impacts related to the proposed use of evaporation ponds to dispose of the industrial wastewater could be mitigated through effective application of state and local LORS. However, staff could not complete the analysis of this waste disposal method or identify the appropriate mitigation methods because the applicant has not provided all the necessary information to staff and the Colorado River Basin Regional Water Quality Control Board (CRB RWQCB) to complete the in-lieu permit requirements.

Additional Information Staff Requires from the Applicant in Order to Complete the FSA

- The applicant has been requested to submit a copy of the draft DESCP and the SWPPP for the Rio Mesa SEGF for staff review and analysis in order for staff to complete the FSA and ensure the project would not significantly increase or decrease erosion rates within the projects watershed during construction and operation.
- The applicant has been requested to submit all the necessary information including final design and plans for the two evaporation ponds to Energy Commission staff and the Colorado River Basin Regional Water Quality Control Board (CRB RWQCB) to complete the process of analyzing and issuing Waste Discharge Requirements.

TRAFFIC and TRANSPORTATION

- Staff is currently investigating the feasibility of preparing a condition of certification to ensure that glint impacts would be less than significant. This condition would require the project owner to prepare a Heliostat Operations Positioning and Monitoring Plan (HPMP) to minimize glint exposure to aircraft and other potential receptors, such as motorists, through strategic heliostat positioning, avoidance of malfunctions, and procedures for investigating and resolving any complaints from the public. Staff has provided a Data Request to the applicant asking for identification of potential receptors and methods to ensure that heliostats would be positioned to avoid reflection onto these receptors.

Additional Information Staff Requires from the Applicant in Order to Complete the FSA

- The applicant has been requested to identify potential heliostat glint receptors and present proposed methods to ensure that heliostats would be positioned to avoid casting glint on those receptors at all times. Staff must have this information prior to issuance of the FSA in order to ensure that potential impacts are identified and can be mitigated.

TRANSMISSION SYSTEM ENGINEERING

- The California Independent System Operator (California ISO) Queue Cluster 3/Queue Cluster 4 Phase II Interconnection Study (QC3/QC4 Phase II Study) is not available for staff to review at this time. The Phase II Study is required for staff to determine the potential need for downstream transmission facilities. Without the Phase II Study, staff cannot determine if the proposed interconnection facilities including the Rio Mesa Solar Electric Generating Facility (Rio Mesa SEGF) 220 kilovolt[2] (kV) switchyard, a single 230 kV overhead generator tie-line, and the termination at the proposed Southern California Edison (SCE) Colorado River Substation are adequate and in accordance with industry standards and good utility practices. Staff cannot determine if the Rio Mesa SEGF is acceptable according to engineering laws, ordinances, regulations, and standards (LORS). In addition, if the study shows the project would cause any transmission line overloads which might require transmission line reconductoring or other significant downstream upgrades, a general CEQA analysis will be required. The environmental analysis of potential

[2] The Rio Mesa SEGF Application for Certification uses both 220 kV and 230 kV interchangeably.

upgrades could cause a delay in the licensing process for the Rio Mesa SEGF project.

Additional Information Staff Requires from the Applicant in Order to Complete the FSA

- To complete the FSA, the applicant has been requested to submit a copy of the QC3/QC 4 Phase II Study for staff to determine the potential need for downstream transmission facility upgrades.

VISUAL RESOURCES

- Staff concludes that the proposed project, after implementing all staff-recommended conditions of certification, would still have significant and unavoidable adverse direct visual impacts.
- The project in combination with existing and foreseeable future projects within the immediate project viewshed could contribute to significant unavoidable cumulative visual impacts. Project impacts, in combination with existing and foreseeable future solar and other development projects within the I-10 corridor in Riverside County, could contribute to a perceived sense of cumulative industrialization of the open, undeveloped desert landscape of the eastern Chuckwalla Valley and Palo Verde Mesa, and impact views of scenic resources as experienced by I-10 motorists, local residents, and recreational visitors within the Rio Mesa SEGF viewshed. Within the southern California desert as a region, anticipated cumulative operational impacts of past and foreseeable future region-wide projects are considered cumulatively considerable, potentially significant and unmitigable considering the substantial decline in the overall number and extent of scenically intact, undisturbed desert landscapes, and a substantially more urbanized, industrial character in the overall southern California desert landscape.
- The project would not be consistent with several applicable policies of the Riverside County General Plan.

Additional Information Staff Requires from the Applicant in Order to Complete the FSA

- As mentioned in Traffic and Transportation above,the applicant is required to identify potential heliostat glint receptors and present proposed methods to ensure that heliostats would be positioned to avoid casting glint on those receptors at all times. Staff must have this information prior to issuance of the FSA in order to ensure that potential impacts are identified and can be mitigated. This request was made in a recent formal data request and is further discussed in the **Traffic and Transportation** section of this PSA.

WATER SUPPLY

- The project would use groundwater that is in hydraulic connection with the Colorado River and may capture groundwater that would otherwise contribute to the volume of water flow in the Colorado River. Due to some issues with the computer model submitted by the applicant that raise questions about the reliability of the model, staff could not evaluate and quantify the potential effect that the project groundwater pumping would have on the volume of flow in the Colorado River. Staff, therefore, conservatively assumes that any withdrawal of groundwater by the proposed project would directly affect the volume of flow in the river and require mitigation. The proposed method of mitigation must be submitted to staff for review and analysis prior to publication of the FSA. The applicant must demonstrate how the project owner will conserve Colorado River water in a volume equivalent to the volume of groundwater pumped by the project and discuss in detail how the elements required by proposed Condition of Certification **WATER SUPPLY-6** would be satisfied.

Additional Information Staff Requires from the Applicant in Order to Complete the FSA

- The applicant is required to submit a detailed description of how the applicant would mitigate Colorado River take and define the water conservation method, quantify the conservation amounts, and analyze how the conservation projects mitigate the impacts of the proposed project.

Executive Summary Table 2
Summary of Impacts of the Rio Mesa SEGF PSA Technical Analyses

Technical Area	Complies with local, state and federal LORS	Impacts mitigated to level below significant
Air Quality	Yes	Yes
Efficiency	Not Applicable	Not Applicable
Facility Design	Yes	Yes
Geology and Paleontology	Yes	Undetermined
Hazardous Materials Management	Yes	Yes
Noise and Vibration	Yes	Yes
Public Health	Yes	Yes
Reliability	Not Applicable	Not Applicable
Soil and Surface Water	Undetermined	Undetermined
Traffic and Transportation	Yes	Undetermined
Transmission Line Safety and Nuisance	Yes	Yes
Transmission System Engineering	Undetermined	Undetermined
Visual Resources	No	No
Waste Management	Yes	Yes
Water Supply	Yes	Undetermined
Worker Safety and Fire Protection	Yes	Yes

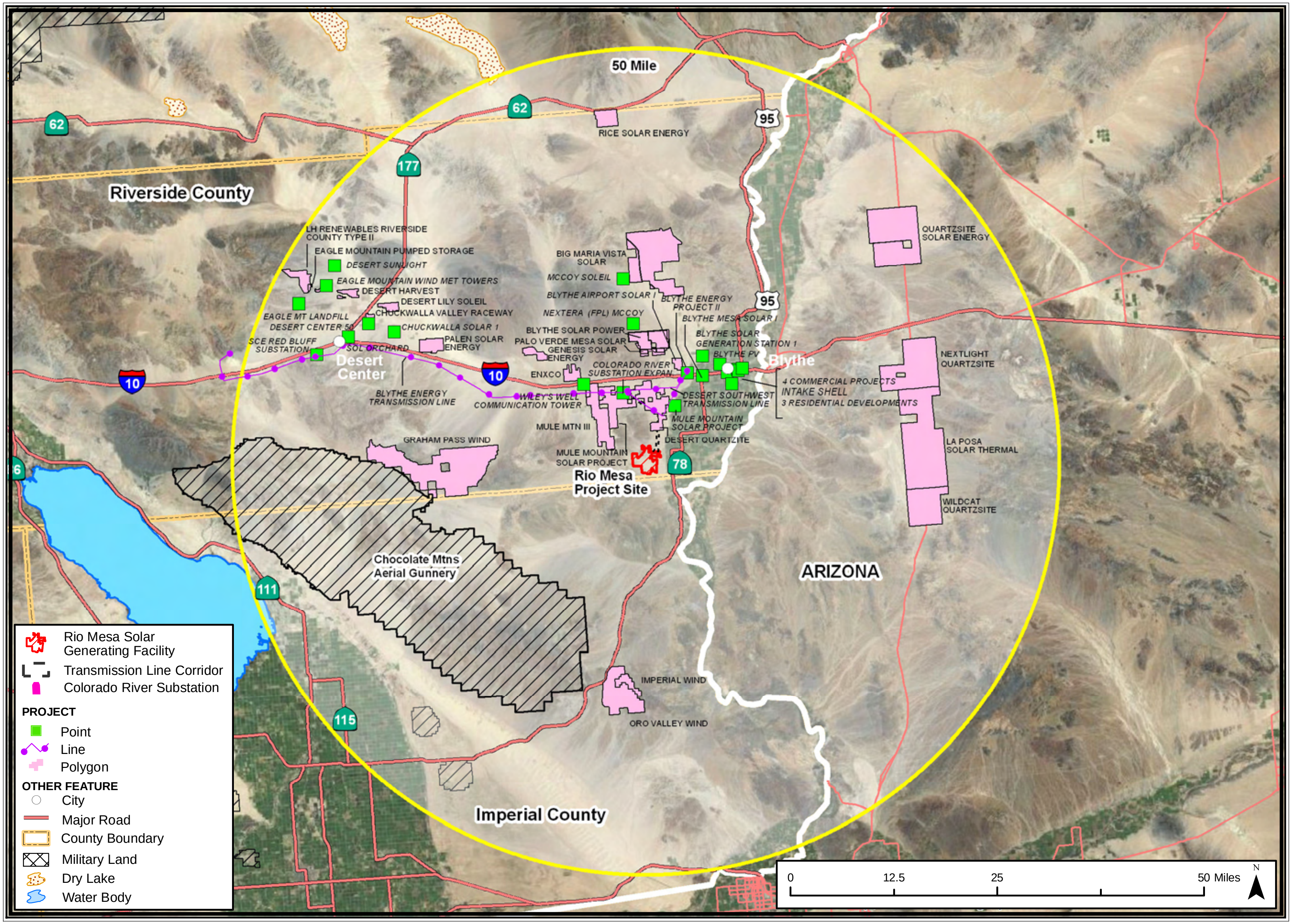
SUMMARY

Based on the preliminary staff conclusions noted above and further supported by the detailed review of each technical section included in this PSA Part A, it appears that with the exception of the technical areas listed above, the Rio Mesa SEGF will comply with LORS and that any potential impacts can be mitigated to a less than significant level, provided compliance with the recommended conditions of certification.

Staff anticipates publishing PSA Part B by October 15, 2012, which will include staff's alternatives analysis as well as staff's environmental and engineering evaluation for the balance of remaining technical sections: **Biological Resources**, **Cultural Resources**, and **Land Use**. At least one public workshop on this PSA Part A and on the forthcoming PSA Part B is anticipated to be conducted in October/November 2012. Others may be conducted if warranted, and based on comments received on the PSA and any other pertinent information, staff will prepare a FSA, which will represent staff's final analysis, conclusions, and recommendations regarding the Rio Mesa Project.

EXECUTIVE SUMMARY - FIGURE 1

Rio Mesa Solar Electric Generating Facility - Area Map



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION

SOURCE: BLM, ESRI, Tele Atlas Data 2010, and Bing Aerial Image

INTRODUCTION

Pierre Martinez, AICP

PURPOSE OF THIS REPORT

This Preliminary Staff Assessment (PSA) is the California Energy Commission (Energy Commission) staff's independent analysis of the proposed Rio Mesa Solar Electric Generating Facility (Rio Mesa SEGF). This PSA is a staff document. It is neither a Committee document, nor a draft decision. The PSA describes the following:

- the proposed project;
- the existing environment;
- whether the facilities can be constructed and operated safely and reliably in accordance with applicable laws, ordinances, regulations and standards (LORS);
- the environmental consequences of the project including potential public health and safety impacts;
- the potential cumulative impacts of the project in conjunction with other existing and known planned developments;
- mitigation measures proposed by the applicant, staff, interested agencies, the public local organizations and intervenors that may lessen or eliminate potential impacts;
- the proposed conditions under which the project should be constructed and operated, if it is certified; and
- project alternatives.

The analyses contained in this PSA are based upon information from the: 1) Application for Certification (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 made at public workshops or submitted in writing. The analyses for most technical areas include discussions of proposed conditions of certification. Each proposed condition of certification contains staff's recommended measures to eliminate or mitigate the project's potential environmental impacts and is followed by a proposed means of "verification" to ensure that each condition of certification is implemented. The PSA presents preliminary 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.

The Energy Commission staff's analyses were prepared in accordance with Public Resources Code section 25500 et seq. and Title 20, California Code of Regulations section 1701 et seq., and the California Environmental Quality Act (CEQA) (Pub. Resources Code, §21000 et seq.)

ORGANIZATION OF THE PRELIMINARY STAFF ASSESSMENT

The PSA contains an Executive Summary, Introduction, Project Description, and 20 technical sections. The technical sections contain the environmental, engineering, public health and safety, and alternatives analysis of the proposed project. These chapters are followed by a discussion of facility closure, project construction and operation compliance monitoring plans, and a list of staff that assisted in preparing this report.

Each of the 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).

ENERGY COMMISSION SITING PROCESS

The Energy Commission has the exclusive 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 power plant Applications for Certification (AFCs) to assess potential environmental impacts including potential impacts to public health and safety, potential measures to mitigate those impacts [Pub. Resources Code, §25519), and compliance with applicable governmental laws or standards (Pub. Resources Code, §25523 (d)].

The Energy Commission's siting regulations require staff to independently review the AFC and assess the environmental effects of the applicant's proposal, the completeness of the applicant's proposed mitigation measures, and the need for, and feasibility of, additional or alternative mitigation measures [Cal. Code Regs., tit. 20, §§1742 and 1742.5(a)].

Additionally, 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 (coordinated with other agencies) to ensure that applicable laws, ordinances, regulations and standards are met [Cal. Code Regs., tit. 20, §1744(b)].

Staff conducts its environmental analysis in accordance with the requirements of the California Environmental Quality Act (CEQA). No Environmental Impact Report (EIR) is required because the Energy Commission's site certification program (AFC process) 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.

Staff prepares a PSA that presents for the applicant, intervenors, organizations, agencies, other interested parties and members of the public, the staff's analysis, conclusions, and recommendations. Where it is appropriate, the PSA incorporates comments received from agencies, the public, and parties to the siting case, and comments made at the workshops.

Staff will provide a public comment period that follows the publication of the PSA. The comment period is used to resolve issues between the parties and to narrow the scope of adjudicated issues in the evidentiary hearings as well as receiving comments on the analysis from the public and interested agencies. During the period after the publishing of the PSA, staff will conduct one or more workshops to discuss its findings, proposed mitigation measures, and proposed verification measures. Based on the workshops and written comments received, staff may refine its analysis, correct errors, and finalize conditions of certification. These revisions and changes will be presented in a Final Staff Assessment (FSA) that will be published and made available to the public and interested agencies.

The FSA is only one piece of evidence that will be considered by the Committee (two Energy Commission Commissioners who have been assigned to this project) in reaching a decision on whether or not to recommend that the full five-member Energy Commission approve the proposed project. 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.

Following the hearings, the Committee's recommendation to the full Energy Commission on whether or not to approve the proposed project will be contained in a document entitled the Presiding Member's Proposed Decision (PMPD). Following publication, the PMPD is circulated in order to receive written public comments. At the conclusion of the comment period, the Committee may prepare a revised PMPD. At the close of the comment period for the revised PMPD, the PMPD is submitted to the full Energy Commission for a decision.

AGENCY COORDINATION

As noted above, 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). However, the Energy Commission typically seeks comments from and works closely with other regulatory agencies that administer LORS that may be applicable to proposed projects. These agencies may include, but are not limited to, the U.S. Bureau of Land Management, the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, State Water Resources Control Board/Regional Water Quality Control Board, California Department of Fish and Game, the California Air Resources Board, the Mojave Desert Air Quality Management District, and Riverside County.

OUTREACH

The Energy Commission's outreach program is primarily facilitated by its Public Adviser's Office (PAO). This is an ongoing process that provides a consistent level of public outreach, regardless of outreach efforts conducted by the applicant or other parties.

LIBRARIES

On October 28, 2011, the Energy Commission staff sent the Rio Mesa SEGF AFC to various public libraries in Riverside County, the Energy Commission's library, as well as to state libraries in Eureka, Fresno, Los Angeles, Sacramento, San Diego, and San Francisco.

On August 6, 2012, the Energy Commission staff sent the Rio Mesa SEGF amended AFC to the same libraries noted above, as well as public libraries in Imperial County.

INITIAL OUTREACH EFFORTS

The PAO's public outreach work is an integral part of the Energy Commission's AFC review process. The PAO reviewed information provided by the applicant and also conducted its own outreach efforts to identify certain local officials, as well as interested entities, within a six-mile radius of the proposed site for the project. These entities included, but were not limited to, schools, local service organizations (e.g. Rotary Clubs, Kiwanis, and Soroptomists), cultural/ethnic groups, special service districts, environmental organizations and certain staff and elected officials from the City of Blythe, Riverside County, Imperial County, and La Paz County (Arizona).

The PAO provided notification by letter and enclosed notice of the February 1, 2012 Informational Hearing and Site Visit, held at the Blythe City Hall Council Chambers in Blythe, California. Notices were distributed to local residences and entities referenced above. Additionally, the notice was placed in the Palo Verde Valley Times.

Energy Commission regulations require staff to notice, at a minimum, property owners within 1,000 feet of a project and 500 feet of a linear facility (such as transmission lines, gas lines and water lines). This was done for the Rio Mesa SEGF project. Staff's ongoing public and agency coordination activities for this project are discussed under the "Public Agency and Coordination and Outreach Efforts" heading in the **Executive Summary** section of the PSA.

PROJECT DESCRIPTION

Pierre Martinez, AICP

INTRODUCTION

The Rio Mesa Solar Electric Generating Facility (Rio Mesa SEGF) is proposed for development by Rio Mesa Solar I, LLC and Rio Mesa Solar II, LLC. Each entity would hold an equal one half ownership interest of certain shared facilities while separately owning each respective power plant. Both entities are wholly owned by Rio Mesa Holdings, LLC, which in turn is wholly owned by BrightSource Energy, Inc. (Applicant).

As proposed, the Rio Mesa SEGF would encompass a total of approximately 3,805 acres. This area would include the two proposed power plants, associated heliostat fields, and support facilities located within a common area. Off-site project components, including a temporary construction area, transmission line corridors, and access roads encompass approximately 2,188 acres, for a total of approximately 5,993 acres. The component areas of the proposed development are shown in **Table 3-1**. Approximately 3,805 acres, on which the two power plants would be located, would be on land leased from the Metropolitan Water District of Southern California (MWD). The Right of Way corridor for the gen-tie transmission lines primarily traverse public lands administered by the U.S. Bureau of Land Management (BLM), all within Riverside County, California. The project site is located on the Palo Verde Mesa approximately 13 miles southwest of Blythe, California (**Project Description Figures 1 – 6**).

The Rio Mesa SEGF would comprise two solar concentration thermal power plants, associated solar fields, and an approximate 19.5-acre common area to accommodate a combined administrative, control, maintenance, and warehouse building; evaporation ponds; groundwater wells; a water treatment plant; and a common switchyard. An approximate 103-acre construction logistics area (CLA) would be established to accommodate construction parking, office equipment, and conference trailers; equipment staging assembly and material storage; a tire cleaning station; and other construction support facilities.

Each solar plant would generate 250 megawatts (MW) (net), for a total net output of 500 MW and would use heliostats – elevated mirrors guided by a tracking system mounted on a pylon – to focus the sun’s rays on a receiver located atop a 750-foot-tall solar power tower near the center of each solar field. Each solar field would use approximately 85,000 heliostats. Rio Mesa I, the southernmost plant site, would occupy approximately 1,828 acres, and Rio Mesa II, the northernmost plant site, would occupy approximately 1,977 acres.

TABLE 3-1*
Project Area Components

	Acres
Fenceline Boundary of Solar Fields**	3,805
Temporary Construction Logistics Area	103
Approximate Gen-tie Line ROW Corridor	1,641
Bradshaw Trail Access Road Corridor	71
34th Avenue Road Corridor to be Improved	63
SCE 33kV Proposed Service (Existing ROW overload)	119
SCE 33kV Proposed Service (New ROW overload)	77
Colorado River Substation Gen-tie Area	114
Total	**5,993**

*See Project Description Figure 2 to view the boundaries of the above-noted areas.
**Includes Common Areas, Switchyard, and Gas Metering Yard.

The Rio Mesa SEGF is proposed to be interconnected to the Southern California Edison (SCE) grid through a new 220kV line that would be built as part of the project and would run north approximately 9.7 miles to connect to the Colorado River Substation.

Access to both plants would be via Bradshaw Trail (primary) – paved or unpaved and a new secondary access road directly north and parallel to 34th Avenue off of State Route 78. The portion of Bradshaw Trail that would be used for the primary access route is currently a two-lane, east-west paved road for one mile west of Rannells Avenue. Beyond the paved segment it becomes a graded dirt road. The applicant proposes to improve the segment to a point where it connects to the northerly boundary of the northern plant as depicted in **Project Description Figure 2**, however, that portion of Bradshaw Trail traverses BLM land and how it is improved is at the discretion of BLM. The secondary access route would be improved and provide access to the southerly power plant north of the proposed metering station. In addition to the access roads, each plant would have perimeter access/maintenance roads (see the **Traffic and Transportation** section of the PSA for more details).

PROJECT OBJECTIVES

The Application for Certification (AFC) describes the proposed Rio Mesa SEGF project objectives as follows

1. Safely and economically construct and operate a nominal 500 MW solar generating facility in southeastern Riverside County, California capable of providing clean, renewable, competitively priced solar-generated electricity.

2. Assist Southern California Edison (SCE) in meeting its obligations under the Renewable Portfolio Standard (RPS) and the California Global Warming Solutions Act (AB32).

3. Consistent with national policy, which encourages the development of new or significantly improved technologies to “avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases”, to use BrightSource Energy, Inc.’s proprietary solar power tower technology in another utility-scale project, further improving economic viability of the technology.

4. Develop a project that minimizes land consumption on a megawatt-hour (MWH) per acre basis.

5. Locate the solar generating facility in an area of high insolation.

6. Select a site with minimal slope, predominately five (5) percent or less.

7. Design and develop the project to conform to the requirements of the site-assigned 20-year Power Purchase Agreements (PPAs) for Rio Mesa Solar Holdings, LLC, including commercial on-line date (COD) of 2015.

8. Site the project in a timely and environmentally responsible manner by selecting a location with minimal potentially significant impacts, where compliance with applicable laws, ordinances, regulations, and standards (LORS) is feasible.

9. Secure site control within a reasonable timeframe, using a reasonable effort at reasonable cost.

10. Respond to Metropolitan Water District of Southern California’s (MWD’s) request for proposal (RFP) to develop a solar electric generation facility on MWD-owned land.

11. Locate the project near existing electric transmission equipment with a California Independent System Operator (CAISO) point of interconnection and a natural gas infrastructure.

12. Develop a solar generating facility that assists the U.S. Bureau of Land Management (BLM) with its mission to approve 10,000 MW of renewable energy projects on public lands by 2015 in a manner that reduces impacts (i.e. edge effects) and leverages resources being developed on private lands (i.e. shared facilities).

PROJECT LOCATION AND JURISDICTION

The Rio Mesa SEGF site, being proposed mostly on lands under lease from MWD and partially on public lands administered by BLM can generally be described as being located in the eastern portion of Riverside County, on the Palo Verde Mesa, approximately 13 miles southwest of Blythe, California.

The project site is generally bounded on the east by the 161 kV Western Area Power Authority (WAPA) transmission lines, with undeveloped desert lands and active agriculture further east, on the south by undeveloped desert lands located in Imperial County, on the west by undeveloped desert lands and the Mule Mountains, and on the north by undeveloped public desert lands administered by the BLM.

State and Federal Jurisdiction

The Energy Commission has exclusive permitting jurisdiction for the siting of thermal power plants of 50 MW or more and related facilities in California. The Energy Commission also has responsibility for ensuring compliance with the California Environmental Quality Act (CEQA) through the administration of its certified regulatory program and is the lead agency under CEQA.

However, because the project transmission tie line, emergency and construction electrical power supply line, and primary access road will be located on public lands managed by the BLM, approval of a Right of Way Grant, issued by the BLM, is required as well. A Right of Way Grant authorizes rights and privileges for a specific use on administered lands for a set period of time and subject to certain terms and conditions. The BLM will be conducting its own environmental review of the entire project – as a connected action – even though only a relatively small portion is on public lands. This environmental review process falls under the requirements of the National Environmental Policy Act (NEPA) and will result in the publication of an Environmental Impact Statement (EIS). The BLM's federal process under NEPA is anticipated to occur concurrently with the Energy Commission's siting and environmental review process. A Notice of Intent to prepare a draft EIS was filed by the BLM, Palm Springs South Coast Field Office on August 29, 2012.

The Energy Commission and BLM staff coordinates many aspects of their respective CEQA and NEPA regulatory review processes. This coordination will continue throughout the Energy Commission's siting and environmental review process.

PROJECT FACILITY FEATURES, DESIGN, AND OPERATION

The proposed project would include two solar concentrating thermal power plants, associated heliostat fields and a shared common area to include shared systems. Each solar concentration thermal power plant would use a solar power boiler, located atop a dedicated concrete tower, and a solar field based on heliostat mirror technology developed by BrightSource Energy, Inc., known as "LPT" (**Project Description Figures 3 and 7-9**). The reflecting area of an individual heliostat (which includes two mirrors) is about 19 square meters (**Project Description Figure 10**). The heliostat fields would focus solar energy on the solar power boiler, referred to as "solar receiver steam generator" (SRSG), which converts the solar energy into superheated steam.

Each power plant would generate electricity using solar energy as its primary fuel source. However, auxiliary boilers would be used to operate in parallel with the solar fields during partial load conditions and occasionally in the afternoon when power is needed after the solar energy has diminished to a level that no longer would support solar-only generation of electricity. These auxiliary boilers would also assist with daily start-up of the power generation equipment and night time preservation.

Auxiliary equipment supporting each power plant's SRSG, solar field, and turbine/generator would include the following:

- Boiler feed water and condensate pumps
- Feed water heaters
- Deaerator
- Condensate polisher
- Wet-surfaced air cooler (WSAC) (hybrid auxiliary cooler)
- Air-cooled condenser for main process steam
- Transformers
- Emergency diesel generators
- Diesel and motor-driven fire pumps

Power Cycle

The solar plant's power cycles would be based on a Rankine cycle steam turbine with three pressure stage casings. Primary thermal input would be via an SRSG located at the top of the solar power tower. Live superheated steam would enter a high-pressure (HP) turbine casing at 2,465 pounds of force per square inch absolute (psia) and 1,085 degrees Fahrenheit (°F). Steam from the high-pressure turbine exhaust would be routed directly to the intermediate-pressure (IP) turbine inlet casing. A portion of the HP turbine exhaust steam would be routed to the HP feed water heaters.

The HP exhaust would enter the IP casing at 537 psia and 665°F. Steam from the IP casing would be exhausted directly to the low-pressure (LP) turbine casing at 78 psia and 311° F. Exhaust steam at 3.25 inches of mercury absolute (inHgA) would be condensed in an air-cooled condenser and collected in a condensate collection tank (condenser well).

Condensate would be sent from the condensate collection tank through a condensate polisher to four LP feed water pre-heaters, then to the deaerator, which also serves as the feed water reserve. From the deaerator, HP feed water pumps would send feed water through three HP pressure feed water pre-heaters and then to the SRSG drum.

PROJECT FEATURES AND FACILITIES

The solar field and power generation equipment would start each morning after sunrise and, unless augmented, would shut down when insolation (sun ray intensity) drops below the level required to keep the turbines producing electricity.

Solar Tower

The tower is proposed to be a cylindrical concrete tower with the SRSG located atop the concrete structure. The tower and SRSG height is 750 feet, with a 10-foot tall lightning rod on top, for an overall height of 760 feet.

Solar Receiver Steam Generator (SRSG)

The SRSG would consist of evaporation-steam generation and superheating sections. It would be designed and manufactured in accordance with conventional power boiler standards and procedures. Each SRSG section would require different intensity and distribution levels of energy flux. The energy flux on the SRSG would be controlled by a solar field integrated control system (SFINCS) based on mathematical calculation algorithms, steam temperature measurements at SRSG panel headers, and flux models with second-degree protection using infrared cameras. The solar field would operate like a conventional fuel burner and its controller would function like a boiler management controller, including control and safety functions.

Solar Field Including Heliostats, Mirrors, and Layout Principles

The heliostats would be arranged in arrays around each solar receiver boiler. Each heliostat would be comprised of a tracking controller with azimuth and elevation positioning capability, a power unit, and two mirrors. Each heliostat would track the sun throughout the day and reflect solar energy to the receiver boiler. Each mirror would be 8.5 feet wide by 12 feet high, with a total reflecting surface of 205 square feet (**Project Description Figure 10**). The heliostats would be arranged concentrically around the power tower as described below.

Each solar field would contain approximately 85,000 heliostats arranged around the power tower. The layout of each solar field (**Project Description Figures 7 and 11**) would be designed according to various parameters, including but not limited to ground topography and plant design parameters. The solar field would be controlled by the solar field integrated control system (SFINCS), which controls the heliostat and all solar field auxiliary equipment, independently and collectively, according to the SRSG energy demand and general system requirements.

Each heliostat would be an independent unit standing on a single pylon with rectangular mirrors on both sides. The heliostat would allow for an approximate 1.5-foot clearance from ground when the heliostat is in the vertical position. Each heliostat would be driven by a dual-axis drive that tracks the sun and maintains the focal point on the SRSG. The dual-axis drive would have two stepper motors that would regulate the azimuth and elevation angles, respectively. Each heliostat would be controlled by its own heliostat controller, which would be controlled by the SFINCS. The heliostat would be autonomous and its power supply would be based on a photovoltaic system and super capacitor; its communication would be based on either wireless or wired infrastructure.

Steam Turbine Generator

The steam turbine system consists of a non-reheat, condensing steam turbine generator (STG) with eight extractions, a gland steam system, a lubricating oil system, a hydraulic control system, and steam admission/induction valving. HP steam would be received from the superheater of the SRSG and would enter the steam turbine through the inlet steam system. The steam would expand through multiple stages of the turbine, driving the generator. On exiting the LP turbine, the steam would be directed into the air-cooled, dry-surface condenser.

Air Cooled Condenser

An air cooled steam condenser system is the main steam-cycle heat rejection system. The air cooled steam condenser would receive exhaust steam from the low pressure section of the steam turbine and from the boiler feed pump turbine drive and condense it back to water for reuse. The condenser would remove heat from the condensing steam up to a maximum of 1,230 MMBtu/hr, depending on ambient air temperature and plant load, while maintaining normal operation pressure of about 3.25 inHgA.

Electrical Transmission System

Existing Transmission Facilities

The proposed project is located within approximately eight miles of four existing electrical transmission lines. As shown in **Project Description Figure 2,** the Buck-Julian Hinds 220kV transmission line, Imperial Irrigation District (IID) 161kV transmission line, and Western Area Power Authority (WAPA) 161kV transmission line all run parallel with each other in a southwesterly direction until the lines are crossed by Southern California Edison's (SCEs) Devers-Palo Verde (DPV-1) 500kV line, which is located approximately four miles north of the project site's northern boundary. At this point, the Buck-Julian Hinds line turns northwest to parallel DPV-1 line on the north side of the 500kV corridor. The WAPA and IID lines continue in a southerly direction to a point approximately 2.7 miles north of the project northern boundary where the IID line turns southwest and no longer parallels the WAPA line. The WAPA line continues southerly and traverses along the eastern portion of the site.

Proposed Transmission Interconnection Facilities

SCE recently received approval to construct the Colorado River Substation (CRS), which will be located just south of the SCE 500kV route. Rio Mesa Solar I, LLC and Rio Mesa Solar II, LLC would be interconnected to the SCE grid through the new CRS, which would be interconnected to SCE's DPV-1 500kV line passing north of the CRS site on an east-west right of way. SCE has developed a service plan for the CRS to interconnect additional projects and allow for future growth. SCE's service plan will include the following: the new

CRS and other system upgrades to interconnect and deliver electrical power from the Rio Mesa SEGF and other interconnecting customers in the region, as well as support future growth. The CRS construction is projected to be completed in 2013 or 2014, well before the Rio Mesa SEGF is expected to come online. The design of the CRS and associated upgrades will be performed by SCE.

Power from each plant will be interconnected to the California Independent System Operator (CAISO) grid via a common 220kV gen-tie line to the CRS. The project will include a common area switchyard on site where both project generator underground tie lines will terminate. These shared facilities will be jointly owned by both project companies in an equal percentage.

Natural Gas Fuel System

The natural gas supply for the Rio Mesa SEGF will connect to the TransCanada Gas Transmission Company (TCGT) North Baja pipeline, which runs adjacent to the eastern edge of the proposed solar fields. However, TCGT is not a natural gas retailer. Current plans are for the gas supply to be obtained from one or more suppliers on the TCGT pipeline. Separate contracts for Rio Mesa Solar I, LLC and Rio Mesa Solar II, LLC would be executed with such suppliers. A gas metering station would be required at the TCGT tap point to measure and record gas volumes for custody transfer. In addition, facilities would be installed either at the tap station or the power block to regulate the gas pressure and to remove liquids, solid particles, or other impurities. The metering station would require a minimum area of approximately 150 feet by 150 feet. The approximate location of the project gas line and the location of the gas metering yard are shown on **Project Description Figures 7 and 8**.

Construction activities related to the tap and metering station include grading a pad and installing above- and below-ground gas piping, metering equipment, gas conditioning, pressure regulation, and pigging (pipe cleaning and inspection) facilities. An electrical distribution service line, photo voltaic system, or thermal generator would supply electrical power for tap and metering station operations, lighting, and communication equipment. An access road and perimeter chain-link fence for security would also be installed.

Water Supply and Use

Raw water would be drawn from wells located within the common area. Each 250 MW plant would require up to 84.5 acre feet per year (afy) or total of 169 afy for the entire 500 MW project. This does not include approximately 4.3 afy for common area uses (please see the **Water Supply** section of the PSA for more details).

A breakdown of the estimated average daily quantity of water required for operation of the facilities is presented in **Table 3-2**

TABLE 3-2
Average Daily Water Requirements with Both Solar Plants in Operation

Water Use	Average Daily Use (gpd)	Annual Use (afy)
Process and heliostat wash	150,800	169
Potable water service (including Common Area)	3,200	4.3

gpd = gallons per day
afy = acre-feet per year (based on an annual operation of approximately 3,600 hours/year)

The plants would use air-cooled condensers to save water. Water would be used mainly to replace boiler blow down, provide supplemental cooling for critical plant auxiliary systems, and provide water for washing heliostats. The latter is required for the thee-week washing cycle associated with the heliostats in order that they function at full performance. Because of dust created during site grading, the washing cycle may be more frequent during this period (i.e. when one plant is operating and another power block and associated roads are being graded), but the increase in the washing cycle is not likely to more than double. Based on this calculation, during construction, total water usage at the plant may peak at 400 afy.

Plant Cooling Systems

The main steam-cycle heat rejection system would consist of an air-cooled steam condenser system described on page 3.1-8. The condenser would be designed to normally operate at a pressure of about 3.25 inHgA.

Cooling of auxiliary plant equipment coolers would be through a hybrid closed-cooling water system consisting of dry fin-fan coolers operating in series with a WSAC. The WSAC would operate in a dry mode for the majority of the year. Only when the ambient air temperature exceeds 85°F would the use of external spray water over the WSAC tube bundles be initiated. The WSAC would remove up to 37 MMBtu/hr of heat from the closed cooling water system.

Fire Protection

The fire protection system would be designed to protect personnel and limit property loss and plant downtime in the event of a fire or explosion. The project will use the following fire protection systems:

- **Steam Turbine Lube Oil Areas Water Spray/Foam System**. This system provides suppression for the steam turbine area lube oil piping and lube oil storage area.
- **Fire Hydrants/Hose Stations**. This system will supplement the plants' fixed fire suppression systems. Water will be supplied from the plants' fire water systems.
- **Fire Suppression**. The project's administrative/control/warehouse/ maintenance building, the heliostat assembly building, the plant water

treatment building, and other structures will be equipped with fixed fire suppression systems and portable fire extinguishers as required by the local fire department.

The Rio Mesa SEGF on-site fire suppression systems would be backed up by fire suppression support from Riverside County Fire Department, Ripley Fire Station No. 44. Please refer to the **Worker Safety and Fire Protection and Socioeconomics** sections of the PSA for more specifics related to fire response and emergency services for the proposed Rio Mesa SEGF's construction and operation.

HAZARDOUS MATERIALS

There will be a variety of hazardous materials used and stored during construction and operation of the project. The **Hazardous Materials Management** section of this PSA 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 would be used during construction include gasoline, diesel fuel, oil, lubricants, and small quantities of solvents and paints. All hazardous materials used during construction and operation would 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 would include the needed secondary containment in case of tank/vessel failure.

WASTE MANAGEMENT

Waste management is the process whereby all wastes produced at the project site are properly collected, treated (if necessary), and disposed of. Wastes include process and sanitary wastewater, nonhazardous waste, and hazardous waste, both liquid and solid. The generation plants' waste would include oily rags, broken and rusted metal and machine parts, defective or broken electrical materials, empty containers, and other solid wastes, including the typical municipal refuse generated by workers. The **Waste Management** section of this PSA details the types of waste generated by the project and the process by which both hazardous and nonhazardous wastes from Rio Mesa SEGF construction and operation will be appropriately stored, transferred and disposed.

EMISSION CONTROL AND MONITORING

Air emissions from the combustion of natural gas in the start-up/auxiliary-boilers at each plant would be controlled using appropriate air emission control devices. To ensure that the systems perform correctly, parametric (predictive) emissions monitoring systems (PEMSs) for nitrogen oxides (NO_x) and carbon monoxide (CO) would be deployed as required by the Mojave Desert Air Quality Management District (MDAQMD). The **Air Quality** section of this PSA discusses in detail the anticipated emissions resulting from project construction and operation, the types of equipment proposed to limit emissions, as well as mitigation measures that would ensure emissions are at levels consistent with required laws, ordinances, regulations, and standards.

PROJECT CONSTRUCTION AND CLOSURE

The Construction of Rio Mesa SEGF, from site preparation and grading to commercial operation, is expected to take place from the fourth quarter of 2013 to the first quarter of 2016. Major milestones are listed in **Table 3-3**. Construction of the shared facilities will occur during construction of the first plant.

Table 3-3
Project Schedule Major Milestones

Activity	Date
Rio Mesa 1	
Begin construction	Fourth Quarter 2013
Startup and test	Third Quarter 2015
Commercial operation	Fourth Quarter 2015
Rio Mesa 2	
Begin construction	First Quarter 2014
Startup and test	Fourth Quarter 2015
Commercial operation	First Quarter 2016

Based on the approximate 35-month construction period[1], there would be an average of 840 and a peak workforce of approximately 2,200. The workforce would consist of construction craft people, supervisory, support, and construction management personnel. The peak construction site workforce level is expected to occur in months 22 and 23 and can be reviewed in the **Socioeconomics** section of this PSA.

PROJECT CONSTRUCTION

Vegetation Clearing and Cutting

To construct the heliostat array fields, some vegetation clearing would occur, but only where necessary to allow for equipment access and storm water management. In areas where general site grading is not required, vegetation clearing would not occur, except for the drive zones, which would be grubbed, bladed, and smoothed.

An approximate 8- to 12-foot-wide linear swath of vegetation along the entire outer edge of the area to be developed would be cleared and grubbed (but not graded as required for safe passage of vehicles) to create an internal perimeter path for installation of the tortoise and security fencing. Vegetation clearing, with leveling and grading limited to the walls of the washes, would be performed

[1] The entire construction schedule is 35 months from start of construction to substantial completion. This includes desert tortoise translocation and completion of construction and demobilization of craft resources prior to the completion date.

beneath the heliostats where the existing vegetation cover would not permit access of installation equipment and materials.

Other than areas required for access roads and drive zones, vegetation would be cut to a height of approximately 12 to 18 inches to allow clearance for heliostat function and, at the same time, leave the soil surface and root structures intact. Occasional trimming of the vegetation may be required during the operational phase of the project to control plant re-growth that could affect heliostat mirror movement.

General Grading and Leveling

The grade of the surface soil at each plant would be designed to provide the minimum requirements for access of installation equipment and materials during site construction and operations. Most of the natural drainage features would be maintained and any grading required would be designed to promote sheet flow where possible.

Heavy to medium grading would be performed within each plant's solar power tower and power block areas, within the common area, and within the construction logistics area (CLA). The deepest excavations would be restricted to foundations and sumps. Within each of these individual areas, earthwork cuts and fills would be balanced to the degree possible. The earthwork within the power blocks and common area would be excavated and compacted in accordance with the recommendations provided in the geotechnical report.

At some washes, slopes may be close to vertical, and too steep for safe equipment passage. In those cases, cuts into the side of the existing embankments would be necessary. Surface rocks and boulders would need to be relocated to allow proper installation of heliostats and facilities when they could not be avoided.

Areas disturbed by grading and other ground disturbance would be protected from erosion by implementation of appropriate best management practices (BMPs).

Storm Drainage System

The original grades and natural drainage features would be maintained across the majority of the project site and therefore would require no added storm drainage control. In limited areas, such as the power blocks, substation, heliostat assembly buildings and administrative areas, the storm water management system would include diversion channels, bypass channels, or swales to direct run-on flow from up-slope and run-off flow through and around each plant.

Diversion channels would be designed so that a minimum ground surface slope of 0.5 percent would be provided to allow positive, puddle-free drainage. To reduce erosion, storm drainage channels may be lined with a non-erodible material, such as compacted rip-rap, geo-synthetic matting, or engineered vegetation. Channels would be designed to allow sheet flow to occur for all storm events less than or equal to a 100-year, 24-hour storm event. All surface runoff during and after construction would be controlled in accordance with the requirements of a Drainage, Erosion, and Sediment Control Plan and any other applicable regulations.

Erosion and Sediment Control Measures

To minimize wind and water erosion, open spaces would be preserved and left undisturbed, maintaining existing vegetation to the extent possible with consideration of site topography and access requirements. Areas compacted during construction activities would be restored, as appropriate, to approximate preconstruction compaction levels in order to minimize the opportunity for any increase in surface runoff.

If needed, stone filters and check dams would be strategically placed throughout the project site to provide areas for sediment deposition and to promote the sheet flow of storm water. Where available, native materials (rock and gravel) would be used for the construction of the stone filters and check dams. Diversion berms would be used to redirect storm water around critical facilities, as required. Additional detailed discussion can be found in the **Soil and Surface Water** section of this PSA.

Periodic maintenance would be conducted as required after major storm events and when the volume of material behind the check dams exceeds 50 percent of the original volume. Stone filters and check dams are not intended to alter drainage patterns but to minimize soil erosion and promote sheet flow

PROJECT CLOSURE

At some point in the future, the project will cease operation and close down. At that time, it will be necessary 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 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 25 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 would be consistent with LORS in effect at the time of closure.

The project closure process is described in detail in the **General Conditions** section of this PSA. The **General Conditions** section describes the procedures necessary to protect the public and the environment from adverse impacts in the event of a planned or unplanned facility closure.

REFERENCES

BS 2011a – Bright Source/J. Woolard (tn 62584). Rio Mesa Application for Certification - Volumes 1, 2, and 3, dated October 14, 2011. Submitted to CEC Docket Unit on October 14, 2011.

BS 2011b – Bright Source/T. Stewart (tn 62930). Supplement to the Application for Certification, dated November 18, 2011. Submitted to CEC Docket Unit on November 18, 2011.

BS 2012v – Bright Source/ T. Stewart (tn 66292) Applicant's Environmental Enhancement Proposal dated July 23, 2012. Submitted to CEC Dockets Unit on July 23, 2012.

PROJECT DESCRIPTION - FIGURE 1

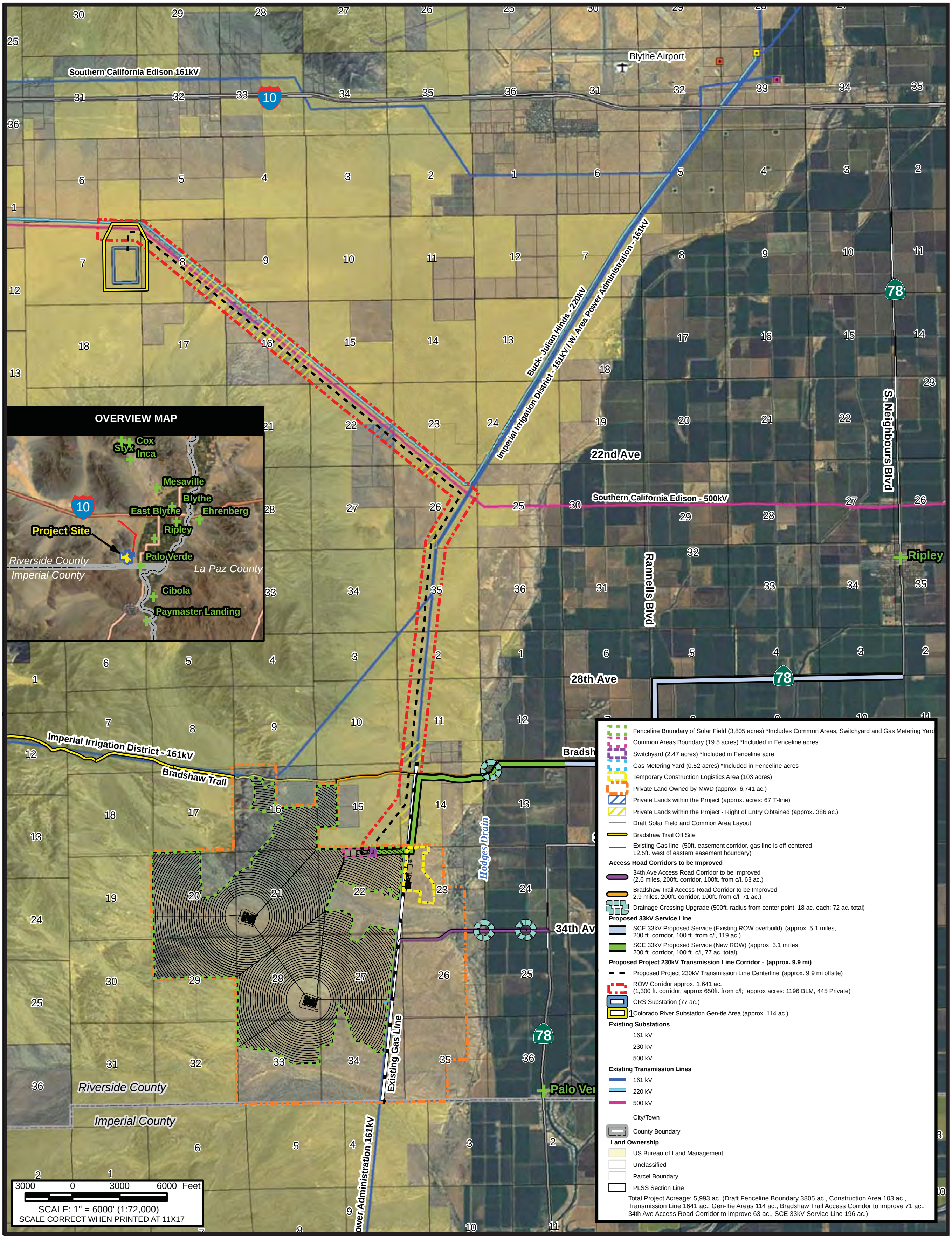
Rio Mesa Solar Electric Generating Facility - Regional and Vicinity Map

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Ammended AFC 7/23/2012, Fig. 1.1-1 (Rev)

PROJECT DESCRIPTION - FIGURE 2

Rio Mesa Solar Electric Generating Facility - Composite Map



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Ammended AFC 7/23/2012, Fig. 1-2.1 (Rev)

PROJECT DESCRIPTION - FIGURE 3

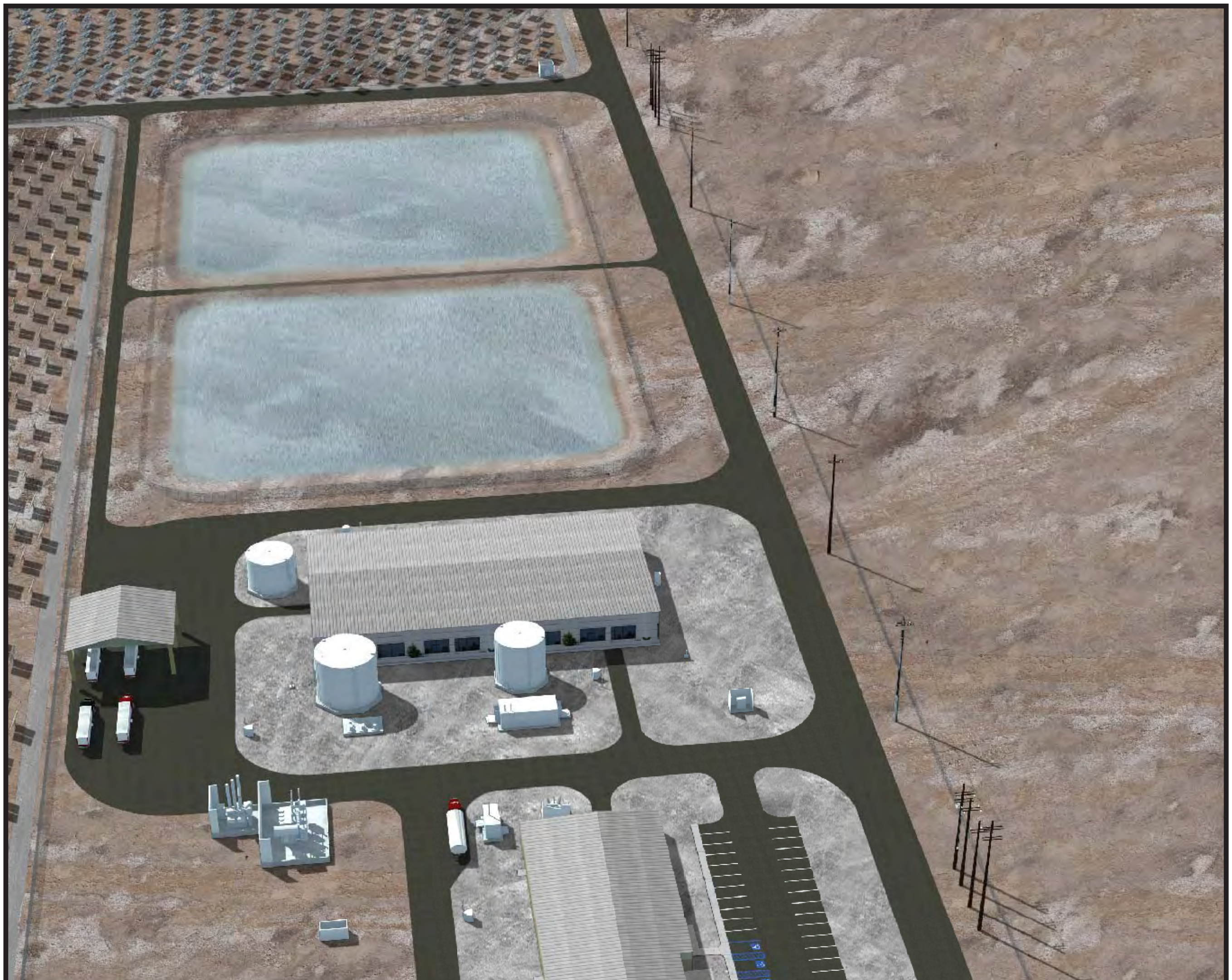
Rio Mesa Solar Electric Generating Facility - Post Construction Artist's Rendering

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Ammended AFC 7/23/2012, Fig. 1.3-2 (Rev)

PROJECT DESCRIPTION - FIGURE 4

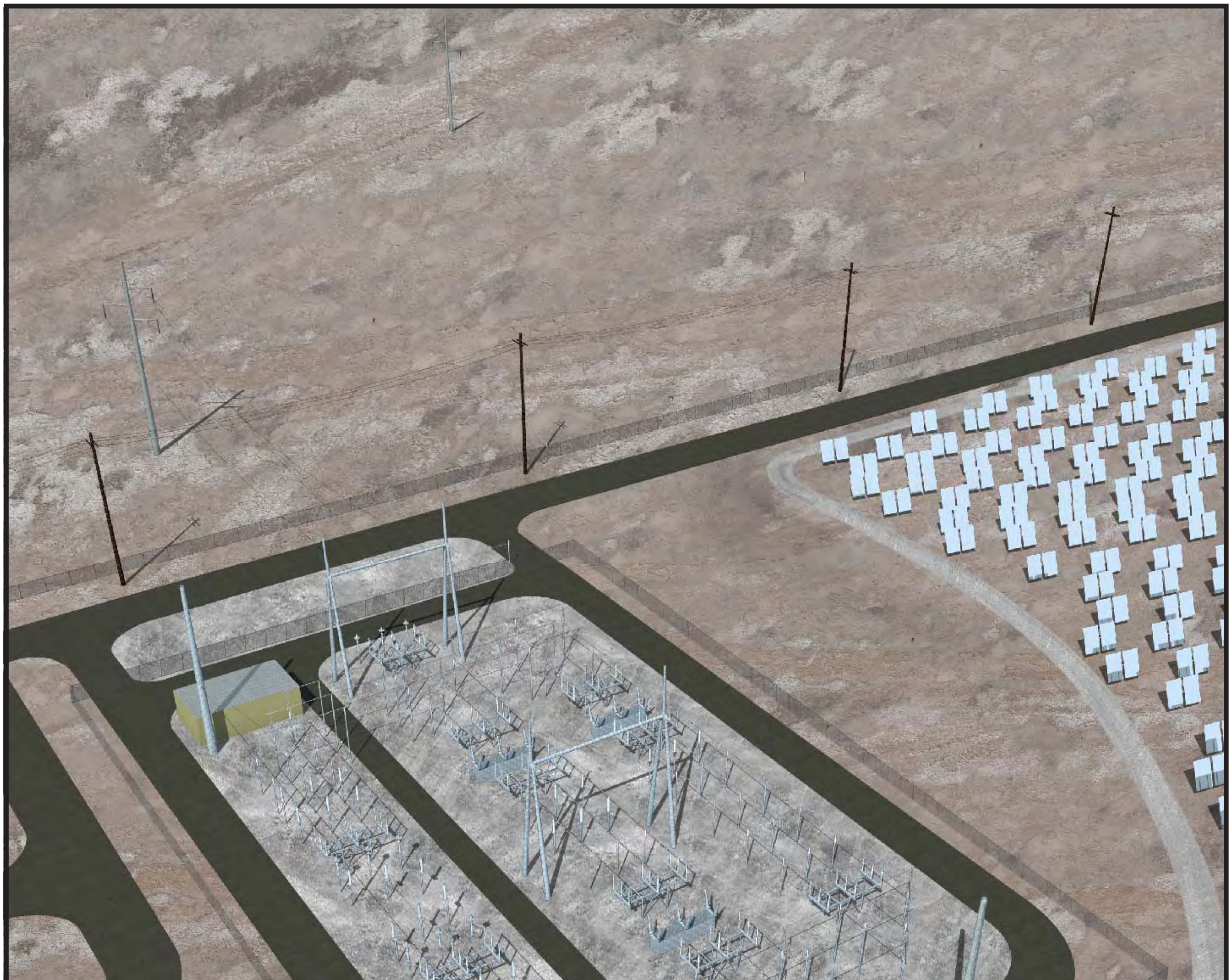
Rio Mesa Solar Electric Generating Facility - Close Up of Common Area and Administration Building



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Ammended AFC 7/23/2012, Fig. 1-3.3 (Rev)

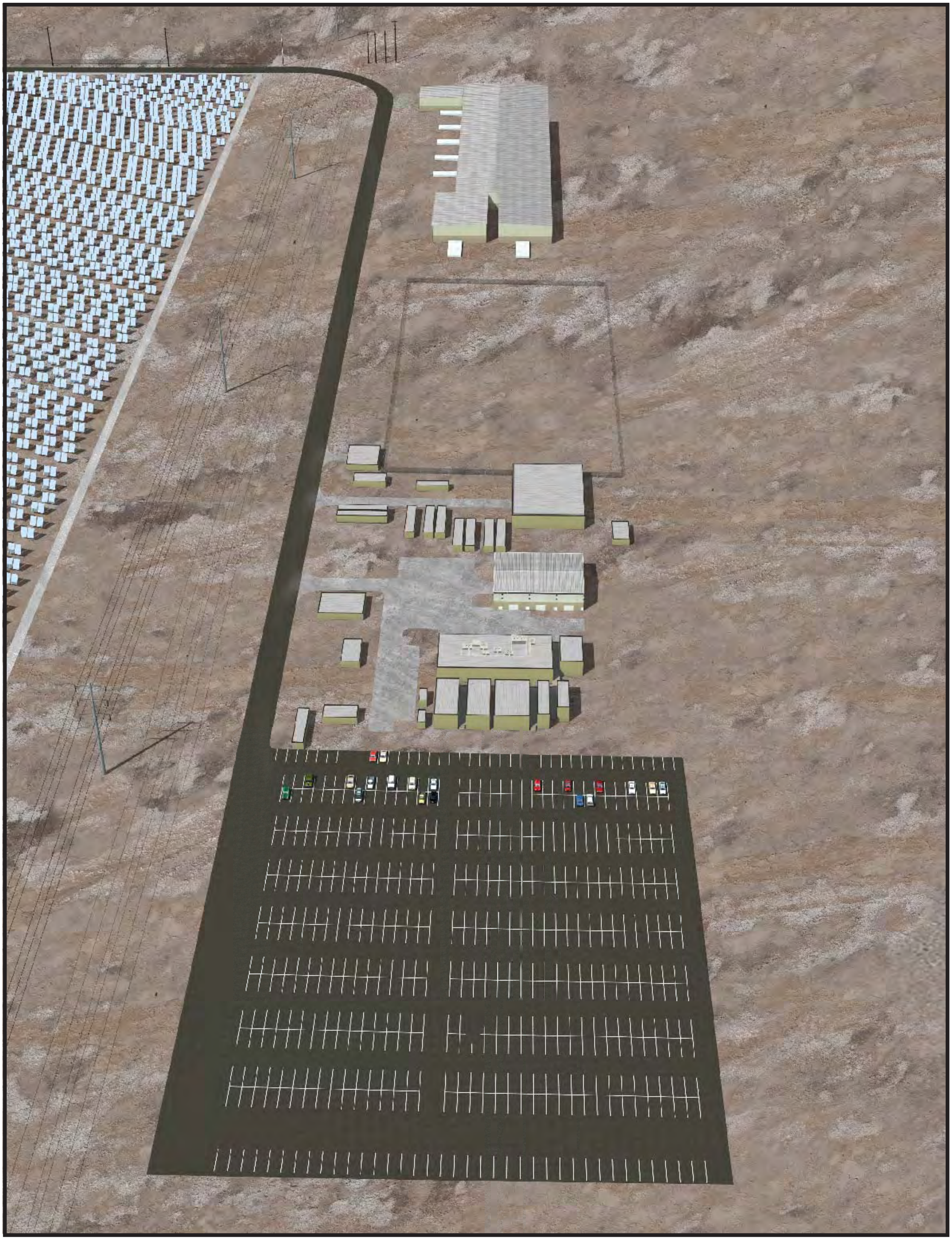
PROJECT DESCRIPTION - FIGURE 5
Rio Mesa Solar Electric Generating Facility - Close Up of Substation



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Ammended AFC 7/23/2012, Fig. 1-3.4 (Rev)

PROJECT DESCRIPTION - FIGURE 6

Rio Mesa Solar Electric Generating Facility - Aerial Staging

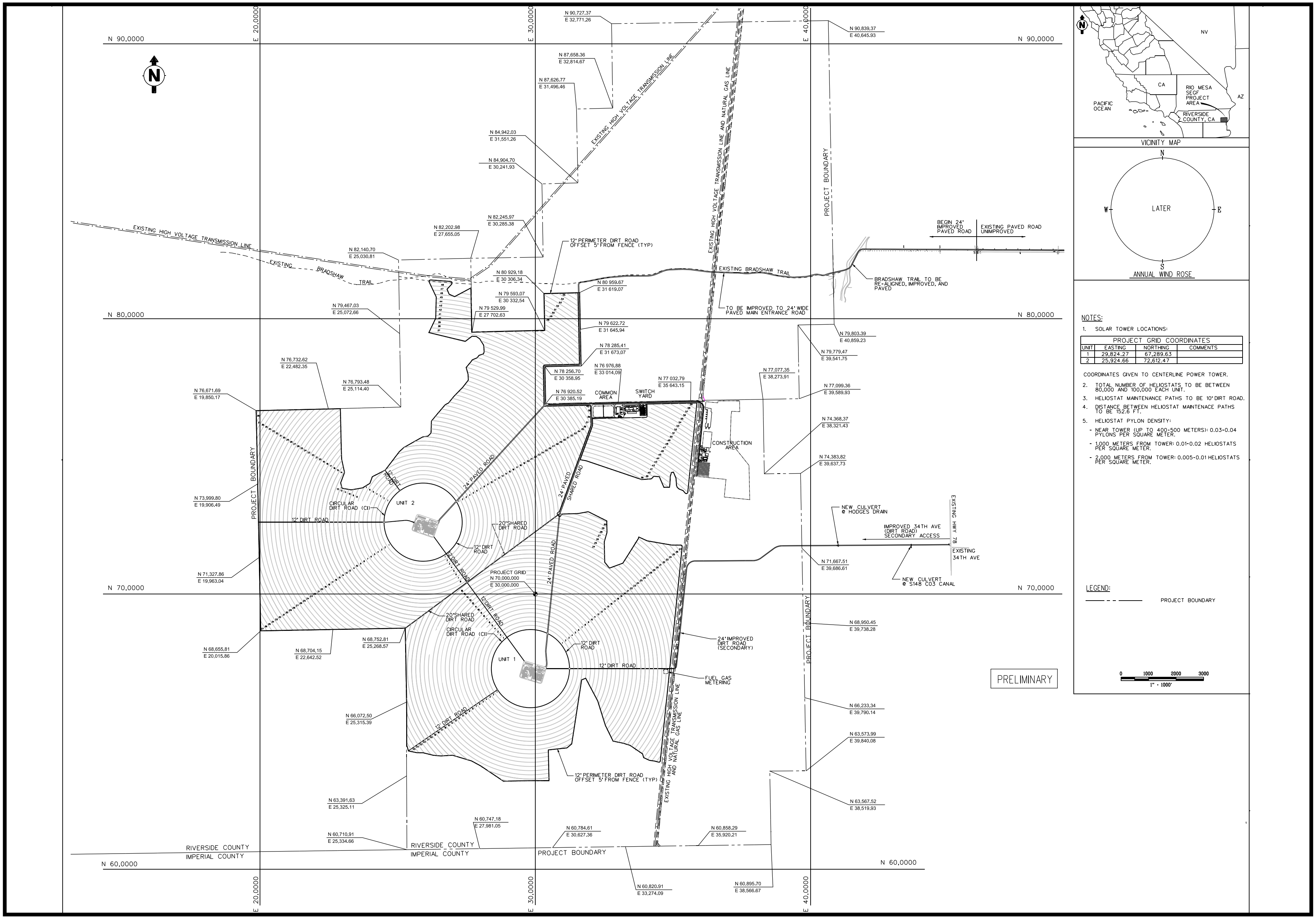


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Ammended AFC 7/23/2012, Fig. 1-3.5 (Rev)

PROJECT DESCRIPTION - FIGURE 7

Rio Mesa Solar Electric Generating Facility - Site Plan



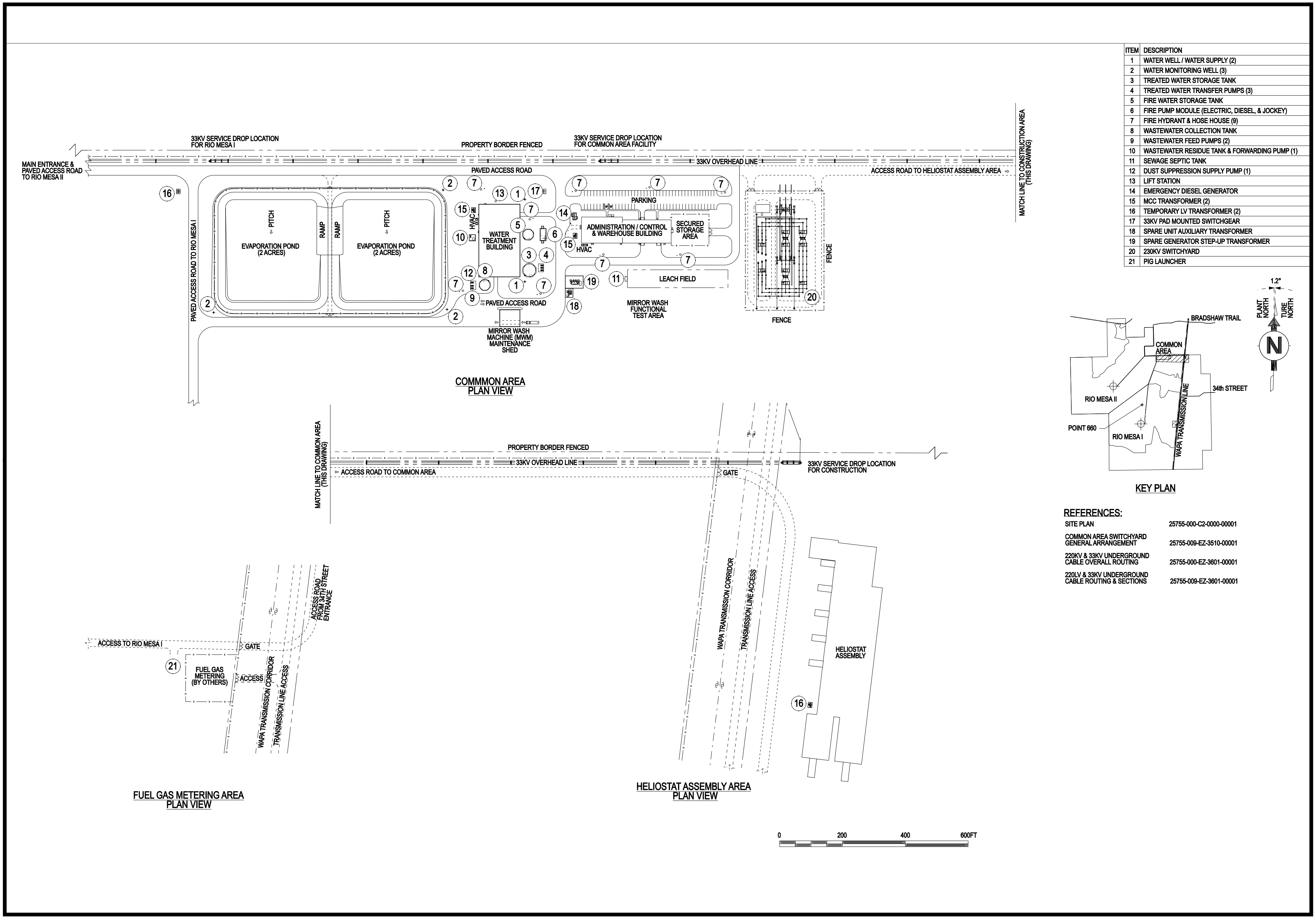
PROJECT DESCRIPTION

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Ammended AFC 7/23/2012, Fig. 2-5 (Rev)

PROJECT DESCRIPTION - FIGURE 8

Rio Mesa Solar Electric Generating Facility - Common Area Plot Plan

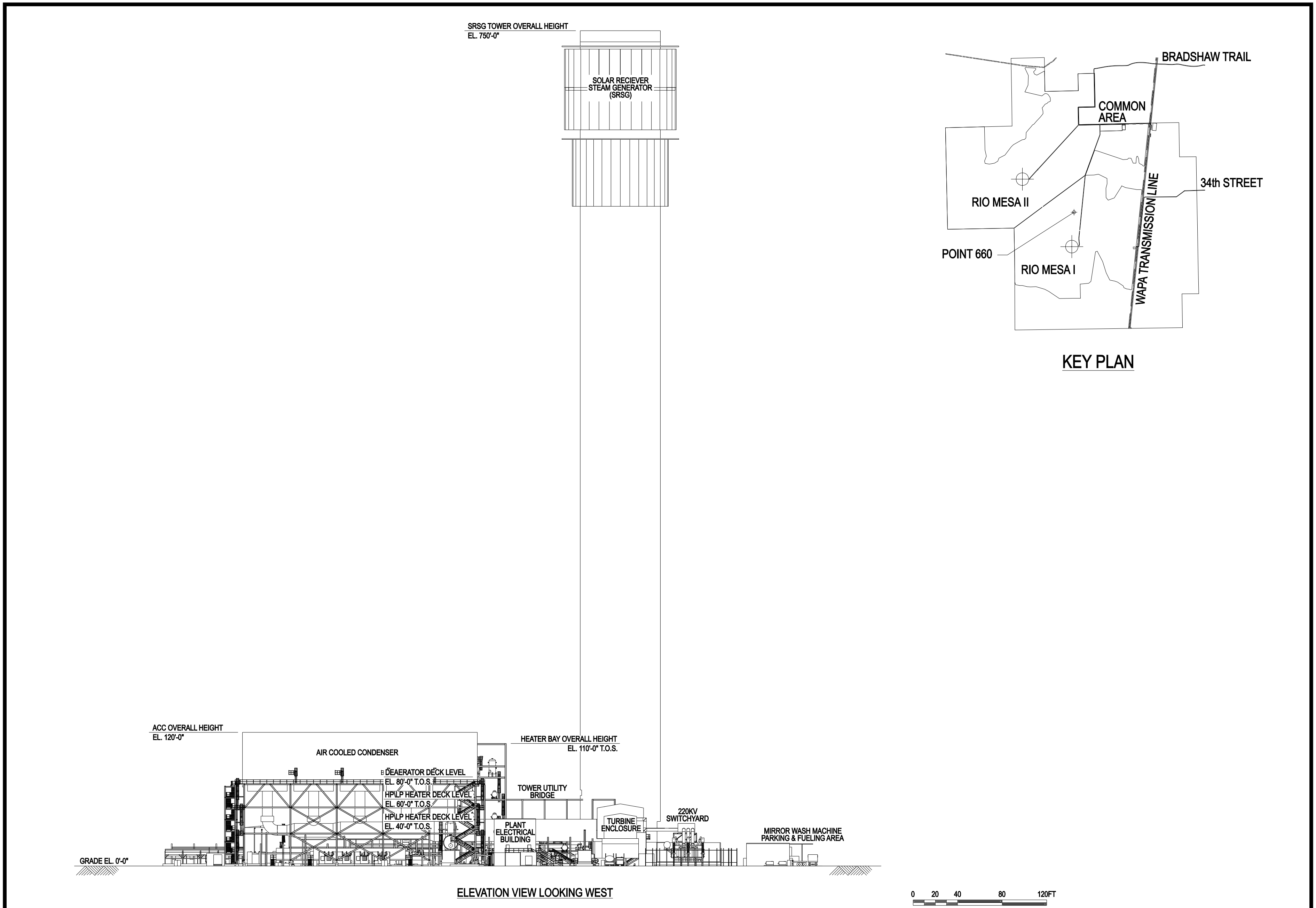


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Applicant’s Supplemental Response to Data Request 16 and 26, Ammended AFC 7/23/2012, Fig. 2-8 (Rev)

PROJECT DESCRIPTION - FIGURE 9

Rio Mesa Solar Electric Generating Facility - Power Block Elevation View Looking West

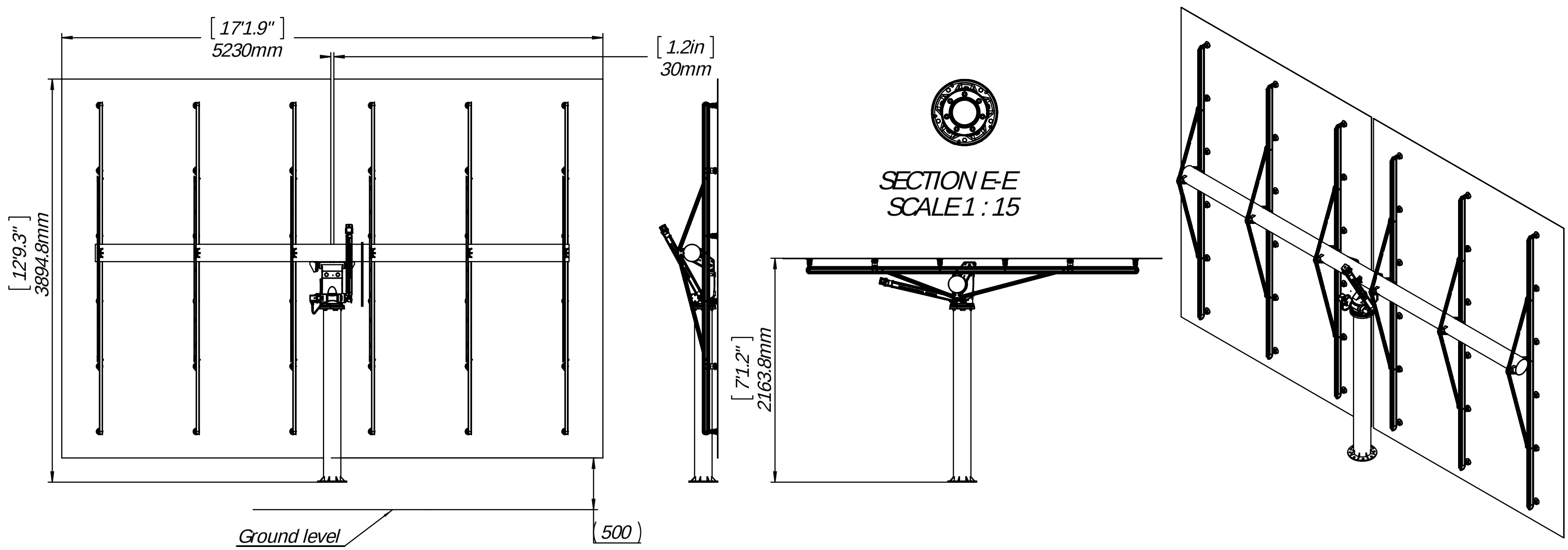


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Ammended AFC 7/23/2012, Fig. DA - 16 (Rev)

PROJECT DESCRIPTION - FIGURE 10

Rio Mesa Solar Electric Generating Facility - Heliostat Dimensions



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Supplement to the AFC, 11/18/11, Fig. 2-12

PROJECT DESCRIPTION - FIGURE 11

Rio Mesa Solar Electric Generating Facility - Typical View of Power Block from Northeast Facing Southwest

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Amended AFC 7/23/2012,Fig. 2-8 (Rev)

ENVIRONMENTAL ASSESSMENT

AIR QUALITY

Wenjun Qian, Ph.D.

SUMMARY OF CONCLUSIONS

Energy Commission staff (staff) believes that with the adoption of the recommended conditions of certification at the end of this section, the proposed Rio Mesa Solar Electric Generating Facility (Rio Mesa SEGF) project would comply with all applicable laws, ordinances, regulations, and standards (LORS) and would not result in any significant air quality-related environmental impacts. Conditions of certification referred to herein serve the dual purposes of compliance with LORS and mitigating otherwise potential adverse impacts. Without adequate fugitive dust mitigation, the project could cause potential localized exceedances of the particulate matter (less than 10 microns in diameter, or PM10) National Ambient Air Quality Standards (NAAQS) during construction and operation. This impact would be less than significant with adoption of the proposed construction and operation fugitive dust mitigation measures.

Staff concludes that the project would meet the minor source provisions of the federal New Source Review (NSR) program and thus would not require Prevention of Significant Deterioration (PSD) review or Nonattainment New Source Review.

The Rio Mesa SEGF project would emit substantially lower greenhouse gas (GHG)[1] emissions per megawatt-hour produced than fossil-fueled generation resources in California. The project is not subject to the requirements of SB 1368 (Greenhouse Gases Emission Performance Standard; Cal. Code Reg., tit. 20, § 2900 et. seq.) and the Emission Performance Standard; however, it would nevertheless meet the Emission Performance Standard.

INTRODUCTION

On October 14, 2011, subsidiaries of BrightSource Energy, Inc. (Applicant) submitted an Application for Certification (AFC) to construct and operate the Rio Mesa Solar Electric Generating Facility (Rio Mesa SEGF). Rio Mesa SEGF would be located on approximately 3,805 acres (5.95 square miles) of mostly leased land from the Metropolitan Water District of Southern California (MWD). The right-of-way corridor for the gen-tie transmission lines, the Bradshaw Trail access road corridor, and proposed 33kV transmission lines traverse public lands administered by the U.S. Bureau of Land Management (BLM). The project site is proposed on the Palo Verde Mesa, approximately 13 miles southwest of the city of Blythe, in Riverside County, California.

[1] Greenhouse gas emissions are not criteria pollutants; 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.

Rio Mesa SEGF would comprise two solar fields and associated facilities: the southeastern solar plant (Rio Mesa I) and the northwestern solar plant (Rio Mesa II). Each solar plant would generate 250 megawatts (MW) nominal, for a total net output of 500 MW. Each 250 MW plant requires about 1,850 acres (2.9 square miles) of land to operate. A 19.5-acre common area would be located at the northeast portion of the Rio Mesa I solar field west of the Western Area Power Administration (WAPA) transmission line to accommodate an administration/control room, warehouse, and maintenance complex; an onsite substation; asphalt-paved visitor and employee parking area, potentially a tire cleaning station, and landscape areas. A temporary 103-acre Construction Logistics Area would be established on the eastern border of the site.

Each solar plant would use heliostats, which are elevated mirror arrays guided by a tracking system mounted on a pylon. Their purpose is to focus the sun's rays on a solar receiver steam generator (SRSG) located atop a solar power tower near the center of each solar field. The solar power tower technology for the Rio Mesa SEGF project design incorporates a 750-foot-tall solar power tower that allows the heliostat rows to be placed closer together, with the mirrors at a steeper angle. The desired goal of the layout is to reduce mirror shading and allow more heliostats per acre.

This analysis evaluates the expected air quality impacts from the emissions of criteria air pollutants from both the construction and operation of the Rio Mesa SEGF project. Criteria air pollutants are air contaminants for which the state of California or federal government has established an ambient air quality standard to protect public health.

The criteria pollutants analyzed 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 for the Rio Mesa SEGF, but lead and other toxic air pollutant emissions impacts are analyzed in the **Public Health** section of this PSA. 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 compound (VOC) emissions readily react in the atmosphere to form 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 project are discussed in an **Appendix Air-1** in the context of cumulative impacts.

In carrying out this analysis, the California Energy Commission (Energy Commission) staff evaluated the following major points:

- whether the Rio Mesa SEGF project is likely to conform with applicable federal, state, and Mojave Desert Air Quality Management District (MDAQMD or District) air quality laws, ordinances, regulations and standards (Title 20, California Code of Regulations, section 1744 (b));
- whether the Rio Mesa SEGF project 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); and

- whether mitigation measures proposed for the project are adequate to lessen potential impacts to a level of less than significant (Title 20, California Code of Regulations, section 1742 (b)).

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 Rio Mesa SEGF are summarized in **Air Quality Table 1**. Staff's analysis examines the 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 is delegated to MDAQMD. Prevention of Significant Deterioration (PSD) requires major sources or major modifications to major sources to obtain permits for attainment pollutants. The Rio Mesa SEGF project is a new source that has a rule listed emission source thus the PSD trigger levels are 100 tons per year for NOx, VOC, SO_2, PM2.5 and CO.
40 CFR Part 60	New Source Performance Standards (NSPS), Subpart Db Standards of Performance for Electricity Steam Generation Units. Establishes emission standards and monitoring/recordkeeping requirements for units with greater than 100 MMBtu/hr heat input. Subpart Dc Standards of Performance for Electricity Steam Generation Units. Establishes emission standards and monitoring/recordkeeping requirements for units with less than 30 MMBtu/hr heat input. Subpart IIII Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. Establishes emission standards for compressions ignition internal combustion engines, including emergency fire water pump engines.

Applicable LORS	Description
State	
Health and Safety Code (HSC) Section 40910-40930	Permitting of source needs to be consistent with Air Resources 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 Toxic Control Measure for Stationary Compression Ignition Engines. Limits the types of fuels allowed, establishes maximum emission rates, establishes recordkeeping requirements on stationary compression ignition engines, including emergency fire water pump engines.
Local (Mojave Desert Air Quality Management District, MDAQMD)	
Rule 201 and 203 Permits Required	Requires a Permit to Construct before construction of an emission source occurs. Prohibits operation of any equipment that emits or controls air pollutant without first obtaining a permit to operate.
Rule 212 Standards for Approving Permits	Establishes baseline criteria for approving permits by the MDAQMD for certain projects.
Rules 401, 402, 403, and 403.2 Nuisance, Visible Emissions, Fugitive Dust	Limits the visible, nuisance, and fugitive dust emissions.
Rule 404 Particulate Matter – Concentration	Limits the particulate matter concentration from stationary source exhausts.
Rule 407 Liquid and Gaseous Air Contaminants	Limits carbon monoxide emissions from sources other than internal combustion engines.
Rule 408 Circumvention	Prohibits hidden or secondary rule violations.
Rule 409 Combustion Contaminants	Limits particulate matter emissions from combustion equipment.
Rule 430 Breakdown Provisions	Requires the reporting of breakdowns and excess emissions.
Rule 431 Sulfur Content of Fuels	Limits the sulfur content in gaseous, liquid, and solid fuels.
Rule 475 Electric Power Generating Equipment	Limits NO_x and PM emissions from electrical generating equipment rated greater than or equal to 50 MMBtu/hr.
Rule 476 Steam Generating Equipment	Specifies monitoring and recordkeeping requirements and limits NO_x and PM emissions from steam generators rated above 50 MMBtu/hr.
Rule 900 Standard of Performance for New Stationary Source	Incorporates the Federal NSPS (40 CFR 60) rules by reference.
Regulation XII – Federal Operating Permits	Requires new or modified major facilities, or facilities that trigger NSPS, Acid Rain or other federal air quality programs to obtain a Title V federal operating permit.
Rule 1210 – Acid Rain	Requires facilities subject to the federal Acid Rain program to obtain permits and comply with emissions and monitoring provisions.
Rule 1113 Architectural Coatings	Limits VOC content of applied architectural coatings.
Rules 1300, 1302, 1303, and 1305 General, Procedure, Requirements, and Emission Offsets of New Source Review	Sets the requirements for the preconstruction review of all new or modified facilities and specifies BACT level and offset requirements for a new emissions unit that has potential to emit any affected pollutant.
Rule 1306 Electric Energy Generating Facilities	Describes actions to be taken for permitting of power plants that are within the jurisdiction of the Energy Commission.

SETTING

CLIMATE AND METEOROLOGY

The project would be located on the Palo Verde Mesa in Riverside County, about 13 miles southwest of downtown Blythe. Relatively high daytime temperatures, large variations in relative humidity, large and rapid diurnal temperature changes, occasional high winds, and sand, dust, and thunderstorms characterize the climate of the project area in the Colorado Desert. The aridity of the region is influenced by a sub-tropical high-pressure system typically off the coast of California and topographical barriers that effectively block the flow of moisture to the region. Eastern Riverside County experiences two rainy seasons per year: the winter rainy season and the summer monsoon season. The average annual precipitation at the project site is about 3.5 inches.

The highest monthly average high temperature in Blythe is 108.4°F in July and the lowest average monthly low temperature is 41.3°F in December (WRCC 2012). The Applicant provided wind roses in the AFC Figures 5.1-1 thru 5.1-5 from the Blythe airport from 2006 to 2010 (BS 2011a). Note that the standard convention is with the wind direction heading into the center of the plot. Local wind circulations are channeled north-south by the presence of the Colorado River Valley. Winds are typically of light to moderate strength from either the northwest or the southwest, channeled by the river valley. There is little percentage of east-west winds, which indicates there would be little exchange of pollution between California and Arizona in this area. Mixing heights in the area, which represent the altitudes where different air masses mix together, are estimated to be on average 230 feet (70 meters) in the morning to as high as 5,250 feet (1,600 meters) above ground level in the afternoon.

<u>Sensitive Receptors</u>

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. No daycare, hospital, park, preschool, or school receptors were found within six miles of the project site. The nearest residence to the Rio Mesa SEGF property boundary is approximately 8,200 feet (1.55 miles) south of the Rio Mesa I solar array fence line. The nearest residence to any power block equipment is approximately 13,770 feet[2] (2.61 miles) east of the Rio Mesa I power block.

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), set at levels to protect public health and welfare. The

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[2] TN 66877, Report of Conversation between Pierre Martinez and Applicant Clarifying Project Distances from Residence, dated August 22, 2012.

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 ambient air quality standards are listed in **Air Quality Table 2**. As indicated 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 annual averages. The standards are read as a concentration, in parts per million (ppm), or as a weighted mass of material per volume of air, in milligrams or micrograms of pollutant in a cubic meter of air (mg/m^3 or µg/m^3, respectively).

In general, an area is designated attainment of an ambient air quality standard if the concentration of a particular air contaminant does not exceed the respective standard. Likewise, an area is designated non-attainment for an air contaminant if that contaminant standard is exceeded. Where not enough ambient air quality data are available to support designation as either attainment or non-attainment, the area is designated as unclassified. An 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.

Air Quality Table 2
Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Standard	California Standard
Ozone (O3)	8 Hour	0.075 ppm (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 ppm (10 mg/m^3)
	1 Hour	35 ppm (40 mg/m^3)	20 ppm (23 mg/m^3)
Nitrogen Dioxide (NO_2)	Annual	53 ppb (100 µg/m^3)	0.030 ppm (57 µg/m^3)
	1 Hour	100 ppb (188 µg/m^3)[a]	0.18 ppm (339 µg/m^3)
Sulfur Dioxide (SO_2)	24 Hour	—	0.04 ppm (105 µg/m^3)
	3 Hour	0.5 ppm (1300 µg/m^3)	—
	1 Hour	75 ppb (196 µg/m^3)[b]	0.25 ppm (655 µg/m^3)
Respirable 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 [c]	—
Sulfates (SO_4)	24 Hour	—	25 µg/m^3
Lead	30 Day Average	—	1.5 µg/m^3
	Rolling 3-Month Average	0.15 µg/m^3	—
Hydrogen Sulfide (H_2S)	1 Hour	—	0.03 ppm (42 µg/m^3)

Pollutant	Averaging Time	Federal Standard	California Standard
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 percent.

[a] To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average must not exceed 100 ppb.
[b] To attain this standard, the 3-year average of the 99th percentiles of the daily maximum 1-hour average must not exceed 75 ppb.
[c] To attain this standard, the 3-year average of the 98th percentile of the daily concentrations must not exceed 35 μg/m^3.
ppm= parts per million
Source: ARB 2012a

The Rio Mesa SEGF is located in eastern Riverside County, which is near the eastern edge of the Mojave Desert Air Basin (MDAB) and is under the jurisdiction of the Mojave Desert Air Quality Management District (MDAQMD or District). The Riverside County portion of the MDAB is designated as non-attainment for the state ozone and PM10 standards. This area is designated as attainment or unclassified for all federal criteria pollutant ambient air quality standards and the state CO, NO_2, SO_2, and PM2.5 standards. **Air Quality Table 3** summarizes the attainment status of the project area in MDAB for various applicable state and federal standards.

Air Quality Table 3
Federal and State Attainment Status
Mojave Desert Air Basin

Pollutant	Attainment Status	
	Federal	State
Ozone	Unclassified/Attainment [a]	Nonattainment
CO	Unclassifiable/Attainment	Unclassified
NO_2	Unclassifiable/Attainment [b]	Attainment
SO_2	Unclassified	Attainment
PM10	Unclassified	Nonattainment
PM2.5	Unclassified/Attainment	Unclassified [a]

Source: ARB 2011, U.S. EPA 2012a
[a] Unclassified or Attainment status for the site area only, not the entire MDAB.
[b] On February 17, 2012 U.S. EPA designated all of California as “unclassifiable/attainment” for their short-term NO_2 standard.

Ambient air quality monitoring data for ozone, PM10, PM2.5, CO, NO_2, and SO_2, compared to the most restrictive applicable standards for the years between 2006 through 2010 (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.** Values shown in bold exceed the limiting AAQS. Ozone data are from the Blythe monitoring station located 6 miles northeast of the project site; PM10, PM2.5, NO_2, and CO data are from the Palm Springs Fire Station monitoring station located 107 miles west northwest of the project site; SO_2 data are from the Victorville monitoring station located 163 miles northwest of the project site. The Blythe monitoring station is the only nearby ambient monitoring station, however, it only collects ozone data. Palm Springs and Victorville monitoring stations are also located in arid areas in Southern California thus they are generally representative of the regional background levels for the project site. Because the Palm Springs station is located closer to large urbanized areas than the project site, it is likely the background PM10, PM2.5, NO_2, and CO data collected at the Palm Springs station are higher than the levels at the project site. Therefore, the use of these data is conservative and will not underestimate background levels for the project site. The same is true with the SO_2 ambient data collected at Victorville monitoring station, which is also closer to large urbanized areas than the project site.

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 [VOCs]) in the presence of sunlight. Pollutant transport from the South Coast Air Basin (Los Angeles Area) is one source of the pollution experienced in the eastern Riverside County portion of the MDAB (SCAQMD 2007, p. 1-2).

Air Quality Table 4
Criteria Pollutant Summary
Maximum Ambient Concentrations (ppm or μg/m³)

Pollutant	Monitoring Station Location	Averaging Period	Units	2006	2007	2008	2009	2010 [c]	Limiting AAQS
Ozone	Blythe, CA	1 hour	ppm	0.078	**0.092**	0.074	0.072	0.072	0.09
Ozone	Blythe, CA	8 hours	ppm	0.059	**0.076**	**0.071**	0.066	0.068	0.07
PM10 [a]	Palm Springs, CA	24 hours	μg/m³	**73**	**81**	**73**	**133**	37	50
PM10 [a,b]	Palm Springs, CA	Annual	μg/m³	**27.7**	**30.1**	**21.3**	**21.9**	18.5	20
PM2.5 [a]	Palm Springs, CA	24 hours	μg/m³	15.8	20.5	17.1	14.6	12.6	35
PM2.5 [a,b]	Palm Springs, CA	Annual	μg/m³	7.8	8.7	7	6.5	6	12
CO	Palm Springs, CA	1 hour	ppm	2.3	1.5	1.3	2.3	1.6	20
CO	Palm Springs, CA	8 hours	ppm	0.9	0.8	0.5	0.7	0.5	9
NO_2	Palm Springs, CA	1 hour	ppm	0.093	0.063	0.049	0.048	0.046	0.18
NO_2	Palm Springs, CA	1 hour (98th percentile)	ppm	0.05	0.051	0.045	0.039	0.039	0.1

Pollutant	Monitoring Station Location	Averaging Period	Units	2006	2007	2008	2009	2010 [c]	Limiting AAQS
NO_2	Palm Springs, CA	Annual	ppm	0.01	0.009	0.009	0.008	0.009	0.03
SO_2	Victorville, CA	1 hour	ppm	0.018	0.009	0.006	0.008	0.052	0.075
SO_2	Victorville, CA	3 hours	ppm	0.012	0.007	0.005	0.006	0.029	0.5
SO_2	Victorville, CA	24 hours	ppm	0.006	0.005	0.002	0.006	0.007	0.04
SO_2	Victorville, CA	Annual	ppm	0.000	0.000	0.000	0.000	0.000	0.03

Source: U.S. EPA 2012b, ARB 2012b
Notes:
[a] Exceptional PM concentration events, such as those caused by windstorms are excluded in the data presented.
[b] Annual average data for PM10 from 2007 to 2009 and PM2.5 from 2006 to 2009 are federal data and may not exactly represent California annual average.
[c] Staff did not include the 2011 data because they may not be finalized and are lower than the data in the previous years.

The entire Mojave Desert Air Basin is classified as a nonattainment area with respect to state ambient standards for ozone, and the project location within the air basin is an unclassified/attainment area with respect to national ambient standards for ozone. The ambient data shown in **Air Quality Table 4** shows the 1-hour ozone CAAQS of 0.09 parts per million (ppm) was exceeded in 2007. The 8-hour ozone CAAQS of 0.07 ppm was exceeded in 2007 and 2008. The 8-hour ozone data in 2007 also exceeded the federal 8-hour ozone NAAQS of 0.075 ppm. However, the ozone values shown are peak values that correspond to the state standard. The federal 8-hour ozone standard is maintained when the 3-year average of the fourth highest 8-hour concentration for individual years is at or below 0.075 ppm, which is how the attainment with the federal 8-hour ozone standard is determined. Therefore, the federal 8-hour ozone standard was not exceeded during the years reported in **Air Quality Table 4**.

Nitrogen Dioxide

The Mojave Desert Air Basin is classified as an attainment area with respect to state ambient standards for NO_2 and an unclassifiable/attainment area with respect to national ambient standards for NO_2.

Most 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 project area within the Mojave Desert Air Basin is unclassified with respect to the state CO ambient standard, and the entire Mojave Desert Air Basin is unclassifiable/ attainment for the federal 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 CO concentrations measured at the Palm Springs monitoring station, which is in the Salton Sea Air Basin, are well below the state and federal ambient air quality standards. Salton Sea Air Basin is classified as an attainment area for state CO standard.

Particulate Matter (PM10)

PM10 can be emitted directly as fugitive dust or combustion particulates, or it can be formed many miles downwind from emission sources when various precursor pollutants interact in the atmosphere and form secondary PM. Gaseous emissions of pollutants like NOx, SOx and VOC from combustion sources, and ammonia (NH_3) from human and animal wastes or combustion NOx control equipment can, given the right meteorological conditions, form particulate matter known as nitrates (NO_3), sulfates (SO_4), and organic compounds. These pollutants are known as secondary particulates because they are not directly emitted but are formed through complex chemical reactions between directly emitted pollutants in the atmosphere.

The project area is nonattainment for state PM10 standards and unclassified for the federal PM10 standard. Both the maximum 24-hour and maximum annual arithmetic mean PM10 levels at the Palm Springs monitoring station exceed the state standards.

Fine Particulate Matter (PM2.5)

Fine particulate matter, or PM2.5 (particulate matter less than 2.5 microns in diameter), is derived either mainly from 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. A small percentage of PM2.5 emissions come from fugitive dust sources and motor vehicles combustion sources from the construction vehicles.

The project location within Riverside County is designated unclassified /attainment with regard to the federal PM2.5 standards and unclassified with regard to the state PM2.5 standard.

Sulfur Dioxide

The Mojave Desert Air Basin is in attainment with respect to the state SO_2 standard and unclassified with respect to the federal SO_2 standard. 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 eastern 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 SO_2 concentrations at the Victorville station are well below the state and federal ambient air quality standards.

Nitrates and Sulfates

PM nitrate (mainly ammonium nitrate) is formed in the atmosphere from the reaction of NOx and ammonia. NOx, as emitted from combustion sources, is mainly in the form of nitric oxide (NO). NO converts to NO_2 primarily by reacting with ozone in the ambient air and sunlight. The formed NO_2 can convert back to NO, which sustains the ozone formation reactions. NO_2 can also form organic nitrates, or be reduced to nitric acid by available hydroxyl radicals in the ambient air. Nitric acid reacts with ammonia in ambient air to form ammonium nitrate. Ammonium nitrate, in its particulate form, can remain suspended in the ambient air and/or be transported long distances downwind as PM2.5. Ammonium nitrate, under certain conditions of heat and humidity, breaks down to NOx and starts a new ozone cycle.

PM sulfate (mainly ammonium sulfate) is formed in the atmosphere from the oxidation of SO_2 and subsequent neutralization by ammonia in the atmosphere. This oxidation of SO_2 depends on many factors, which include the availability of sulfur, hydroxyl, hydroperoxy and methylperoxy radicals, and atmospheric humidity. Given the low SO_2 and humidity levels in the site vicinity, PM sulfate is not expected to be found.

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 monitoring stations staff selected as the most representative of the proposed project area.

Air Quality Table 5
Staff Recommended Background Concentrations ($\mu g/m^3$)

Pollutant	Averaging Time	Recommended Background	Limiting Standard	Percent of Standard
NO_2	1 hour	92.4	339	27%
	1 hour federal[a]	91.5	188	49%
	Annual	17.1	57	30%
PM10	24 hour	**133**	**50**	**266%**
	Annual	**22**	**20**	**110%**
PM2.5	24 hour[b]	17.8	35	51%
	Annual	7.0	12	58%
CO	1 hour	2,645	23,000	12%
	8 hour	778	10,000	8%

Pollutant	Averaging Time	Recommended Background	Limiting Standard	Percent of Standard
SO_2	1 hour	136.6	196	15%
	24 hour	18.4	105	18%
	Annual	0.0	80	0%

Notes:
[a] Background federal 1-hour NO_2 concentration shown is the three-year average of the 98th percentile daily maximum 1-hour NO_2 during 2006-2008.
[b] Background 24-hour PM2.5 concentration shown is three-year average of the 98th percentile values during 2006-2008.

The background 24-hour and annual concentrations for PM10 are above the most restrictive existing ambient air quality standards, while the background concentrations for the other pollutants and averaging times 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**. Staff believes there is no adequate model to account for the contribution of a single power plant to the secondary aerosol formation. Besides, the emissions of lead and visibility reducing particulates or their precursors would be insignificant from a solar power plant using natural gas boilers. Therefore, recommended background concentrations were not determined for the other criteria pollutants (ozone, lead, etc.) or background values determined for other ambient standards (visibility reducing particulates). Instead, staff recommends the stationary equipment, the off-road construction and maintenance equipment, and fugitive dust emissions be mitigated to the greatest extent feasible to lessen potential impacts of ozone and PM to a level of less than significant.

PROJECT DESCRIPTION

The proposed Rio Mesa SEGF would be comprised of two solar fields and a common area (BS 2012v). The applicant has identified the southeastern solar plant as Rio Mesa I and the northwestern plant as Rio Mesa II. Each solar plant would generate 250 megawatts (MW) (nominal), for a total net output of 500 MW. Each would have a central tower surrounded by a distributed field of heliostats (mirrors). The heliostats focus solar energy on the power tower receivers located at the top of each tower. Each plant would require about 1,850 acres (or 2.9 square miles) of land to operate. Both solar plants would share, within an approximate 19.5-acre common facilities area, a combined administration, control, maintenance and warehouse building, evaporation ponds, groundwater wells, water treatment plant and a common switchyard. Another 103 acres is needed during the construction period for lay down and staging activities. Established dirt roads account for any additional acres. The total area required for both plants, including the shared facilities, is approximately 3,805 acres (5.95 square miles), however additional area, located on BLM properties is required for the 220kV generation transmission lines, the Bradshaw Trail access road, and the 33kV service transmission lines.

Each plant would have five emitting sources, consisting of two natural-gas-fired boilers, two diesel fuel-fired emergency engines, and a wet surface air cooler. The common area would contain diesel fuel-fired emergency equipment consisting of a small emergency generator and a fire pump. Two types of boilers would be used at each power block. Each boiler would be equipped with low-NOx burners and flue gas recirculation (FGR) for NOx control; CO would be controlled using good combustion practices; particulate and VOC emissions would be minimized through the use of natural gas as the fuel. Specifications for the new boilers are summarized under the Project Operation discussion of this **Air Quality** section.

Each plant would use one 249 million British Thermal Units per hour MMBtu/hr natural-gas-fired auxiliary boiler to facilitate daily start up in the morning, in the afternoon and early evening hours. This would enhance project efficiency by allowing solar flux to maximize output more quickly than if solar heating alone were used to heat the entire system. During cloudy days or in case of an emergency shutdown, these boilers may also be used to keep the system hot to facilitate plant restart.

Additionally, one small (15 MMBtu/hr) natural-gas-fired boiler, called a nighttime preservation boiler, would be used at each plant to provide superheated steam to keep the steam turbine generators and boiler pump gland systems under vacuum overnight and during other shutdown periods when solar heat is not available. Using these small boilers would be more efficient than allowing these systems to cool and then using the larger startup boilers to re-establish the vacuums in the morning.

On an annual basis, heat input from natural gas would be limited to less than 10 percent of the heat input from the sun.

Each plant would also have one 3,633-horsepower diesel emergency generator at each power block to provide backup power to the facility in case of loss of line power; there would be one smaller 398-horsepower diesel emergency generator to provide emergency power to the common area (total of three emergency engine generators for the project). One 200-horsepower diesel fire pump engine would also be located in each power block as well as in the common area (total of three fire pump engines) to comply with fire codes.

Turbine cooling would be provided by air-cooled condensers, supplemented by a partial dry-cooling system (wet surface air cooler [WSAC]) for auxiliary equipment cooling. Under most conditions, all cooling would be provided by the dry portion of the cooling system. The wet portion of each cooling system emits only water vapor and would be equipped with a 4,000 gallons per minute (gpm) WSAC. Treated well water would be used for makeup water and the Total Dissolved Solids (TDS) level of the recirculating water would be approximately 1,500 parts per million by weight (ppmw) after concentration. The WSAC would be operated only when the ambient temperature is 86°F or higher. The WSACs are exempt from MDAQMD permit requirements per District Rule 219.E.4.c (exempting “[w]ater cooling towers…not used for evaporative cooling of process water…”).

The Rio Mesa SEGF would receive natural gas from the TransCanada Gas Transmission (TCGT) North Baja Pipeline, which runs adjacent to the Western Area Power Administration (WAPA) electric transmission line along the eastern edge of the developed solar fields for both plants. Natural gas would be delivered to the project by installing one or more tap and meter station(s) on the existing TCGT North Baja Pipeline. From the tap, natural gas would go through a master metering station where the total flow of natural gas would be measured.

The Rio Mesa SEGF would require an approximately 10-mile transmission line to connect the project to the electrical grid. The two plants would be interconnected via a common overhead 220 kilovolt (kV) generator tie-line (gen-tie line) to the Southern California Edison (SCE) Colorado River Substation (CRS) to the north. The project would include a common switchyard on site where underground transmission lines from both plants would terminate. Portions of the project gen-tie line, on the Bradshaw Trail access road, and 33 kV construction/emergency backup power supply line would be located on public lands managed by the BLM. The project would require certification both by the Energy Commission and BLM.

Following completion of project licensing and close of financing, Rio Mesa SEGF would be constructed in approximately 35 months with the following anticipated schedule:

- Begin construction: fourth quarter 2013 for Rio Mesa I; first quarter 2014 for Rio Mesa II
- Startup and testing: third quarter 2015 for Rio Mesa I; fourth quarter 2015 for Rio Mesa II
- Commercial operations: fourth quarter 2015 for Rio Mesa I; first quarter 2016 for Rio Mesa II

Additionally, the applicant has proposed that the facility would have engines for the mirror washing equipment that will be EPA-certified, larger Far From Tower (FFT) on-road engines and smaller Near Tower (NT) off-road engines (URS 2012e). These would create both tailpipe and fugitive dust emissions during operation.

PROJECT CONSTRUCTION

The Construction of Rio Mesa SEGF, from perimeter fencing to site preparation and grading to commercial operation, is expected to take place approximately from the fourth quarter of 2013 to the first quarter of 2016 (35 months total). Major milestones are listed in **Air Quality Table 6** (although the construction order may change). Construction of the shared facilities would occur concurrently with the construction of the first plant.

Air Quality Table 6
Project Schedule Major Milestones

Activity	Date
Plant 1 (Rio Mesa I)	
Begin Construction	Fourth Quarter 2013
Start-up and test	Third Quarter 2015
Commercial operation	Fourth Quarter 2015
Plant 2 (Rio Mesa II)	
Begin construction	First Quarter 2014
Start-up and test	Fourth Quarter 2015
Commercial operation	First Quarter 2016

There would be an average workforce of approximately 840 construction craft people, supervisory, support, and construction management personnel onsite during construction. The peak construction site workforce of 2,200 is expected to occur in months 22 and 23 (BS 2012v).

Air Quality Table 7 presents the applicant's estimate of direct onsite and offsite (delivery and employee vehicle) construction emissions for NOx, VOC, SOx, CO, PM10 and PM2.5. The emissions in **Air Quality Table 7** are based on construction of the original design of three solar plants as proposed by the applicant in the original AFC (BS 2011a).

Air Quality Table 7
Rio Mesa SEGF Construction Emissions (Assumes Three Solar Plants)

Solar Facility Construction	Daily Emissions (lbs/day) [a]					
	NOx	SOx	CO	VOC	PM10	PM2.5
Maximum Daily Onsite Emissions	408.5	0.8	236	36.7	287.7	49.7
Maximum Daily Offsite Emissions	776.2	1.13	892.9	121.5	40.1	32
Maximum Daily Emissions	1,184.7	1.93	1,128.9	158.2	327.8	81.7
	Annual Emissions (tons/year) [a]					
Maximum Annual Onsite Emissions	31.4	0.1	17.5	3.1	17.3	3.6
Maximum Annual Offsite Emissions	74.9	0.1	99.4	12.8	3.9	3.1
Maximum Annual Emissions	106.3	0.2	116.9	15.9	21.2	6.7

Source: AFC (BS 2011a), and supplemental data response submitted April 16, 2012 (URS 2012e).
Notes:
a. Emissions include fugitive dust. Maximum emissions were estimated based on construction of original design of three power blocks and the transmission line. Emissions from construction of two power blocks would likely be less.

Later, the applicant revised the project to include only two solar plants instead of three (BS 2012v). The construction emissions for two plants would likely be less than those for three solar plants. Thus staff believes the peak daily and annual construction emissions in **Air Quality Table 7** are conservative.

These emission estimates appear reasonable in terms of the onsite equipment and offsite vehicle use and the offsite vehicle fugitive dust emissions. However, the onsite fugitive dust emissions estimate may be underestimated given the amount of activity on the site and appropriate level of control for the applicant's proposed mitigation measures (specifically watering unpaved roads). Staff recommends additional mitigation measures, specifically the use of soil binders on unpaved roads and other inactive disturbed surfaces during construction, so that the applicant's fugitive dust emissions estimate and associated impact would be minimized for this project.

PROJECT OPERATION

The Rio Mesa SEGF would be a nominal 500 Megawatt (MW) power tower thermal solar electrical generating facility comprised of two plants, Rio Mesa I (250 MW), and Rio Mesa II (250 MW) (BS 2012v). The direct air pollutant emissions from solar power generation are minimal; however, the facility would start-up each day with the assistance of natural gas-fueled boilers associated with each plant and there are other equipment and maintenance activities necessary to operate and maintain the facility.

The Rio Mesa SEGF onsite stationary and mobile emission sources are as follows:

- Each solar plant would include two gas-fired boilers:
    - One auxiliary boiler (249 MMBtu/hr) would provide steam prior to sunrise to expedite the process of bringing the plants online and power augmentation primarily in the late afternoon/early evening. Each auxiliary boiler would have a maximum of no more than 1,100 full-load hours and 865 startup hours of use per year;
    - One night preservation boiler (15 MMBtu/hr) would provide superheated steam to the steam turbine generator (STG) and boiler feedwater pump and systems overnight and during other shutdown periods when steam is not available from the solar receiver steam generator (SRSG). Each nighttime preservation boiler would have maximum 4,780 full-load hours and 345 startup hours of use per year;
- One 3,633-bhp diesel-fired emergency generator engine (two for entire Rio Mesa SEGF project) and one 398-bhp diesel-fueled emergency generator for the common area; each engine would operate in non-emergency mode no more than 50 hours per year;
- One 200-bhp diesel-fired emergency fire water pump engine in each power block and the common area (total of three); all would operate in a non-emergency mode for no more than 50 hours per year or no more than required by National Fire Protection Association, whichever is greater;
- One Wet Surface Air Cooler (WSAC) system in each power block with water flow rate of 4,000 gallons per minute (gpm). Each WSAC system would operate no more than 2,000 hours per year;
- Onsite diesel-fueled maintenance vehicles used for mirror washing and other maintenance/operation support activities.

The following assumptions were used to develop the hourly, daily, and annual emissions estimate for Rio Mesa SEGF operation:

A. Maximum Hourly Emissions

- All boilers are operating full load;
- All emergency generator engines operate for one-half hour of duration for testing purposes;
- All fire pump engines operate for one-half hour of duration for testing purposes;
- All WSACs are operating;
- The maximum hourly use of the mirror washing vehicles is 1/7300th of the annual use[3], which is 2.6 miles of travel during the hour for Far From Tower vehicles and 0.5 miles of travel during the hour for Near Tower vehicles;
- Forty (40) employees are traveling 65 miles one-way trip to/from the site and one heavy-duty delivery vehicle is traveling 50 miles one-way to/from the site during the hour.[4]

B. Maximum Daily Emissions

- All auxiliary boilers operate 5 full-load hours and 2.5 hours in startup mode;
- All nighttime preservation boilers operate 16 full-load hours in the winter (12 hours in the summer) and 1 hour in startup mode;
- All emergency generator engines operate for one-half hour of duration for testing purposes;
- All fire pump engines operate for one-half hour of duration for testing purposes.
- All WSACs operate 12 hours per day;
- The maximum daily use of the mirror washing vehicles is 1/365th of the annual use, which is 52 miles of travel during the day for Far From Tower vehicles and 11 miles of travel during the day for Near Tower vehicles;
- Eighty (80) employees travel 1.5 trips per day with a round trip distance of 130 miles and 10 heavy-duty delivery vehicles travel 300 round trip miles per day.

C. Maximum Annual Emissions

- All auxiliary boilers operate 1,100 full-load hours and 865 hours in startup mode;

[3] Emissions calculations are embedded in the *Repeated Confidential Designation for a Microsoft Excel Spreadsheet as a Supplemental Response to CEC Staff's Data Request #16*, dated July 19, 2012 (TN 66272). Applicant assumed mirror washing vehicles operate 20 hours per day and 365 days per year.

[4] Staff estimated the hourly offsite emissions based on applicant's estimates of daily offsite emissions and assumptions used in the Final Staff Assessment (FSA) for Ivanpah Solar Electric Generating System (ISEGS) (CEC 2009). In the ISEGS FSA, staff assumed less than half of the employees (25 out of 66) travel 50 miles to/from the ISEGS project to calculate the hourly emissions. In this analysis, staff believes it is more conservative to assume half of the employees (40 out of 80) travel 65 miles per hour to/from the Rio Mesa SEGF.

- All nighttime preservation boilers operate 4,780 full-load hours and 345 hours in startup mode;
- All emergency generator engines operate for 50 hours of duration for testing purposes;
- All fire pump engines operate for 50 hours of duration for testing purposes;
- All WSACs operate 2,000 hours;
- Far From Tower mirror washing vehicles travel 18,900 miles per year and Near Tower mirror washing vehicles travel 4,000 miles per year;
- Employees travel a total of 5,694,000 miles and heavy-duty delivery vehicles travel 1,095,000 miles per year, which are the maximum daily Vehicle Miles Traveled multiplied by 365.

The Rio Mesa SEGF onsite stationary sources, onsite mobile equipment, and offsite vehicle emissions, including fugitive PM10 emissions, are estimated and summarized in **Air Quality Table 8**.

Similar to the construction emissions estimate staff, believes that the onsite fugitive dust emissions estimate may be underestimated given the amount of activity on the site and appropriate level of control for the applicant’s proposed mitigation measures (specifically, watering unpaved roads). Therefore, staff recommends additional mitigation measures (Condition of Certification **AQ-SC7**) requiring the use of soil binders on unpaved roads and other inactive disturbed surfaces during site operation, so that the applicant’s fugitive dust emissions estimate and associated impact analysis will be minimized for this project.

The direct stationary source emissions from this project are well below the PSD and/or nonattainment New Source Review (NSR) permitting applicability thresholds; therefore, the U.S. Environmental Protection Agency (U.S. EPA) and MDAQMD consider the facility to be a minor stationary source and not expected to create significant impacts.

INITIAL COMMISSIONING

Initial commissioning refers to a period of approximately 60 days prior to beginning commercial operation when the equipment undergoes initial tuning and performance tests. Staff does not expect substantial change of emissions from facility commissioning compared to that of full operation.

Air Quality Table 8
Rio Mesa SEGF Operation – Maximum Hourly, Maximum Daily, and Annual Emissions

	Maximum Hourly Emissions (lbs/hr)					
Emission Source	NOx	SOx	CO	VOC	PM10	PM2.5
Boilers	5.8	1.1	10.2	2.8	2.6	2.6
Emergency Generator Engines	39.8	0.04	22.0	1.4	1.3	1.3
Emergency Fire Pump Engines	2.0	0.00	1.7	0.1	0.1	0.1
WSACs	-	-	-	-	0.03	0.03
Maintenance Vehicles (mirror washing)	0.2	0.1	0.1	0.1	0.01	0.01
Maintenance Vehicles (fugitive dust)	-	-	-	-	1.7	0.2
Employee and Delivery Vehicles (offsite) [b]	3.41	0.00	25.5	2.40	0.3	0.2
Total Maximum Hourly Emissions	51.2	1.2	59.5	6.9	6.1	4.4
Emission Source	**Maximum Daily Emissions (lbs/day)**					
Boilers	46.9	6.6	86.9	22.8	16.4	16.4
Emergency Generator Engines	39.8	0.04	22.0	1.4	1.3	1.3
Emergency Fire Pump Engines	2.0	0.00	1.7	0.1	0.1	0.1
WSACs	-	-	-	-	0.4	0.4
Maintenance Vehicles (mirror washing)	4.1	1.1	1.6	1.9	0.1	0.1
Maintenance Vehicles (fugitive dust)	-	-	-	-	34.6	3.5
Employee and Delivery Vehicles (offsite) [a]	87.7	0.1	177.7	20.4	4.9	3.8
Total Maximum Daily Emissions	180.4	7.9	289.9	46.6	57.8	25.5
Emission Source	**Annual Emissions (tons/year)**					
Boilers	6.3	0.8	11.8	3.0	2.0	2.0
Emergency Generator Engines	2.0	0.0	1.1	0.1	0.1	0.1
Emergency Fire Pump Engines	0.1	0.0	0.1	0.0	0.0	0.0
WSACs	-	-	-	-	0.03	0.03
Maintenance Vehicles (mirror washing)	0.7	0.2	0.3	0.3	0.02	0.02
Maintenance Vehicles (fugitive dust)	-	-	-	-	6.3	0.6
Employee and Delivery Vehicles (offsite) [a]	16.0	0.0	32.4	3.7	0.9	0.7
Total Annual Emissions	25.1	1.0	45.7	7.2	9.3	3.4

Source: supplemental data submitted July 23, 2012 Table 5.1B-10R2 and Table 5.1B-11R2 (BS 2012v)

[a] Applicant's estimates emailed from Sierra Research to staff.

[b] Staff estimated the hourly offsite emissions based on applicant's estimates of daily offsite emissions and assumptions used in the Final Staff Assessment (FSA) for Ivanpah Solar Electric Generating System (ISEGS) (CEC 2009). In the ISEGS FSA, staff assumed less than half of the employees (25 out of 66) travel 50 miles to/from the ISEGS project to calculate the hourly emissions. In this analysis, staff believes it is more conservative to assume half of the employees (40 out of 80) travel 65 miles per hour to/from the Rio Mesa SEGF.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff assessed three kinds of primary and secondary[5] impacts: construction, operational, and cumulative. Construction impacts result from emissions occurring during site preparation and construction of the project. Operational impacts result from emissions of the proposed project during normal operation, which includes all of the onsite auxiliary equipment (boilers, cooling towers, emergency engines, etc.) and maintenance

[5] 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.

vehicle emissions. Cumulative impacts result from the proposed project's incremental effect, 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, and15355.)

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANT ADVERSE IMPACTS

Energy Commission staff used two main significance criteria in evaluating this project. First, all project emissions of nonattainment criteria pollutants and their precursors (PM10, NOx, VOC and SO_2) are considered significant cumulative impacts that must be mitigated. Second, any AAQS violation or any contribution to any existing AAQS violation caused by any project emissions is considered significant and must be mitigated. Potentially significant impacts are deemed to be mitigated to less than significant with the application of maximum feasible mitigation measures.

For construction emissions, mitigation is limited to controlling both construction equipment tailpipe emissions and fugitive dust emissions to the maximum extent feasible.

For operating emissions, when analyzing renewable projects with very low direct criteria pollutant emissions from stationary sources associated with electric generation that: 1) are located in areas with generally good air quality; and 2) are non-attainment of ambient air quality standards primarily or solely due to pollutant transport, the mitigation that is considered is limited to feasible emission controls. These feasible emission controls are applied to both the stationary sources (such as requiring BACT) and the on-site, non-stationary emission sources (such as maintenance vehicles) including associated fugitive dust emission sources.

The ambient air quality standards that staff uses as a basis for determining project significance are health-based standards established by the ARB and U.S. EPA. They are set at levels 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, including a margin of safety.

Impacts from Closure and Decommissioning

Impacts from closure and decommissioning, as a one-time, limited duration event are evaluated with the same methods and thresholds as construction emissions as discussed above.

DIRECT/CUMULATIVE IMPACTS AND MITIGATION

While the emissions are the actual mass of pollutants emitted from the project, the impacts are the concentration of pollutants from the 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 diluted by the time they reach ground level. The emissions from the proposed project, both stationary source and onsite mobile source emissions, are analyzed by 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 proposed 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 for short-term (1-hour, 3-hour, 8-hour, and 24-hour) and annual periods. The model results are generally described as maximum concentrations expected outside the project's boundary and are often described as a unit of mass per volume of air, such as micrograms per cubic meter ($\mu g/m^3$).

The applicant has used the U.S. EPA-approved AMS/EPA Regulatory Model (AERMOD version 12060) air dispersion model to estimate the direct impacts of the project's NOx, PM10, CO, and SOx emissions resulting from project construction and operation. Additionally, boiler emission fumigation impacts during inversion breakup conditions were determined using the U.S. EPA approved SCREEN3 (version 96043) model.

Staff revised the background concentrations provided by the applicant, replacing them with the available highest ambient background concentrations for the last three years from representative monitoring sites shown 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 project's emission impacts would cause a new violation of the ambient air quality standards or would contribute to an existing violation.

The inputs for the air dispersion models include stack information (exhaust flow rate, temperature, and stack dimensions), specific 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 surface meteorological data (e.g., hourly wind speed and direction, temperature) from the Blythe Airport for 2006 through 2010, which is the closest complete meteorological data source to the project site, and cloud cover data from the McCarran Airport in Las Vegas, NV, as no cloud cover data are collected at the Blythe station. Concurrent upper air data from the Tucson, Arizona station were also used.

Additionally, the applicant used hourly ozone data at the Blythe station and hourly NO_2 data at the Palm Springs station during the same five years of the meteorological input data set to conduct a more refined NO_2 impact modeling analysis using the Ozone Limiting Method (OLM).

Proposed Project

Construction Impacts Analysis

The Rio Mesa SEGF project would be constructed in two partially overlapping phases that would last a total of 35 months. Construction generally consists of two major activities: site preparation, and construction and installation of major equipment and structures. In addition to fugitive dust emissions resulting from the site preparation, emissions from construction equipment exhausts, such as vehicles and internal combustion engines, would also occur during the project construction phase.

Using estimated peak hourly, daily, and annual construction equipment exhaust and fugitive dust emissions, the applicant performed a modeling analysis. **Air Quality Table 9** presents the results of the applicant's modeling analysis.

Air Quality Table 9
Maximum Project Construction Impacts

Pollutants	Avg. Period	Impacts ($\mu g/m^3$)	Background [a] ($\mu g/m^3$)	Total Impact [b] ($\mu g/m^3$)	Standard ($\mu g/m^3$)	Percent of Standard
NO_2	1-hr	31.4	92.4	123.8	339	37%
	1-hr federal [c]	31.4	91.5	122.9	188	65%
	Annual	0.9	17.1	18	57	32%
PM10	24-hr	**4.5**	**133**	**137.5**	**50**	**275%**
	Annual	**0.5**	**22**	**22.5**	**20**	**113%**
PM2.5	24-hr	0.9	17.8	19	35	53%
	Annual	0.1	7.0	7.1	12	59%
CO	1-hr	18.8	2,645	2,664	23,000	12%
	8-hr	9.0	778	787	10,000	8%
SO_2	1-hr	0.08	136.6	136.7	196	70%
	24-hr	0.02	18.4	18.4	105	18%
	Annual	0.0	0.0	0.0	80	0%

Source: supplemental data response submitted April 16, 2012 (URS 2012e).
Notes:
[a] Background values have been adjusted per staff recommended background concentrations shown in **Air Quality Table 5**.
[b] Total concentrations shown in this table are the sum of the maximum predicted impact and the maximum measured background concentration. Because the maximum impact will not occur at the same time as the maximum background concentration, the actual maximum combined impact will be lower.
[c] Total concentration for federal 1-hour NO_2 standard is conservatively estimated to be the sum of the maximum modeled 1-hour impact combined with the three-year average of the 98th percentile background as shown in **Air Quality Table 5**.

This modeling analysis indicates, with the exception of 24-hour and annual PM10 impacts, that the project would not create new exceedances or contribute to existing exceedances for any of the modeled air pollutants. Staff notes that the maximum local background 24-hour and annual measurements of PM10, which exceed the state 24-hour and annual PM10 standard with or without the proposed project, may be substantially impacted by wind-blown dust. However, in light of the existing PM10 and ozone non-attainment status for the project site area with regard to state standards, staff considers the construction NOx, VOC, and PM emissions to be potentially CEQA significant and, therefore, staff is recommending that the off-road equipment and fugitive dust emissions be mitigated to the greatest extent feasible.

The modeling analysis shows that, after implementation of the recommended fugitive dust mitigation measures (Conditions of Certification **AQ-SC3** and **AQ-SC4**), the project's construction is not predicted to cause violations of state or federal AAQS.

Construction Impacts Mitigation

To mitigate the impacts due to construction of the facility, the applicant has proposed to use the following mitigation measures:

A. All unpaved roads and disturbed areas in the project and linear construction sites will be watered until sufficiently wet to ensure that no visible dust plumes leave the project site.

B. Vehicle speeds will be limited to 10 miles per hour within the construction site on unpaved roads.

C. All construction equipment vehicle tires will be washed or cleaned free of dirt prior to entering paved roadways.

D. Gravel ramps of at least 20 feet in length will be provided at the tire washing/cleaning station.

E. All entrances to the construction site will be graveled or treated with water or dust soil stabilization compounds.

F. Construction areas adjacent to any paved roadway will be provided with sandbags to prevent run-off to the roadway.

G. All paved roads within the construction site will be swept at least twice daily when construction activity occurs.

H. At least the first 500 feet of any paved public roadway, accessed from the construction site or from unpaved roads en route to the construction site and construction staging areas will be swept regularly on days when construction activity occurs.

I. All soil storage piles and disturbed areas that remain inactive for longer than 10 days will be covered or treated with appropriate dust suppressant compounds.

J. All vehicles that are used to transport solid bulk material on public roadways and that have potential to cause visible emissions will be provided with a cover, or the materials will be sufficiently wetted and loaded onto the trucks in a manner to provide at least two feet of freeboard.

K. Wind erosion control techniques such as windbreaks, water, chemical dust suppressants, and vegetation will be used on all construction areas that may be disturbed. Any windbreaks used will remain in place until the soil is stabilized or permanently covered with vegetation.

L. Construction equipment will be shut down to avoid excessive idling emissions.

M. Construction equipment will use low sulfur, low aromatic diesel fuel.

N. Construction equipment will be maintained in top service shape.

O. Construction equipment used will meet state and federal emission most current standards when available.

Staff recommends the implementation of mitigation measures contained in Conditions of Certification **AQ-SC1** to **AQ-SC5**, which incorporate the applicant's proposed measures with revisions and additions recommended by staff to further reduce the impacts from the construction of the proposed project. Specific recommendations from staff include a more aggressive dust control requirement to use polymer based, or equivalent, soil stabilizers on the site's unpaved roads and inactive disturbed surfaces during construction.

The construction of the project would cause particulate matter emissions that would add to existing violations of the state's ambient PM10 air quality standards. Therefore, if unmitigated, the project's construction PM10 emission impacts would be CEQA significant. However, staff believes that the implementation of proposed specific mitigation measures during construction of the facility as identified in the conditions of certification would mitigate these short-term CEQA impacts of PM10 to a level of less than significant.

Operational Impacts

The following section discusses the project's direct operating ambient air quality impacts, as estimated by the applicant, and evaluated by staff. Additionally, this section discusses recommended mitigation measures.

Operational Modeling Analysis

The applicant provided a modeling analysis using the EPA-approved AERMOD model to estimate the impacts of the project's NOx, PM10, PM2.5, CO, and SOx emissions resulting from project operation and mirror washing activities (URS 2012e and BS 2012v). Similar to the assessment of construction impacts, staff added the modeled impacts to the available highest ambient background concentrations recorded during the previous three years from nearby monitoring stations to assess the project operational impacts. **Air Quality Table 10** presents the results of the applicant's modeling analysis with staff recommended background concentrations.

This modeling analysis indicates, with the exception of 24-hour and annual PM10 impacts, that the project would not create new exceedances or contribute to existing exceedances for any of the modeled air pollutants. Staff notes that the maximum local background measurements of PM10 may be substantially impacted by wind-blown dust. However, in light of the existing PM10 and ozone non-attainment status of state ambient air quality standards for the project site area, staff considers the operating NOx, VOC, and PM emissions to be potentially CEQA significant and, therefore, staff is recommending that the stationary equipment, the off-road maintenance equipment, and fugitive dust emissions be mitigated to the greatest extent feasible.

The modeling analysis shows that, after implementation of the recommended fugitive dust mitigation measures (see Condition of Certification **AQ-SC7**), the project's operation is not predicted to cause violations of the state or federal AAQS.

Air Quality Table 10
Project Operation with Mirror Washing Emissions Impacts

Pollutants	Avg. Period	Impacts ($\mu g/m^3$)	Background [a] ($\mu g/m^3$)	Total Impact [b] ($\mu g/m^3$)	Standard ($\mu g/m^3$)	Percent of Standard
NO_2	1-hr	165	92.4	257.4	339	76%
	1-hr federal [c]	-	-	185	188	98%
	Annual	0.2	17.1	17.3	57	30%
PM10	24-hr	**1.6**	**133**	**134.6**	**50**	**269%**
	Annual	**0.5**	**22**	**22.5**	**20**	**113%**
PM2.5	24-hr	0.7	17.8	18.5	35	53%
	Annual	0.05	7.0	7.05	12	59%
CO	1-hr	158	2,645	2,803	23,000	12%
	8-hr [d]	15.0	778	793	10,000	8%
SO_2	1-hr	2.4	136.6	139	196	71%
	24-hr [d]	1	18.4	19.4	105	18%
	Annual	0.01	0.0	0.01	80	0%

Source: supplemental information submitted in URS 2012e and BS 2012v,
Notes:
[a] Background values have been adjusted per staff recommended background concentrations shown in **Air Quality Table 5**.
[b] Total concentrations shown in this table are the sum of the maximum predicted impact and the maximum measured background concentration. Because the maximum impact will not occur at the same time as the maximum background concentration, the actual maximum combined impact will be lower.
[c] Staff calculates the total impact for the federal 1-hour NO_2 standard based on maximum three-year rolling average of 98th percentile of annual distribution of daily maximum paired-sum of project impact and concurrent background for each year (2006-2008). Applicant used five-year (2006-2010) average instead and the total impact would be lower (171 $\mu g/m^3$).
[d] Maximum 8-hour CO and 24-hour SO_2 concentrations occur under fumigation conditions.

Chemically Reactive Pollutant Impacts

The project will have direct emissions of chemically reactive pollutants (NOx, SOx, and VOC), but will also have indirect emission reductions associated with the reduction of fossil-fuel fired power plant emissions due to the project's effect of displacing the need for fossil-fuel power plant operation. The exact nature and location of such reductions is not known and the overall magnitude and downwind impact of those upwind emission reductions is speculative. Staff's impact analysis has not considered these potential reductions as an offset source for the project's emissions, so the discussion below focuses only on the direct emissions from the project.

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 modeling 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 Rio Mesa SEGF project do have the potential (if left unmitigated) to contribute to higher ozone levels in the region, which are already designated nonattainment for the state ozone standard.

PM2.5 Impacts

Secondary particulate formation, which is assumed to be 100 percent 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 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 eastern Riverside 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, due to the limited agricultural activity in the area the project site area would likely be characterized as ammonia poor, and the Rio Mesa SEGF project is not a notable source of ammonia emissions so the small amount of operating NOx and SOx emissions that would be generated by this project would have a reduced potential to create secondary particulate.

Impact Summary

The applicant is proposing to mitigate the project’s stationary source NOx, VOC, SO_2, and PM10/PM2.5 emissions through the use of boiler emission controls (Low NOx burner and flue gas recirculation) and natural gas fuel for the boilers, and use emergency engines that meet the highest available EPA/ARB Tier emission standards fueled with California 15 ppm sulfur diesel fuel. Additionally, staff recommends additional mitigation, specified in conditions of certification **AQ-SC6** and **AQ-SC7,** to reduce maintenance vehicle emissions, both tailpipe emission and fugitive dust emissions that could contribute to further ozone and PM10 violations. With the applicant proposed and staff recommended emission mitigation, it is staff’s belief that the project would not cause CEQA significant secondary pollutant impacts.

Operations Mitigation

Applicant's Proposed Mitigation

Emission Controls

As discussed in the air quality section of the AFC (BS 2011a), the applicant proposes the following emission controls on the stationary equipment associated with the Rio Mesa SEGF operation:

Auxiliary Boilers (Startup Boilers)

The applicant's proposed mitigation for the auxiliary/startup boilers includes Low-NOx burners and 20 percent flue gas recirculation (for NOx), good combustion practices (for CO), and to operate them exclusively on pipeline quality natural gas (for VOC, PM and SOx) to limit boiler emission levels. The AFC (BS 2011a), and Authority to Construct (ATC) conditions (MDAQMD 2012) provides the following emission limits, for each of the (249 MMBtu/hour HHV) boilers:

- NOx: 9.0 ppmvd at 3% O_2 (one-hour average), 2.72 lb/hour
- CO: 25 ppmvd at 3% O_2 (one-hour average), 4.60 lb/hour
- VOC as CH_4: 12.6 ppmvd, 1.32 lb/hour
- PM10/PM2.5: 1.25 lb/hour
- SO2: 0.0021 lb/MMBtu, 0.52 lb/hour, based on 0.75 gr/100 dscf in the natural gas fuel

Nighttime Preservation Boilers

The applicant's proposed mitigation for each preservation boiler includes Low-NOx burners and 20 percent flue gas recirculation (for NOx), good combustion practices (for CO), and to operate them exclusively on pipeline quality natural gas (for VOC, PM and SOx) to limit boiler emission levels. The supplemental analysis from the applicant (BS 2012v), and final PDOC conditions (MDAQMD 2012) will be included in the Final Staff Assessment and these are expected to require the following emission limits, for each of the smaller (15 MMBtu/hour HHV) boilers:

- NOx: 9.0 ppmvd at 3% O_2 (one-hour average), 0.16 lb/hour
- CO: 50 ppmvd at 3% O_2 (one-hour average), 0.55 lb/hour
- VOC: 12.6 ppmvd, 0.08 lb/hour
- PM10/PM2.5: 0.08 lb/hour
- SO_2: 0.03 lb/hour, based on 0.75 gr/100 dscf in the natural gas fuel

Emergency Backup Engines, Power Blocks

The applicant's proposed controls for each emergency generator engine is to purchase a new engine meeting current emission standard requirements (Tier 2) for 3,633 bhp engines. Additionally only low sulfur (15 ppm) ARB diesel fuel will be used. The specific emission levels for the selected engine are currently unknown but they will be no higher than the following Tier 2 emission standards:

- NOx: 4.8 grams per break horsepower-hour (including non-methane hydrocarbons - NMHC/VOC)
- CO: 2.6 grams per break horsepower-hour
- VOC: 0.1669 grams per break horsepower-hour
- PM10: 0.15 grams per break horsepower-hour
- SO_2: 15 ppm sulfur content diesel fuel

Emergency Backup Engines, Common Area

The applicant's proposed controls for each emergency generator engine is to purchase a new engine meeting current emission standard requirements (Tier 3) for 398 bhp engines. Additionally only low sulfur (15 ppm) ARB diesel fuel will be used. The specific emission levels for the selected engine are currently unknown but they will be no higher than the following Tier 3 emission standards:

- NOx: 3.0 grams per break horsepower-hour (including non-methane hydrocarbons - NMHC/VOC)
- CO: 2.6 grams per break horsepower-hour
- VOC: 0.1669 grams per break horsepower-hour
- PM10: 0.15 grams per break horsepower-hour
- SO_2: 15 ppm sulfur content diesel fuel

Fire Water Pump Engines

The applicant has proposed use of one 200-bhp Tier 3 Engine at each power block and the common area (total of three) that should have emission not higher than the following Tier 3 emission standards:

- NOx: 3.0 grams per break horsepower-hour (including NMHC/VOC)
- CO: 2.6 grams per break horsepower-hour
- VOC: (see NOx above)
- PM10: 0.15 grams per break horsepower-hour
- SO_2: 15 ppm sulfur content diesel fuel

Maintenance Vehicles

The applicant has not proposed any specific emission controls for this emission source.

Delivery and Employee Vehicles

The applicant has not proposed any specific emission controls for this emission source.

Emission Offsets

The applicant has not proposed any emission offsets and the stationary source emissions for the Rio Mesa SEGF as currently proposed by the applicant would be well below District offset thresholds and therefore the District does not require offsets.

Adequacy of Proposed Mitigation

Staff concurs with the District's determination that the project's stationary source proposed emission controls/emission levels for criteria pollutants meets regulatory requirements and that the proposed stationary source emission levels are reduced adequately.

Staff Proposed Mitigation

As mentioned earlier in the discussion of the ozone and PM10 impacts, staff believes that the project's ozone precursors and PM10 emissions, if unmitigated, could cause CEQA significant impacts. Additionally, staff believes a solar renewable project, which would have a 30 to 40-year life, located in an ozone and PM10 nonattainment area and just downwind from other ozone and PM10 nonattainment areas, should address its contribution to the potentially ongoing nonattainment of the PM10 and ozone standards. Therefore, staff recommends the following additional mitigation measures:

- Require the use of new model year vehicles at the time of purchase for onsite maintenance, or equivalently low emitting vehicles as long as those vehicles can be demonstrated to have a similar or lower emission profile than new model year vehicles (**AQ-SC6**);
- Limit vehicle speeds within the facility to no more than ten miles per hour on unpaved areas that have not undergone soil stabilization, and up to 25 miles per hour on stabilized unpaved roads as long as no visible dust plumes are observed, to address fugitive PM emissions from the site (**AQ-SC7**);
- Apply and maintain a non-toxic soil binder[6] to the onsite unpaved roads to create a durable, stabilized surface (**AQ-SC7**);
- Additional ongoing operations fugitive dust emissions control techniques such as windbreaks, trackout controls, etc. should be identified in a fugitive dust control plan and used on areas that could be disturbed by vehicles or wind. Any windbreaks used would remain in place until the soil or road is stabilized (**AQ-SC7**).

Staff also proposes Condition of Certification **AQ-SC8** to ensure that the license is amended as necessary to incorporate changes to the air quality permits and **AQ-SC9** to require use of engines that meet model year EPA/ARB Tier emission standards for the year purchased.

Staff believes that the implementation of these recommended additional CEQA mitigation measures would reduce the potential of adverse impacts from the facility on ozone and PM10 to a level of less than significant.

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[6] The soil stabilizer product used will require prior approval by the Energy Commission.

Staff has considered the minority population surrounding the site and reviewed **Socioeconomics Figure 1**, which shows the environmental justice population (see the **Socioeconomics** and **Executive Summary** sections of this PSA for further discussion of environmental justice) is not greater than fifty percent within a six-mile buffer of the proposed Rio Mesa SEGF. Therefore, there would not be a disproportionate **Air Quality** impact resulting from construction and operation of the proposed project to an environmental justice population. Furthermore, the staff-proposed CEQA mitigation measures noted as conditions of certification would reduce the project's air impacts to a less than significant level.

Closure and Decommissioning Impacts and Mitigation

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 any dismantling activities. These activities would be of a much shorter duration than construction of the project, equipment are assumed to have much lower comparative emissions due to technology advancement during the intervening years, and fugitive dust emissions would be required to be controlled in a manner at least equivalent to that required during construction. Therefore, while there will be adverse air quality impacts during decommissioning they are expected to be less than significant.

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.

This air quality analysis is concerned with *criteria* air pollutants. Such pollutants have impacts that are usually (though not always) cumulative by nature. Rarely would a project cause a violation of a federal or state criteria ambient air quality standard. However, a new source of pollution may contribute to existing 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.

Much of the preceding discussion is concerned with cumulative impacts. The "Existing Ambient Air Quality" subsection describes the air quality background in eastern

Riverside County portion of the Mojave Desert Air Basin, including a discussion of historical ambient levels for each of the assessed criteria pollutants. The “Construction Impacts and Mitigation” subsection discusses the project’s contribution to the local existing background caused by project construction. The “Operation Impacts and Mitigation” subsection discusses the 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.

Summary of Projections

The eastern Riverside County portion of the MDAB is designated as non-attainment for state PM10 and ozone ambient air quality standards and attainment/unclassified for the federal PM10 and ozone ambient air quality standards. PM2.5, CO, NO_2, and SO_2 are all considered to be attainment or unclassified for the federal and state standards.

Ozone

Since a portion of San Bernardino County in the Mojave Desert Air Basin is currently classified as non-attainment for the federal 8-hour ozone standard north and west of the project site, the District is required to prepare and adopt an ozone attainment plan for submittal to the U.S. EPA describing how it will attain the federal 8-hour standard. The District completed this plan in 2008. The project is not specifically subject to the provisions in the federal attainment plan and the site is outside of the federal non-attainment area. In April 2012, U.S. EPA designated the Coachella Valley of Riverside County, west of the project area, to be non-attainment for the federal 8-hour ozone standard. However, the project area is unclassifiable/attainment for the federal 8-hour ozone standard.

The District is required to prepare and adopt a state ozone attainment plan for submittal to ARB. The latest state ozone attainment plan was adopted by MDAQMD in 2004. The MDAQMD 2004 Ozone Attainment Plan contains attainment plans for both federal (for areas within San Bernardino County) and state ozone standards. The MDAQMD did not propose to adopt any additional control measures as part of the 2004 Plan. Additionally, while there are no additional control measures for direct ozone precursor reduction as part of the federal 2008 attainment plan, MDAQMD is committed to adopt all applicable Federal Reasonably Available Control Technology (RACT) rules it proposed in 8-hour Reasonably Available Control Technology – State Implementation Plan Analysis (RACT SIP Analysis) in 2006. In addition, the MDAQMD updated and indentified new measures in 2007, which will be adopted through 2014, as the State of California mandates all feasible measures. The RACT rules and other new measures do not impact the Rio Mesa SEGF emission sources as proposed by the applicant.

Particulate Matter

Since a portion of San Bernardino County in the Mojave Desert Air Basin is currently classified as non-attainment for the federal PM10 standards north and west of the project site, the District is required to prepare and adopt an attainment plan for submittal to the U.S. EPA describing how it will achieve attainment with the federal PM10 standards. However, the proposed project site in the eastern Riverside County is outside of the non-attainment area and is not subject to the provisions in the federal attainment plan. Currently, virtually all air districts in the state (the lone exception being Lake County) are designated nonattainment of the state PM10 standard. There is no legal requirement for air districts to provide plans to attain the state PM10 standard, so air districts have not developed such plans. Therefore, there are no air quality management plan particulate emission control measures that are applicable to the proposed project.

In 1997, the federal government adopted PM2.5 standards, as did the state in 2003. In 2006, U.S. EPA tightened the 24-hour PM2.5 standard. The U.S. EPA has determined that the area is unclassified/ attainment for both the annual and the 24-hour federal PM2.5 standard. The project area is unclassified for the state PM2.5 standards.

As a solar power generation facility, the direct air pollutant emissions from power generation are negligible and the emission sources are limited to auxiliary equipment and maintenance activities. With the mitigation required by the recommended staff conditions and District conditions, it is unlikely that the project would have a significant impact on particulate matter emissions.

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.

Localized Cumulative Impacts

Since Rio Mesa SEGF air quality impacts can be reasonably estimated through air dispersion modeling (see the "Operational Modeling Analysis" subsection) the project's contribution to localized cumulative impacts can be estimated. To represent *past* and, to an extent, *present projects* that contribute to current ambient air quality conditions, the Energy Commission staff recommends the use of ambient air quality monitoring data (see the "Environmental Setting" 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 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), then 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 data. 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 the Rio Mesa SEGF if the high impact area is the result of high fence line concentrations from another stationary source that 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 “Operational 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 District identified two major stationary source projects within a six mile radius from the Rio Mesa SEGF site in the MDAQMD’s August 29, 2011 letter to Applicant (AFC Appendix 5.1G, Attachment 5.1G-1, BS 2011a). The District did not include the Blythe Solar Power Project because all of the District’s permits for the Blythe Solar Power Project had expired without commencement of construction. According to the MDAQMD, this continues to be the case with no active permits and/or permit applications filed for the Blythe Solar Power Project. Staff insisted that Energy Commission’s permit for the Blythe Solar Power Project is still valid, thus it needs to be included in the cumulative analysis. Applicant then agreed to include the Blythe Solar Power Project in the cumulative analysis. Thus the three specific stationary source projects included in the cumulative modeling analysis are:

- Blythe Energy Project, which is currently operating at a low capacity factor due to transmission line constraints (nearest stack-to-stack distance is about 12 miles from Rio Mesa SEGF);
- Blythe Energy Project Phase II, which is not yet built (nearest stack-to-stack distance is about 11.8 miles from Rio Mesa SEGF);
- Blythe Solar Power Project (nearest stack-to-stack distance is about 13.9 miles from Rio Mesa SEGF).

On June 28, 2012, the project owner of the Blythe Solar Power Project submitted an amendment request to the Energy Commission to convert from concentrating solar thermal collection (CSP) and steam turbine technology to photovoltaic solar technology (PV) (GalatiBlek 2012). The operational emissions from the approved Blythe Solar Power Project were used in the Rio Mesa SEGF cumulative analysis. These emissions are conservative compared to those from the proposed modified PV project.

Emissions from existing mobile emission sources, such as the I-10 freeway and agriculture are forecast to have long-term emission reductions or significantly reduced emission potentials for most pollutants through improvements in on-road and off-road vehicle engine technology and vehicle turnover, respectively.

The proposed project’s significant impact area is the area surrounding the project site where modeled impacts are above the corresponding U.S. EPA significant impact levels (SILs). Applicant reviewed the air quality modeling results for the Blythe Energy Project, Blythe Energy Project Phase II, and Blythe Solar Power Project filed with Energy Commission during the permitting of these projects, the only overlap between the significant impact areas of the four projects (Blythe, Blythe II, Blythe Solar, and Rio Mesa) was associated with modeled 1-hour NO_2 impacts (U.S. EPA SIL of 7.5 µg/m^3).

Applicant used stack and building parameters and emission data available for the cumulative projects, and generally followed the same modeling procedures used for the Rio Mesa SEGF operating emissions modeling analysis, using the most recent version of AERMOD (version 12060). The optional OLM method available with AERMOD, discussed under the operating impacts section, was used to model the NO_2 impacts.

The maximum modeled cumulative impacts are presented below in **Air Quality Table 11**. The total impact is conservatively estimated by the maximum modeled impact plus existing maximum background pollutant levels. The results for the federal 1-hour standard show only the total impact because the project's impacts and background values are combined within the model to obtain the total impact. **Air Quality Table 11** shows that the Rio Mesa SEGF, along with three other existing or expected sources, would not cause new exceedances of the state and federal air quality standards for 1-hr NO_2.

Air Quality Table 11
Ambient Air Quality Impacts from Cumulative Sources (µg/m3)

Pollutants	Avg. Period	Impacts (µg/m^3)	Background [a] (µg/m^3)	Total Impact (µg/m^3)	Standard (µg/m^3)	Percent of Standard
NO_2	1-hr	165	92.4	257.4	339	76%
	1-hr federal [b]	-	-	185	188	98%

Source: supplemental information submitted on July 23, 2012 (BS 2012v)
Notes:
[a] Background values have been adjusted per staff recommended background concentrations shown in **Air Quality Table 5**.
[b] Staff calculates the total impact for the federal 1-hour NO_2 standard based on maximum three-year rolling average of 98th percentile of annual distribution of daily maximum paired-sum of project impact and concurrent background for each year (2006-2008). Applicant used five-year (2006-2010) average instead and the total impact would be lower (171 µg/m^3).

In addition to the cumulative projects modeled above, there are several approved and pending solar and wind projects in the Blythe area and along the I-10 corridor including two Energy Commission certified thermal solar projects, the Palen Solar Power Project and Genesis Solar Energy Project. 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.

COMPLIANCE WITH LORS

The Mojave Desert Air Quality Control District issued the Preliminary Determination of Compliance (PDOC) for the Rio Mesa SEGF on August 30, 2012. Compliance with all District rules and regulations was demonstrated to the District's satisfaction in the PDOC. The District's draft conditions are presented in the Conditions of Certification.

FEDERAL

The District is responsible for issuing the federal New Source Review (NSR) permit, the federal Title V permit, and has been delegated enforcement of the applicable New

Source Performance Standard (Subparts Dc, Db, and IIII). The applicant would be required to submit a Title V permit application to the District within 12 months of commencing operation. Additionally, this project would not require a PSD permit from U.S. EPA, because the project would be below the 100 tons per year (TPY) threshold for criteria pollutants and below the 100,000 TPY for greenhouse gases (GHGs).

The proposed project requires the approval of a federal agency (BLM), but is located in an area that is in attainment or unclassified with all federal ambient air quality standards. Therefore, the proposed project is not subject to federal general conformity regulations (40 CFR Part 93).

STATE

The project would 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 PDOC and the Energy Commission's affirmative finding for the project. In the PDOC, the District concluded that the project would comply with this requirement as the screening health risk assessment they performed found risks to be below a Prioritization Score of 1.0, or below the need for any additional analysis or action. See staff's **Public Health** section for more details on health risk assessments.

The fire pump and emergency generator engines are also subject to the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines (17 CCR §93115). This measure limits the types of fuels allowed, established maximum emission rates and establishes recordkeeping requirements. This measure would also limit the engine's testing and maintenance operation to 50 hours per year. The engines would also meet the current Tier standards of 13 CCR, §2423 – Exhaust Emission Standards and Test Procedures: Heavy-Duty Off-Road Diesel Cycle Engines.

LOCAL

The District rules and regulations specify the emissions control and offset requirements for new sources such as the Rio Mesa SEGF. 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 MDAQMD in October 2011; the District issued a PDOC on August 30, 2012 (MDAQMD 2012). The PDOC states that the proposed project is expected to comply with all applicable District rules and regulations. The PDOC evaluates whether and under what conditions the proposed project would comply with the District's applicable rules and regulations, as described below. The conditions in the PDOC are carried forward in this PSA section as Conditions of Certification **AQ-1** through **AQ-36**.

Regulation II – Permits

Rule 201 and 203 – Permit to Construct and Permit to Operate

Rule 201 establishes the emission source requirements that must be met to obtain a Permit to Construct. Rule 203 prohibits use of any equipment , the use of which may cause the issuance of air contaminants or the use of which may reduce or control the issuance of air contaminants, without obtaining Permit to Operate. The applicant has complied with this rule by submitting the AFC and District permit application materials.

Rule 212 – Standards for Approving Permits

Rule 212 establishes baseline criteria for approving permits by the MDAQMD for certain projects. In accordance with these criteria, the proposed project accomplishes all required notices and emission limits through the PDOC and complying with stringent emission limitations set forth on permits.

Regulation IV – Prohibitions

Rule 401 – Visible Emissions

This rule limits visible emissions from emissions sources, including stationary source exhausts and fugitive dust emission sources. Compliance with this rule is expected.

Rule 402 – Nuisance

This rule restricts discharge of emissions that would cause injury, detriment, annoyance, or public nuisance. The facility is expected to comply with this rule (identical to California Health and Safety Code 41700).

Rule 403 – 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 conditions **AQ-SC3** and **AQ-SC7** the facility is expected to comply with this rule.

Rule 404 – Particulate Matter Concentration

Rule 404 limits particulate matter (PM) emissions to less than 0.1 grains per standard cubic foot of gas at standard conditions. This rule does not apply to emissions from combustion of gaseous fuels in steam generators (i.e. boilers). The sole use of ultra-low sulfur diesel fuel and certified emission IC engines would keep proposed project emission levels in compliance with Rule 404.

Rule 407 – Liquid and Gaseous Air Contaminants

The rule prohibits carbon monoxide emissions in excess of 2,000 ppmv on a dry basis, averaged over 15 minutes. The CO emissions from the boilers would comply with this limit by permit conditions. IC engines are not subject to this rule.

Rule 408 – Circumvention
This rule prohibits hidden or secondary rule violations. The proposed project is not expected to violate Rule 408.

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. The Rio Mesa SGEF stationary sources would have particulate concentrations below the limit of this rule.

Rule 430 – Breakdown Provisions

The rule requires the reporting of breakdowns and excess emissions. The proposed project would be required to comply with Rule 430 by permit condition.

Rule 431 – Sulfur Content of Fuels

The rule prohibits the burning of gaseous fuel with a sulfur content of more than 800 ppm and liquid fuel with a sulfur content of more than 0.5 percent sulfur by weight. The facility is expected to comply with this rule. Compliance with this rule is assured with the required use of pipeline quality natural gas (sulfur content equal to or less than 0.25 grains/100 dscf) and ultra-low sulfur diesel fuel for the emergency engines.

Rule 475 – Electric Power Generating Equipment

This rule limits NO_x and PM emissions from electrical generating equipment rated greater than or equal to 50 MMBtu/hr. The NOx and PM limits apply to the 249 MMBtu/hr auxiliary boilers. This rule limits emissions of NO_x to 80 ppmv @ 3% O_2 and PM not to exceed 0.01 gr/dscf @ 3% O_2 and 11 lbs/hour. The auxiliary boilers will meet these requirements.

Rule 476 – Steam Generating Equipment

This rule specifies monitoring and recordkeeping requirements and limits NO_x emissions from steam generators rated above 50 MMBtu/hr to 125 ppm @ 3% O_2 and PM to less than 0.01 gr/scf and 11 lbs/hr. The 249 MMBtu/hr auxiliary boilers are subject to and will comply with the recordkeeping/monitoring and emission limits by permit condition.

Regulation IX – Standards of Performance for New Stationary Sources

Regulation IX is enacted to adopt by reference all the applicable provisions regarding standards of performance for new stationary sources as set forth in 40 Code of Federal Regulations, Part 60 (40 CFR 60). NSPS referenced in Regulation IX for which the facility has proposed equipment are discussed below.

NSPS for Electric Utility Steam Generating Units (40 CFR 60 Subpart Da) is not applicable to the proposed auxiliary boilers as the boilers, rated at 249 MMBtu/hr are below the applicability threshold of 250 MMBtu/hr.

NSPS for Industrial-Commercial-Institutional Steam Generation Units (40 CFR 60 Subpart Db) applies to new boilers with a maximum heat input greater than 100 MMBtu/hr. Subpart Db applies to the proposed auxiliary boilers, each rated at 249 MMBtu/hr. Subpart Db specifies emission limits for NO_x, SO_x, and PM as follows:

Pollutant	Emission limit (lb/MMBtu)
SOx	0.20 (§60.42b(k)(2))
PM	none (record keeping/reporting only) (60.40b(a))
NOx (as NO2)	0.20 (§60.44b(a))

Permit conditions for the proposed boilers will ensure compliance with these emission limits for NOx, SOx, and PM.

NSPS for Small Industrial-Commercial-Institutional Steam Generating Units (40 CFR 60 Subpart Dc) applies to boilers constructed after June 9, 1989 if they have a heat input between 10 and 100 MMBtu/hr. This applies to the Nighttime Preservation Boilers of the project. The sole use of natural gas in the Nighttime Preservation Boilers satisfies the requirements of Dc.

Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines would be applicable to the emergency engines and the fire pump engines. Permit conditions for the diesel IC engines establish an engine certification (e.g. emission limits) requirement and monitoring provisions pursuant to the requirements of Subpart IIII.

Regulation XI – Source Specific Standards

Rule 1113 – Architectural Coatings

The rule limits VOC content of applied architectural coatings. The proposed project will comply through the purchase and use of compliant coatings.

Rule 1157 – Boilers and Process Heaters

The rule applies to new and existing boilers, steam generators, and process heaters located within the Federal Ozone Non-attainment Area (FONA). This rule does not apply as the Rio Mesa SEGF is located outside the FONA.

Rule 1158 – Electric Power Generating Facilities

The rule applies to any electrical generating steam boilers, including auxiliary boilers, or combined-cycle turbine units used in conjunction with an electrical generating steam boiler located in the FONA. This rule does not apply as the Rio Mesa SEGF is located outside the FONA.

Rule 1160 – Internal Combustion Engines

The rule applies to stationary IC engines rated at 500 bhp and greater, located in the FONA. This rule will not apply as the proposed project is located outside the FONA.

Regulation XIII – New Source Review

Rule 1300 – General

The rule ensures that Prevention of Significant Deterioration (PSD) requirements apply to all projects. The proposed project does not have the Potential to Emit (PTE) 25 tons per year or more of a criteria pollutant and therefore is not a major source of emissions. As this facility is not a major source, it is not subject to the PSD requirements of Title I, Part C of the Federal Clean Air Act (42 U.S.C. §§7470-7492) which apply to major sources only and therefore is in compliance with the PSD requirements of Rule 1300.

Rule 1302 – Procedure

The rule requires certification of compliance with the Federal Clean Air Act, applicable implementation plans, and all applicable MDAQMD rules and regulations. The ATC application package for the proposed project includes sufficient documentation to comply with Rule 1302(D)(5)(b)(iii). Permit conditions for the proposed project would ensure compliance with Rule 1302(D)(5)(a)(iii).

Rule 1303 – Requirements

This rule requires BACT at major new sources and permit units which have the PTE more than 25 pounds per day of criteria pollutants or facilities which have the PTE at or above the NSR major source thresholds. As this facility is not a major source and none of the individual pieces of equipment has the PTE more than 25 pounds per day, BACT is not required.

Rule 1305 – Emissions Offsets

This facility does not have the PTE a regulated air pollutant in an amount greater than or equal to MDAQMD's offset threshold amounts and therefore offsets are not required.

Rule 1306 – Electric Energy Generating Facilities

This rule places additional administrative requirements on projects involving approval by the California Energy Commission (Energy Commission). The proposed project would not receive an ATC without Energy Commission's approval of their Application for Certification, ensuring compliance with Rule 1306.

Regulation XII – Federal Operating Permits

Regulation XII contains requirements for sources which must have a federal operating permit (FOP) and an acid rain permit (1200 (B)(1)(d)). The proposed project is subject to the acid rain program and hence, will be required to obtain an FOP. (Rule 1200 (B)(1)(d)). This facility is not subject to the provisions of Rule 1211**–** *Greenhouse Gas Provisions of Federal Operating Permits* because the annual CO2e emissions are less than 100,000 tpy.

Maximum Achievable Control Technology Standards

Health & Safety Code §39658(b)(1) states that when U.S. EPA adopts a standard for a toxic air contaminant pursuant to §112 of the Federal Clean Air Act (42 USC §7412), such standard becomes the Airborne Toxic Control Measure (ATCM) for the toxic air contaminant. Once an ATCM has been adopted it becomes enforceable by the MDAQMD 120 days after adoption or implementation (Health & Safety Code §39666(d)). The following MACT standards apply to specific emission devices at this facility:

- National Emission Standards for Reciprocating Internal Combustion Engines (40 CFR 63, Subpart ZZZZ) applies to the emergency fire pumps and generators located at the proposed facility. Compliance with this regulation for the engines proposed would be achieved through the purchase of engines complying with 40 CFR 60, Subpart IIII.
- National Emission Standards for Area Sources: Industrial/Commercial/Institutional Boilers (40 CFR, Subpart JJJJJJ) does not include requirements for natural gas-fired boilers, so this regulation would not apply to the boilers at the proposed Rio Mesa SEGF.

NOTEWORTHY PUBLIC BENEFITS

Renewable energy facilities, such as the Rio Mesa SEGF, are needed to meet California's mandated renewable energy goals.

CONCLUSIONS

Staff makes the following conclusions about the Rio Mesa SEGF:

- The 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 significant air quality impacts. However, without adequate fugitive dust mitigation, the project would have the potential to cause localized exceedances of the PM10 NAAQS during construction and operation. Recommended Conditions of Certification **AQ-SC1** through **AQ-SC4**, for construction, and **AQ-SC7**, for operation, would mitigate these potentially significant impacts.
- The project would comply with all applicable district rules and regulations, including New Source Review requirements; staff recommends the inclusion of the District's PDOC conditions as Conditions of Certification **AQ-1** through **AQ-16** for the auxiliary boilers, **AQ-17** through **AQ-23** for the nighttime preservation boilers, **AQ-24** through **AQ-30** for the emergency generators, and **AQ-31** through **AQ-36** for the fire water pump engines.
- Condition of Certification **AQ-SC9** is needed to ensure that the emergency engines meet applicable model year emission standards.

- The project's construction activities would likely contribute to significant adverse PM10 and ozone impacts without additional mitigation. Staff recommends **AQ-SC1** through **AQ-SC5** to fully mitigate these potential impacts.
- The 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's direct operational NOx, SOx, PM2.5 and CO emission impacts are not CEQA significant.
- The project's direct and indirect (or secondary) emissions contribution to existing violations of the ozone and PM10 ambient air quality standards are 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 impacts are mitigated to less than significant over the life of the project.
- Since the project's cumulative air quality impacts have been mitigated to less than significant and the environmental justice population is not greater than fifty percent within a six-mile buffer of the project, staff concludes that there is no environmental justice issue for air quality.

PROPOSED CONDITIONS OF CERTIFICATION

STAFF CONDITIONS OF CERTIFICATION

Staff conditions **AQ-SC1** through **AQ-SC9** are all Energy Commission-specific mitigation measures and associated construction and operating 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-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 replaced 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 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**.

<u>Verification:</u> At least 60 days prior to the start of any ground disturbance, the project owner shall submit the AQCMP to the CPM for approval. The AQCMP shall include effectiveness and environmental data for the proposed soil stabilizer. The 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 CPM in each Monthly Compliance Report (MCR) that demonstrates compliance with the following mitigation measures for the purposes of preventing all fugitive dust plumes from leaving the project boundary. Any deviation from the following mitigation measures shall require prior CPM notification and approval.

A. The main access roads through the facility to the power block areas will be paved 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 operational 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 both as efficient or more efficient for fugitive dust control as Air Resources Board (ARB)-approved soil stabilizers, and 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 stabilized with a non-toxic soil stabilizer or soil weighting agent 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 and along traveled routes.

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.

I. Construction areas adjacent to any paved roadway 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 at least twice daily (or 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 at least twice daily (or 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 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.

<u>Verification:</u> The AQCMM shall provide to the CPM in the MCR:

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-SC4 Dust Plume Response Requirement: The AQCMM 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 shall implement the following procedures for additional mitigation measures in the event that such visible dust plumes are observed:

Step 1: The AQCMM shall direct more intensive application of the existing mitigation methods within 15 minutes of making such a determination.

Step 2: The AQCMM 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 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 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 any directive from the AQCMM to shut down an activity, if the shutdown shall go into effect within one hour of the original determination, unless overruled by the CPM before that time.

Verification: The AQCMM shall provide to the CPM in the MCR:

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 MCR, a table that demonstrates compliance with the AQCMP mitigation measures for purposes of controlling diesel construction-related combustion emissions. Any deviation from the AQCMP mitigation measures requires prior CPM notification and approval.

All off-road diesel construction equipment used in the construction of this facility shall be powered by the cleanest engines available that also comply with the California Air Resources Board's (ARB's) Regulation for In-Use Off-Road Diesel Fleets (California Code of Federal Regulations Title 13, Article 4.8, Chapter 9, Section 2449 et.seq.) and shall be included in the Air Quality Construction Mitigation Plan (AQCMP) required by **AQ-SC2**. The AQCMP measures shall include the following, with the lowest-emitting engine chosen in each case, as available:

a. All off-road vehicles with compression ignition engines shall comply with the California Air Resources Board's (ARB's) Regulation for In-Use Off-Road Diesel Fleets.

b. To meet the highest level of emissions reduction available for the engine family of the equipment, each piece of diesel-powered equipment shall be powered by a Tier 4 engine (without add-on controls) or Tier 4i engine (without add-on controls), or a Tier 3 engine with a post-combustion retrofit device verified for use on the particular engine powering the device by the ARB or the U.S. EPA. For PM, the retrofit device shall be a particulate filter if verified, or a flow-through filter, or at least an oxidation catalyst. For NOx, the device shall meet the latest Mark level verified to be available (as of January 2012, none meet this NOx requirement).

c. For diesel powered equipment where the requirements of Part "b" cannot be met, the equipment shall be equipped with a Tier 3 engine without retrofit control devices or with a Tier 2 or lower Tier engine using retrofit controls verified by ARB or U.S. EPA as the best available control device to reduce exhaust emissions of PM and nitrogen oxides (NOx) 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 can be considered "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. EPA to control the engine in question and the highest level of available control using retrofit or Tier 1 engines is being used for the engine in question; or

    2. The use of the retrofit device would unduly restrict the vision of the operator such that the vehicle would be unsafe to operate because the device would impair the operator's vision to the front, sides, or rear of the vehicle, or

    3. The construction equipment is intended to be on site for 10 work days or less.

d. The CPM may grant relief from a requirement in Part "b" or "c" if the AQCMM can demonstrate a good faith effort to comply with the requirement and that compliance is not practical.

e. 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 a replacement for the equipment item in question meeting the level of control required occurs within 10 work days of termination of the use (if the equipment would be needed to continue working at this site for more than 15 work 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 exhaust 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.

f. All equipment with engines meeting the requirements above shall be properly maintained and the engines tuned to the engine manufacturer's specifications. Each engine shall be in its original configuration and the equipment or engine must be replaced if it exceeds the manufacturer's approved oil consumption rate.

g. Construction equipment will employ electric motors when feasible.

h. If the requirements detailed above cannot be met, the AQCMM shall certify that a good faith effort was made to meet these requirements and this determination must be approved by the CPM.

i. All off-road 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.

Verification: The AQCMM shall include in the MCR 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 table listing all heavy equipment used on site during that month, showing the tier level of each engine and the basis for alternative compliance with this condition for each engine not meeting Part "b" requirements. The MCR shall identify the owner of the equipment and contain a letter from each owner indicating that the equipment has been properly maintained; 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-SC6 The project owner, when obtaining dedicated 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 for the model year when obtained.

Other vehicle/fuel types may be allowed assuming that the emission profile for those vehicles, including fugitive dust generation emissions, is comparable to the vehicles types identified in this condition.

<u>Verification:</u> At least 60 days prior to the start of commercial operation, the project owner shall submit to the CPM a 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.

AQ-SC7 The project owner shall provide a site operations dust control plan, including all applicable fugitive dust control measures identified in **AQ-SC3** that would be applicable to reducing fugitive dust from ongoing operations; 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 surfaces to solar equipment maintenance vehicles only. In addition, vehicle speed shall be limited to no more than 10 miles per hour on these unpaved surfaces, with the exception that vehicles may travel up to 25 miles per hour on stabilized unpaved surfaces 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 surfaces and 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 surfaces remain stabilized. The soil stabilizer used shall be a non-toxic soil stabilizer or soil weighting agent that can be determined to be both as efficient or more efficient for fugitive dust control as ARB approved soil stabilizers, and shall not increase any other environmental impacts including loss of vegetation.

The fugitive dust controls shall meet the performance requirements of condition **AQ-SC4**. The 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 CPM for review and approval a copy of the 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 the beginning of commercial operation, the project owner shall provide to the CPM a report identifying the locations of all speed limit signs, and a copy of the project employee and contractor training material 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. 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 5 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 approved modified air permits to the CPM within 15 days of receipt.

AQ-SC9 The emergency generator and fire pump engines procured for this project will meet or exceed the NSPS Subpart IIII emission standards for the model year that corresponds to their date of purchase.

Verification: The project owner shall submit the emergency engine specifications to the CPM at least 30 days prior to purchasing the engines for review and approval.

DISTRICT CONDITIONS OF CERTIFICATION

The following permit conditions will be placed on the Authorities to Construct (ATC) for the project. Separate permits will be issued for each auxiliary boiler, nighttime preservation boiler, fire pump and emergency generator. The electronic version of this document contains a set of conditions that are essentially identical for each of multiple pieces of equipment, differing only in MDAQMD permit reference numbers. The signed and printed ATCs will have printed permits (with descriptions and conditions) in place of condition language listings.

References below to the "CPM" mean the Energy Commission's Compliance Project Manager.

AUXILIARY BOILER AUTHORITY TO CONSTRUCT CONDITIONS

[Two – 249 MMBtu/hr Natural Gas Fired Auxiliary Boiler, Application Number: 00012024 and 0012031]

AQ-1 This boiler shall use only natural gas as fuel and shall be equipped with a meter measuring fuel consumption in standard cubic feet. [1302(C)(2)(a)]

Verification: As part of the Annual Compliance Report, the project owner shall include proofs that only pipeline quality or Public Utility Commission regulated natural gas are used for the boilers.

AQ-2 Prior to the expiration date each year, after the completion of construction the owner/operator shall have this equipment tuned, as specified by Rule 1157(I), Tuning Procedure. [1302(C)(2)(a)]

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-3 The owner/operator shall maintain an operations log for this unit current and on-site (or at a central location) for a minimum of five (5) years, and this log shall be provided to District, State and Federal personnel upon request. The log shall include, at a minimum, the daily and calendar year fuel use for this equipment in standard cubic feet, or BTU's, and daily hours of operation. [Rule 1202(D) and 40 CFR Subpart Db]

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, or Energy Commission staff.

AQ-4 Emissions from this equipment shall not exceed the following hourly emission limits, operating at normal operating conditions and verified by fuel use and/or compliance tests:

a. NOx as NO_2: 2.72 lb/hr (0.0109 lb/MMBtu) (based on 9.0 ppmvd corrected to 3% oxygen and averaged over one hour).

b. CO: 4.60 lb/hr (based on 25 ppmvd corrected to 3% oxygen and averaged over one hour).

c. VOC as CH_4: 1.32 lb/hr.

d. SOx as SO_2: 0.52 lb/hr (0.0021 lb/MMBtu), based on 0.75 gr/100 dscf.

e. PM10: 1.25 lb/hr.

[District Rule 1302(C)(2)(a) and Rule 1304 (D)(1)(a)]

Verification: The project owner shall submit to the CPM data showing compliance with the limits of this condition as part of the Quarterly Operation Report.

AQ-5 The owner/operator shall perform initial compliance tests on this equipment in accordance with the MDAQMD Compliance Test Procedural Manual. The test report shall be submitted to the District within 180 days of initial start up. The following compliance tests are required:

a. NOx as NO_2 in ppmvd at 3% oxygen and lb/hr (measured per U.S. EPA Reference Methods 7E or equivalent).

b. CO in ppmvd at 3% oxygen and lb/hr (measured per U.S. EPA Reference Method 10).

c. VOC as CH_4 in ppmvd at 3% oxygen and lb/hr (measured per U.S. EPA Reference Methods 25A and 18).

d. SOx as SO_2 in ppmvd at 3% oxygen and lb/hr.

e. PM10 in mg/m^3 at 3% oxygen and lb/hr (measured per U.S. EPA Reference Methods 201A and 202 or CARB Method 5).

[New Source Review – Regulation XIII, 40 CFR Subpart A – §60.8]

Verification: The project owner shall notify the District and the CPM within 15 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 the timeframe required by this condition.

AQ-6 The owner/operator shall perform annual compliance tests on this equipment in accordance with the MDAQMD Compliance Test Procedural Manual. The test report shall be submitted to the District no later than six weeks prior to the expiration date of this permit. The following compliance tests are required:

a. NOx as NO_2 in ppmvd at 3% oxygen and lb/hr (measured per U.S. EPA Reference Methods 7E).

b. CO in ppmvd at 3% oxygen and lb/hr (measured per U.S. EPA Reference Method 10).

c. VOC as CH_4 in ppmvd at 3% oxygen and lb/hr (measured per U.S. EPA Reference Methods 25A and 18).

d. SOx as SO_2 in ppmvd at 3% oxygen and lb/hr.

e. PM10 in mg/m^3 at 3% oxygen and lb/hr (measured per U.S. EPA Reference Methods 201A and 202 or CARB Method 5).

[New Source Review – Regulation XIII, Periodic Monitoring]

Verification: The project owner shall notify the District and the CPM within 15 working days before the execution of the initial compliance test required in this condition. The test results shall be submitted to the District and to the CPM within 6 weeks of the date of the tests.

AQ-7 This boiler shall be operated in compliance with all applicable requirements of 40 CFR 60 Subpart Db – Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units (NSPS Db).

Verification: The project owner shall complete and submit to the CPM a compliance plan that provides a list of the 40 CFR 60 Subpart Db plans, tests, and recordkeeping requirements and their compliance schedule dates as applicable for the Rio Mesa SEGF Boilers 1 and 2 at least 30 days prior to first fire of the boilers or earlier as necessary for compliance with Subpart Db.

AQ-8 Records of fuel supplier certifications of fuel sulfur content shall be maintained to demonstrate compliance with the sulfur dioxide and particulate matter emission limits.

[New Source Review – Regulation XIII, 40 CFR Subsection 60.49b(r)]

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-9 The owner/operator shall continuously monitor and record fuel flow rate and flue gas oxygen level. [NSPS Db]

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-10 In lieu of installing Continuous Emissions Monitoring system (CEMs) to monitor NOx emissions, and pursuant to 40 CFR 60 Subpart Db, Section 60.49b(c), the owner/operator shall monitor boiler operating conditions and estimate NOx emission rates per a District approved emissions estimation plan. The plan shall be based on the initial source test and annually pursuant to condition **AQ-6**. The plan shall include test results, operating parameters, analysis, conclusions and proposed NOx estimating relationship consistent with established emission chemistry and operational effects.

Verification: This initial plan shall be submitted to the district for approval, and the CPM for review, within 360 days of the initial startup. Any proposed changes to a district-approved plan shall include subsequent test results, operating parameters, analysis, and any other pertinent information to support the proposed changes. The

District must approve any emissions estimation plan or revision for estimated NOx emissions to be considered valid.

AQ-11 The owner/operator shall comply with all applicable recordkeeping and reporting requirements of NSPS Db.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or Energy Commission staff.

AQ-12 This boiler shall not burn more than 1.3 MMSCF of natural gas in any single day, and no more than 294.8 MMSCF in any calendar year.

These limits shall not apply during the facility commissioning period. The commissioning period shall begin the first time fuel is fired in the boiler. The commissioning period shall end when the facility achieves commercial operation, but no later than 180 days after first fire.

Verification: The project owner shall submit to the CPM data showing compliance with the limits of this condition as part of the Quarterly Operation Report.

AQ-13 This equipment shall exhaust through a stack at a minimum height of 135 feet. [1302(C)(2)(a)]

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-14 This facility shall not emit more than 9.9 t/y of a single HAP and 24.9 t/y of all HAP's. To ensure compliance, the owner/operator shall calculate and record the annual emissions of Federal Hazardous Air Pollutants (HAP's) in tons per year (t/y) on a calendar year basis (January 1 through December 31). The list of HAP's can be found in Section 112(b)(1) of the Federal Clean Air Act or at web site: http://www.epa.gov/ttn/atw/188polls.html

Verification: As part of the Annual Compliance Report the project owner shall include information on operating emission rates to demonstrate compliance with this Condition.

AQ-15 The owner/operator shall submit a complete federal operating permit application to the District no later than 12 months from the date this facility commences operation. [Rule 1200 (B)(1)(d) and 1202 (B)(3)(c)(ii)]

Verification: The project owner shall submit a copy of the federal operating permit application to the CPM no later than 12 months from the date this facility commences operation.

AQ-16 The owner/operator shall submit a complete Acid Rain permit application, including a compliance plan, to the District at least 24 months prior to commencing operation. [Rule 1210(C)(1)(a) and 1210(D)(1)(a)]

Verification: The project owner shall submit a copy of Acid Rain permit application, including the compliance plan, to the CPM at least 24 months prior to commencing operation.

NIGHTTIME PRESERVATION BOILER AUTHORITY TO CONSTRUCT CONDITIONS

[Two – 15 MMBtu/hr Natural Gas Fired Nighttime Preservation Boiler, Application Number: 00012025 and 0012032]

AQ-17 This boiler shall be operated in compliance with all applicable requirements of 40 CFR 60 Subpart Dc – Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units (NSPS Dc).

Verification: The project owner shall complete and submit to the CPM a compliance plan that provides a list of the 40 CFR 60 Subpart Dc plans, tests, and recordkeeping requirements and their compliance schedule dates as applicable for the boilers on Rio Mesa SEGF I, and Rio Mesa SEGF II at least 30 days prior to first fire of each boiler or earlier as necessary for compliance with Subpart Dc.

AQ-18 This boiler shall use only natural gas as fuel and shall be equipped with a meter measuring fuel consumption in standard cubic feet. [1302(C)(2)(a)]

Verification: As part of the Annual Compliance Report, the project owner shall include proof that only pipeline quality (or Public Utility Commission approved) natural gas is used for the boilers.

AQ-19 The owner/operator shall maintain an operations log for this unit current and on-site (or at a central location) for a minimum of five (5) years, and this log shall be provided to District, State and Federal personnel upon request. The log shall include, at a minimum the amount of fuel combusted during each operating day. [40 CFR 60.48c(g)(1)]

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or Energy Commission staff.

AQ-20 Emissions from this equipment shall not exceed the following hourly emission limits, operating at normal operating conditions and verified by fuel use, tuneups, and/or compliance tests:

a. NOx as NO_2: 0.16 lb/hr (based on 9.0 ppmvd corrected to 3% oxygen and averaged over one hour).

b. CO: 0.55 lb/hr (based on 50 ppmvd corrected to 3% oxygen and averaged over one hour).

c. VOC as CH_4: 0.08 lb/hr.

d. SOx as SO_2: 0.03 lb/hr (based on 0.75 gr/100 dscf).

e. PM10: 0.08 lb/hr.

[District Rule 1302(C)(2)(a) and Rule 1304 (D)(1)(a)]

Verification: The project owner shall submit to the CPM data showing compliance with the limits of this condition as part of the Quarterly Operation Report.

AQ-21 The owner/operator shall perform initial compliance tests on this equipment in accordance with the MDAQMD Compliance Test Procedural Manual. The test report shall be submitted to the District within 180 days of initial start up. The following compliance tests are required:

a. NOx as NO_2 in ppmvd at 3% oxygen and lb/hr (measured per U.S. EPA Reference Methods 7E or equivalent).

b. CO in ppmvd at 3% oxygen and lb/hr (measured per U.S. EPA Reference Method 10).

c. VOC as CH_4 in ppmvd at 3% oxygen and lb/hr (measured per U.S. EPA Reference Methods 25A and 18).

d. SOx as SO_2 in ppmvd at 3% oxygen and lb/hr.

e. PM10 in mg/m^3 at 3% oxygen and lb/hr (measured per U.S. EPA Reference Methods 201A and 202 or CARB Method 5).

[New Source Review – Regulation XIII, 40 CFR Subpart A – §60.8]

Verification: The project owner shall notify the District and the CPM within 15 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 the timeframe required by this condition.

AQ-22 The owner/operator shall perform annual compliance tests on this equipment in accordance with the MDAQMD Compliance Test Procedural Manual. The test report shall be submitted to the District no later than six weeks prior to the expiration date of this permit. The following compliance tests are required:

a. NOx as NO_2 in ppmvd at 3% oxygen and lb/hr (measured per U.S. EPA Reference Method 7E).

b. CO in ppmvd at 3% oxygen and lb/hr (measured per U.S. EPA Reference Method 10).

[1302(C)(2)(a) and Periodic Monitoring]

Verification: The project owner shall notify the District and the CPM within 15 working days before the execution of the initial compliance test required in this condition. The test results shall be submitted to the District and to the CPM within 6 weeks of the date of the tests.

AQ-23 Prior to the expiration date each year, after the completion of construction the owner/operator shall have this equipment tuned, as specified by Rule 1157(I), Tuning Procedure.

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.

EMERGENCY GENERATOR AUTHORITY TO CONSTRUCT CONDITIONS

[Power Blocks I and II: Two – 3,633 hp emergency IC engine each driving a generator, Application Number: 00012026 and 00012023.

Common Area: One – 398 hp emergency IC engine driving a generator, Application Number 00012035]

AQ-24 This engine, certified in accordance with 40 CFR Part 89, and after treatment control device (if any) shall be installed, operated and maintained according to the manufacturer's emission-related written instructions. Further, the owner/operator shall change only those emission-related settings that are permitted by the manufacturer. Unless otherwise noted, this equipment shall also be operated in accordance with all data and specifications submitted with the application for this permit. [40 CFR Part 60 Subparts 60.4205, and 60.4211]

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-25 This unit shall only be fired on ultra-low sulfur diesel fuel, whose sulfur concentration is less than or equal to 0.0015% (15ppm) on a weight per weight basis per CARB Diesel or equivalent requirements. [17 CCR 93115; 60.4207(b)]

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-26 A non-resettable hour meter with a minimum display capability of 9,999 hours shall be installed and maintained on this unit to indicate elapsed engine operating time. [Title 17 CCR §93115.10(e)(1)]. **District and State Only**

Verification: At least 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.

AQ-27 This unit shall not be used to provide power during a voluntary agreed to power outage and/or power reduction initiated under an Interruptible Service Contract (ISC); Demand Response Program (DRP); Load Reduction Program

(LRP) and/or similar arrangement(s) with the electrical power supplier. [17 CCR 93115] [40 CFR 60 Subpart IIII allowance for DRP streamlined out.]

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 This unit shall be limited to use for emergency power, defined as in response to a fire or when commercially available power has been interrupted. In addition, this unit shall be operated no more than 0.5 hrs per day for a total of 50 hours per year for testing and maintenance. [[District Rule 1302(C)(2)(a) and Rule 1304 (D)(1)(a)] and 17 CCR 93115] [Hours allowed by 60.42(f) streamlined out.]

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-29 The owner/operator shall maintain an operations log for this unit current and on-site (or at a central location) for a minimum of five (5) years, and this log shall be provided to District, State and Federal personnel upon request. The log shall include, at a minimum, the information specified below:

a. Date of each use and duration of each use (in hours);

b. Reason for use (testing & maintenance, emergency, required emission testing, etc.);

c. Monthly and calendar year operation in terms of fuel consumption (in gallons) and total hours [17 CCR 93115]; and,

d. Fuel sulfur concentration (the o/o may use the supplier's certification of sulfur content if it is maintained as part of this log.) [17 CCR 93115]

Verification: The project owner shall submit records required by this condition that demonstrating compliance with the sulfur content and engine use limitations of conditions **AQ-25** and **AQ-28** in the Annual Compliance Report, 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-30 This unit is subject to the requirements of the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines (17 CCR §93115) and 40 CFR Part 60, Subpart IIII (NSPS). In the event of conflict between these conditions and the ATCM or NSPS, the more stringent requirements shall govern.

Verification: Not necessary.

EMERGENCY FIRE SUPPRESSION WATER PUMP AUTHORITY TO CONSTRUCT CONDITIONS

[Three – 200 hp emergency IC engine each driving a fire suppression water pump, Application Number: 00012034, 00012036, and 00012027]

AQ-31 This engine, certified in accordance with 40 CFR Part 89, and after treatment control device (if any) shall be installed, operated and maintained according to the manufacturer's emission-related written instructions. Further, the owner/operator shall change only those emission-related settings that are permitted by the manufacturer. Unless otherwise noted, this equipment shall also be operated in accordance with all data and specifications submitted with the application for this permit. [40 CFR Part 60 Subparts 60.4205 and 60.4211]

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-32 This unit shall only be fired on ultra-low sulfur diesel fuel, whose sulfur concentration is less than or equal to 0.0015% (15ppm) on a weight per weight basis per CARB Diesel or equivalent requirements. [17 CCR 93115; 60.4207(b)]

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-33 A non-resettable hour meter with a minimum display capability of 9,999 hours shall be installed and maintained on this unit to indicate elapsed engine operating time. [Title 17 CCR §93115.10(e)(1)]. **District and State Only**

Verification: At least 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.

AQ-34 This unit shall be limited to use for emergency power, defined as in response to a fire or when commercially available power has been interrupted. In addition, this unit shall be operated no more than 0.5 hrs per day for a total of 50 hours per year for testing and maintenance. The 50 hour limit can be exceeded when the emergency fire pump assembly is driven directly by a stationary diesel fueled CI engine operated per and in accord with the National Fire Protection Association (NFPA) 25 – "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems," 1998 edition. This requirement includes usage during emergencies. [[District Rule 1302(C)(2)(a) and Rule 1304 (D)(1)(a)] and 17 CCR 93115.3(n)] [Hours allowed by federal regulation 40 CFR 60.42(f) “streamlined out” as these permit requirements are more stringent than the federal regulatory requirements.]

<u>Verification:</u> 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-35 The owner/operator shall maintain an operations log for this unit current and on-site (or at a central location) for a minimum of five (5) years, and this log shall be provided to District, State and Federal personnel upon request. The log shall include, at a minimum, the information specified below:

a. Date of each use and duration of each use (in hours);

b. Reason for use (testing & maintenance, emergency, required emission testing, etc.);

c. Monthly and calendar year operation in terms of fuel consumption (in gallons) and total hours [17 CCR 93115]; and,

d. Fuel sulfur concentration (the o/o may use the supplier's certification of sulfur content if it is maintained as part of this log.) [17 CCR 93115]

<u>Verification:</u> The project owner shall submit records required by this condition that demonstrating compliance with the sulfur content and engine use limitations of conditions **AQ-32** and **AQ-34** in the Annual Compliance Report, 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-36 This unit is subject to the requirements of the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines (17 CCR §93115) and 40 CFR Part 60, Subpart IIII (NSPS). In the event of conflict between these conditions and the ATCM or NSPS, the more stringent requirements shall govern.

<u>Verification:</u> Not necessary.

ACRONYMS

AAQS	Ambient Air Quality Standard
ACC	Air Cooled Condenser
ACR	Annual Compliance Report
AERMOD	AMS/EPA Regulatory Model
AFC	Application for Certification
AQCMM	Air Quality Construction Mitigation Manager
AQCMP	Air Quality Construction Mitigation Plan
AQMD	Air Quality Management District
ARB	California Air Resources Board
ATC	Authority to Construct
ATCM	Airborne Toxic Control Measure
BACT	Best Available Control Technology
bhp	brake horsepower
BRW	Basin Range and Watch
Btu	British thermal unit
CAA	Clean Air Act (Federal)
CAAQS	California Ambient Air Quality Standard
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
DOC	Determination of Compliance
dscf	dry standard cubic feet
EIR	Environmental Impact Report
ERC	Emission Reduction Credit
FDOC	Final Determination Of Compliance
FSA	Final Staff Assessment
GHG	Greenhouse Gas
gr	Grains (1 gr $\cong$ 0.0648 grams, 7000 gr = 1 pound)
hp	horsepower
H_2S	Hydrogen Sulfide

HSC	Health and Safety Code
lbs	Pounds
LORS	Laws, Ordinances, Regulations and Standards
MCR	Monthly Compliance Report
MDAQMD	Mojave Desert Air Quality Management District
MDABAB	Mojave Desert Air Basin
mg/m^3	milligrams per cubic meter
MMBtu	Million British thermal units
MW	Megawatts (1,000,000 Watts)
NAAQS	National Ambient Air Quality Standard
NH_3	Ammonia
NMHC	Non-Methane Hydrocarbons
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NO_3	Nitrates
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
PSA	Preliminary Staff Assessment
PTO	Permit to Operate
PVMRM	Plume Volume Molar Ratio Method
Rio Mesa SEGF	Rio Mesa Solar Electric Generating Facility (proposed project)
scf	Standard Cubic Feet
SO_2	Sulfur Dioxide
SO_3	Sulfate

SOx	Oxides of Sulfur
SRSG	Solar Receiver Steam Generator
STG	Steam Turbine Generator
U.S. EPA	United States Environmental Protection Agency
$\mu g/m^3$	Microgram per cubic meter
VOC	Volatile Organic Compounds

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AIR QUALITY APPENDIX AIR-1
GREENHOUSE GAS EMISSIONS

Wenjun Qian, Ph.D. and David Vidaver

SUMMARY AND CONCLUSIONS

The Rio Mesa Solar Electric Generating Facility (Rio Mesa SEGF) project is a proposed renewable project addition to the state's electricity system. The Rio Mesa SEGF would be a concentrating solar power plant, and would be comprised of fields of heliostat mirror arrays focusing solar energy on the solar receiver located on centralized power towers. As a solar project it would emit considerably fewer greenhouse gases (GHG) than existing power plants and most other generation technologies, and thus would contribute to continued improvement of the annual average GHG emission rates for both California and the western United States generation resources. While the Rio Mesa SEGF would emit some GHG emissions, the Rio Mesa SEGF's contribution to the system build-out of renewable resources in California would result in a net cumulative reduction of energy and GHG emissions from new and existing fossil resources.

Electricity is produced by operation of interconnected generation resources. Operation of any one power plant, like the Rio Mesa SEGF, affects all other power plants in the interconnected system. The operation of the Rio Mesa SEGF would affect the overall electricity system operation and GHG emissions in several ways:

- The Rio Mesa SEGF would displace higher GHG-emitting generation. Because the project's GHG emissions per megawatt-hour (MWh) would be largely based upon renewable solar generation, GHG emissions would be much lower than power plants that the project would displace even with the natural gas fueled auxiliary boilers. Therefore, the addition of the Rio Mesa SEGF would contribute to a reduction of California and overall Western Electricity Coordinating Council system GHG[7] emissions and GHG emission rate average.
- The Rio Mesa SEGF would facilitate to some degree the replacement of out-of-state high-GHG-emitting (e.g., coal) electricity generation that must be phased out in conformance with the State's Emissions Performance Standard.
- The Rio Mesa SEGF could facilitate to some extent the replacement of generation provided by aging power plants and those that use once-through cooling (OTC).

These system effects would result in a net reduction in GHG emissions across the electricity system providing energy and capacity to California. Thus, staff believes that the project would result in a cumulative overall reduction in GHG emissions from power

[7] Fuel-use closely correlates to the efficiency of and carbon dioxide (CO_2) emissions even from renewable power plants. Since CO_2 emissions from fuel combustion dominate greenhouse gas (GHG) emissions from power plants, the terms CO_2 and GHG are used interchangeably in this section.

plants, would not worsen current conditions, and would not result in impacts that are cumulatively significant.

Staff concludes that the short-term, minor emissions of greenhouse gases during construction that are necessary to create this new, very low GHG-emitting renewable power generating facility would be reduced by “best practices” and would, therefore, not be significant.

The Rio Mesa SEGF project, as a solar project with a nightly shutdown, would operate significantly less than a 60 percent capacity factor and is therefore not subject to the requirements of SB 1368 (Stats. 2006, ch. 598; Cal. Code Reg., tit. 20, Section 2900 et. seq.). However, the Rio Mesa SEGF would easily comply with the requirements of SB 1368 and the Greenhouse Gas Emission Performance Standard.

AIR QUALITY GHG ANALYSIS – Wenjun Qian

INTRODUCTION

The generation of electricity using fossil fuels, even in an auxiliary boiler or 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. California is actively pursuing policies to reduce GHG emissions that include adding non-GHG emitting renewable generation resources to the system. The greenhouse gases are carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), sulfur hexafluoride (SF_6), hydrofluorocarbons (HFC), and perflurocarbons (PFC). CO_2 emissions are the most common of these emissions; as a result, even though the other GHGs may have a greater impact on climate change on a per-unit basis, GHG emissions are often “normalized” in terms of metric tons of CO_2-equivalent (MTCO2E) for simplicity. 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.

GHG emissions are not criteria pollutants. Since the impact of the GHG emissions from a power plant’s operation has global, rather than local effects, those impacts should be assessed not only by analysis of the plant’s emissions, but also in the context of the operation of the entire electricity system of which the plant is an integrated part. Furthermore, the impact of the GHG emissions from a power plant’s operation should be analyzed in the context of applicable GHG laws and policies, such as AB 32, California’s Global Warming Solutions Act. (Stats. 2006, ch. 488.)

The State has demonstrated a clear willingness to address global climate change though research, adaptation[8], and GHG inventory reductions. In that context, staff evaluates the GHG emissions from the proposed project, presents information on GHG

[8] While working to understand and reverse global climate change, it is prudent to also adapt to potential changes in the state’s climate (for example, changing rainfall patterns).

emissions related to electricity generation (see "**Electricity System GHG Impacts**" below), and describes the applicable GHG policies and programs.

In December 2009, the U.S. Environmental Protection Agency (EPA) declared that greenhouse gases (GHGs) threaten the public health and welfare of the American people (the so-called "endangerment finding"). Regulating GHGs at the federal level is required by Prevention of Significant Deterioration Program (PSD) for sources that exceed 100,000 tons per year of carbon dioxide-equivalent emissions. Additionally, Federal rules that became effective December 29, 2009 (40 CFR 98) require federal reporting of GHGs. As federal rulemaking evolves, staff at this time focuses on analyzing the ability of the project to comply with existing federal- and state-level policies and programs for GHGs.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

The following federal, state, and local laws, ordinances, regulations, and standards (LORS) in **Greenhouse Gas Table 1** pertain to the control and mitigation of greenhouse gas emissions applicable to power plants. Staff's analysis examines the 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) Parts 51, 52, 70 and 71	This rule "tailors" GHG emissions to PSD and Title V permitting applicability criteria.
40 Code of Federal Regulations (CFR) Parts 51 and 52	A new stationary source that emits more than 100,000 TPY of greenhouse gases (GHGs) is considered to be a major stationary source subject to Prevention of Significant Determination (PSD) requirements. This project would not trigger the 100,000 TPY PSD threshold.
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. This requirement is triggered by this project.
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 are regulated by the ARB. A cap-and-trade program is being developed to achieve approximately 20 percent of the GHG reductions expected by 2020.
California Code of Regulations, Title 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.	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 MTCO2/MWh) or 1,100 pounds carbon dioxide per megawatt-hour (1,100 lbs CO2/MWh).

GLOBAL CLIMATE CHANGE AND CALIFORNIA

There is general scientific consensus that climate change is occurring and that human activity contributes in some measure (perhaps significantly) 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 or global climate change[9] 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 GHG emissions levels that existed in 1990, with such reductions to be achieved by 2020. 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 to meet this requirement. Executive Order S-3-05 also requires ARB to plan for further GHG emissions reductions to achieve an 80 percent reduction from 1990 GHG emissions by the year 2050.

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 significant sources of GHG via regulations, market mechanisms, and other actions. ARB adopted regulations implementing cap-and-trade regulations on December 22, 2011 and ARB staff continues to develop and implement regulations to refine key elements of the GHG reduction measures to improve their linkage with other GHG reduction programs. Federal and state mandatory reporting requirements apply to this project.

The California Climate Action Team produced a report to the Governor (CalEPA 2006) which included many examples of strategies that the state could pursue to reduce GHG emissions in California, in addition to several strategies that had been recommended by the Energy Commission and the Public Utilities Commission. Their third biennial report, published in December 2010 and required by Executive Order S-3-05, is the most recent report addressing actions that California could take to reduce GHG emissions (CalEPA 2010). The scoping plan approved by ARB in December 2008 builds upon the overall climate change policies of the Climate Action Team reports and includes recommended strategies to achieve the goals for 2020 and beyond. Some strategies

[9] Global climate change is the result of greenhouse gases, or air emissions with global warming potentials, affecting the global energy balance, and thereby, the global climate of the planet.

focus on reducing consumption of petroleum across all areas of the California economy. Improvements in transportation energy efficiency (fuel economy) and land use planning and alternatives to petroleum-based fuels are slated to provide substantial reductions by 2020 (CalEPA 2006). The scoping plan includes a 33% Renewables Portfolio Standard (RPS), aggressive energy efficiency targets, and a cap-and-trade program that includes the electricity sector (ARB 2008). Mandatory compliance with cap-and-trade requirements commenced on January 1, 2012, although enforcement was delayed until January 2013. Senate Bill 2 (Simitian, Chapter 1, Statutes of 2011-12) expresses the intent of the California Legislature to have 33 percent of California's electricity supplied by renewable sources by 2020 and the Rio Mesa SEGF Project would contribute to this goal.

It is likely that GHG reductions mandated by ARB will be non-uniform or disproportional across emitting sectors, in that most reductions will be based on cost-effectiveness (i.e., the greatest GHG reduction for the least cost). For example, ARB proposes a 40 percent reduction in GHG emissions from the electricity sector even though that sector currently only produces about 25 percent of the state's GHG emissions.

SB 1368,[10] enacted in 2006, and regulations adopted by the Energy Commission and the Public Utilities Commission pursuant to that bill, prohibits California utilities from entering into long-term commitments with any base load facilities that exceed the Emission Performance Standard (EPS) of 0.5 metric tonnes CO_2 per megawatt-hour[11] (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.[12] If a project, instate or out of state, plans to sell base load electricity to California utilities, those utilities will have to demonstrate that the project meets the EPS. *Base load* units are defined as units that are expected to operate at a capacity factor higher than 60 percent. Compliance with the EPS is determined by dividing the annual average carbon dioxide emissions by the annual average net electricity production in MWh. This determination is based on capacity factors, heat rates, and corresponding emissions rates that reflect the *expected* operations of the power plant and not on full load heat rates [Chapter 11, Article 1 §2903(a)].

In addition to these programs, California is involved in the Western Climate Initiative (WCI), 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). WCI created a special entity, WCI, Inc. to assist jurisdictions that are moving ahead with cap-and-trade programs. The initial participants are California and the Canadian province of Quebec. Two other Canadian provinces may join in the near future.

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[10] Public Utilities Code § 8340 et seq.

[11] The Emission Performance Standard only applies to carbon dioxide and does not include emissions of other greenhouse gases converted to carbon dioxide equivalent.

[12] See Rule at http://www.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/64072.htm

Each participating entity is developing their own cap-and-trade program to reduce greenhouse gas pollution, using their own authorities, laws and regulations. These programs will be linked in a larger market if each participating organization finds that such joining of programs creates synergy and can be done without adversely impacting their own system.

WCI timelines 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 of this group. ARB continues to refine AB 32 regulations to mesh California requirements with those of the WCI to minimize leakage of GHG emissions from one geographic area to another. For example, they held a staff workshop on April 9, 2012 to discuss draft amendments to California's cap-and-trade program to better link these two efforts. None of the proposed amendments would change GHG requirements for the Rio Mesa SEGF.

SB1018 (Stats. 2012, ch. 39.) establishes new legislative oversight and controls over the Air Resources Board including: the creation of a separate expenditure fund for proceeds from the auction or sale of GHG allowances pursuant to the market-based compliance mechanism (their cap-and-trade program); the establishment of a separate Cost of Implementation Fee account for oversight and tracking of funds; oversight of actions taken on behalf of the State of California related to market-based compliance and auctions, specific to the WCI and WCI, Inc.; and provides for return of certain funds to ratepayers of Investor Owned Utilities from funds related to the auction or sale of allowances.

If built, the Rio Mesa SEGF will be required to participate in California's greenhouse gas cap-and-trade program. This cap-and-trade program is part of a broad effort by the State of California to reduce GHG emissions as required by AB32, which is being implemented by ARB. As currently proposed, market participants such as the Rio Mesa SEGF will be required to report their GHG emissions and to obtain GHG emissions allowances (and offsets) for those reported emissions by purchasing allowances from the capped market and offsets from outside the AB32 program. As new participants enter the market, and as the market cap is ratcheted down over time, GHG emission allowance and offset prices will increase, encouraging innovation by market participants to reduce their GHG emissions. Thus, the Rio Mesa SEGF, as a GHG cap-and-trade participant, will be consistent with California's landmark AB 32 Program, which is a statewide program coordinated with a region wide WCI program to reduce California's GHG emissions to 1990 levels by 2020.

ELECTRICITY AND GREENHOUSE GAS EMISSIONS

The system to deliver the 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 unavoidably 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 gigawatt-hours (GWh). Ancillary services[13] 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.

Rio Mesa SEGF Project GHG Emissions

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. Construction of the Rio Mesa SEGF project would involve 35 months of activity (not including start-up or commissioning). The project owner provided a GHG emission estimate for the entirety of the construction phase. The GHG emissions estimate, presented below in **Greenhouse Gas Table 2**, includes the peak emissions of 12 consecutive months of construction activity in terms of CO_2-equivalent. Construction period peak GHG emissions are 13,011 MTCO2E per year, compared to annual operating emissions of 64,757 MTCO2E with mirror washing or 45,307 MTCO2E excluding mirror washing. Operating emissions are described more fully below.

Greenhouse Gas Table 2
Rio Mesa SEGF, Estimated Potential Construction Greenhouse Gas Emissions

Construction Source [a]	**Construction-Phase GHG Emissions over peak 12 months (MTCO2E)** [b]
On-Site Construction Equipment	5,805
Off-Site Worker Travel, Truck Deliveries	7,206
Construction Total	**13,011**

Source: Tables 5.1-31 and 5.1-33 (BS 2011a)
Notes:
[a] Includes emissions from workers commuting to work site.
[b] One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms.

Project Operations

The proposed Rio Mesa SEGF would be a nominal 500-megawatt (MW) solar power tower electrical generating facility located in Riverside County, comprised of two 250 MW units. The primary sources that would cause GHG emissions would be from daily operation of each boiler (five hours per day for auxiliary boiler and twelve to sixteen hours per day for nighttime boiler), power block maintenance activities, including mirror cleaning and minimal undesired vegetation removal, weekly testing of the emergency generator and firewater pump, and employee commute trips.

Greenhouse Gas Table 3 shows what the proposed project, as permitted, could potentially emit in greenhouse gases on an annual basis. Emissions are also converted

[13] See CEC 2009b, page 95.

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, but are nevertheless documented here as some of the compounds have very high relative global warming potentials. Staff was not able to determine the degree to which mirror washing should be included in the documentation of operating emissions so operating emissions are shown both with and without mirror washing. GHG emissions from mobile equipment may not count towards operating emissions.

Greenhouse Gas Table 3
Rio Mesa SEGF, Estimated Potential Greenhouse Gas (GHG) Emissions

	Maximum Emissions, metric tonnes/yr				
Emitting Source	**CO_2**	**CH_4**	**N_2O**	**SF_6**	**CO_2-equivalent (MTCO2E[a] per year)**
Auxiliary Boilers	31,900	0.60	0.06	--	
Nighttime Preservation Boilers	7,672	0.14	0.01	--	
Power Block Emergency Generators	704	0.03	0.01	--	
Common Area Emergency Generator	40	1.6E-03	3.3E-04	--	
Power Block Fire Pump Engines	48	2.0E-03	3.9E-04	--	
Common Area Fire Pump Engine	24	9.8E-04	2.0E-04	--	
WSACs	0	0	0	--	
Employee and Delivery Vehicles	4,824	0.2	3.9E-02	--	
Equipment Leakage (SF_6)	--	--	--	1.5E-03	
Total	45,212	0.98	1.2E-01	1.5E-03	
Global warming potential multiplier	1x	21x	310x	23,900x	
Total Project GHG Emissions – MTCO2E [b]	**45,212**	**20.48**	**37.32**	**36.52**	**45,307**
Mirror washing activities FFT[c] (on-road vehicles)	18,093	15	46	--	18,153
Mirror washing activities NT[d] (off-road vehicles)	1,292	1	3	--	1,297
MTCO2	**64,597**	**MTCO2E [b]**			**64,757**
Facility MWh per year [e]	1,374,000				1,374,000
Facility CO_2 EPS (MTCO2/MWh)	0.047[f]	Facility GHG Performance (MTCO2E/MWh)			0.047[f]

Sources: BS 2012v and email from Sierra Research
Notes:
[a] One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms.
[b] Annualized basis uses the project owner's assumed maximum permitted operating basis.
[c] Far from Tower (FFT)
[d] Near Tower (NT)
[e] Estimated Gross MWh
[f] Value includes mirror washing

The proposed project would be permitted, on an annual basis, to emit approximately 64,757 metric tonnes of CO_2-equivalent per year if operated at its maximum permitted level, and mirror washing is included. The CO_2 emissions result from a project capacity factor of 31 percent, well below the trigger for the SB1368 Emission Performance Standard of 60 percent capacity factor. Regardless, the new Rio Mesa SEGF facility would emit at 0.047 MTCO2/MWh (with mirror washing), which would easily meet the SB1368 Greenhouse Gas Emission Performance Standard of 0.5 MTCO2/MWh, if it applied.

Assessment of Impacts and Discussion of Mitigation

Staff assesses the cumulative effects of GHG emissions caused by both construction and operation. As the name implies, construction impacts result from the emissions occurring during the construction of the project. The operation impacts result from the emissions of the proposed project during operation.

Construction Impacts

Staff believes that the small GHG emission increases from construction activities would not be significant for several reasons. First, the period of construction will be short-term and the emissions intermittent during that period and not ongoing during the life of the project. Additionally, control measures that staff recommends to address criteria pollutant emissions, such as limiting idling times and requiring, as appropriate, equipment that meets the latest criteria pollutant emissions standards, would further minimize greenhouse gas emissions to the extent feasible. The use of newer equipment will 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 future ARB regulations to reduce GHG from construction vehicles and equipment.

Direct/Indirect Operation Impacts and Mitigation

Operational impacts of the proposed project are described in detail in a later section titled “**Project Impacts on Electricity System**” since the evaluation of these effects must be done by considering the project’s role(s) in the integrated electricity system. In summary, these effects include reducing the operation and greenhouse gas emissions from the older, existing power plants; and, potentially displacing and accelerating higher-GHG generation retirements and replacements, including facilities currently using once-through cooling.

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.

This entire assessment is a cumulative impact assessment. The project alone would not be sufficient to measurably change global climate or global inventories. But the project would emit greenhouse gases and therefore has been analyzed as a potential cumulative impact in the context of existing electrical system, the GHG regulatory requirements and GHG energy policies.

COMPLIANCE WITH LORS

Although still being refined as discussed above, ARB's AB 32 regulations will address both the degree of electricity generation sector emissions reductions and the method by which those reductions will be achieved (e.g., through cap-and-trade or command-and-control or both). However, the exact approach is still under refinement. That regulatory approach will address emissions not only from the newer, more efficient, and lower emitting facilities licensed by the Energy Commission, but also the older, higher-emitting facilities not subject to Energy Commission jurisdiction. This programmatic approach is expected to be more effective and less costly in reducing GHG emissions overall from the entire electricity sector to meet GHG emissions reduction goals.

ARB has adopted cap-and-trade requirements that went into effect in January 2012, but compliance is not required until January 2013. As ARB continues to codify improved GHG inventories and methods, it may become apparent that emission reductions from the generation sector are less cost-effective than other sectors, and that other sectors of sources can achieve reductions with relative ease and cost-effectiveness. However, all information to date suggests that the electricity sector would be affected at least in proportion to its contribution to GHG emissions, and likely more so.

This project would be subject to ARB's mandatory reporting requirements and cap-and-trade requirements. The manner in which the project would comply with these ARB requirements is speculative at this time, but compliance would be mandatory. Compliance options for cap-and-trade will likely be a combination of purchased allowances and approved GHG emissions offsets, although GHG offsets are limited to no more than 8 percent of total obligations based upon mandatorily-reported GHG emissions. The project may have to provide additional reports and GHG reductions, depending on the future regulations expected from ARB. Similarly, this project would be subject to federal mandatory reporting of GHG emissions because it would emit more than 25,000 MT CO2E per year.

Reporting of GHG emissions would enable the project to demonstrate consistency with the policies described above and the regulations that ARB adopts and to provide the information to demonstrate compliance with any future AB 32 requirements that could be enacted in the next few years. Since this power project would be permitted for less than a 60 percent annual capacity factor, the project is not subject to the requirements of SB 1368 and the current Emission Performance Standard. Nevertheless, the Rio Mesa SEGF's GHG emission performance has been shown to be below the SB 1368 EPS level.

AVENAL PRECEDENT DECISION

The Energy Commission established a precedent in the Final Commission Decision for the Avenal Energy Project. This precedential decision requires all new fossil-fuel fired power plants certified by the Energy Commission to: (a) not increase the overall system heat rate for natural gas plants; (b) not interfere with generation from existing renewable facilities nor interfere with the integration of new renewable generation; and, (c) take into account these factors to ensure a reduction of systemwide GHG emissions and support the goals and policies of AB 32 (CEC 2009, page 111). This proposed, renewable energy project would meet these conditions.

ELECTRICITY SYSTEM GHG IMPACTS – David Vidaver

DIRECT/INDIRECT OPERATION IMPACTS AND MITIGATION

The proposed Rio Mesa SEGF 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. It does this in several ways:

- California's Energy Action Plan Loading Order specifies that electrical energy demand be met first by energy efficiency and demand response, followed by employing renewable energy such as would be provided by the Rio Mesa SEGF.
- The energy produced by the Rio Mesa SEGF would displace energy from higher GHG-emitting coal- and gas-fired generation resources, lowering the GHG emissions from the western United States, the relevant geographic area for the discussion of GHG emissions from electricity generation.
- The dependable capacity provided by the Rio Mesa SEGF would facilitate the retirement/divestiture of resources that cannot meet the Emissions Performance Standard or are adversely affected by the SWRCB's policy on once-through cooling (OTC).

Finally, while the Rio Mesa SEGF combusts some natural gas in onsite boilers for the purposes of freeze protection and to initiate and sustain output during periods of low solar irradiance, the latter displaces higher-emission generation, and reduces the need for energy and ancillary services from natural gas-fired resources, potentially obviating the need for their construction/operation.

California's Energy Action Plan Loading Order

In 2003, the three key energy agencies in California – the California Energy Commission (Energy Commission), the California Power Authority (CPA), and the California Public Utilities Commission (CPUC) – came together in a spirit of unprecedented cooperation to adopt an "Energy Action Plan" (EAP) that listed joint goals for California's energy future and set forth a commitment to achieve these goals through specific actions. The EAP is a living document meant to change with time, experience, and need. In 2005 the CPUC and the CEC jointly prepared an Energy

Action Plan II to identify further actions necessary to meet California's future energy needs (CEC 2005).

The EAP's overarching goal is for California's energy to be adequate, affordable, technologically advanced, and environmentally-sound. Energy must be reliable – provided when and where needed and with minimal environmental risks and impacts. Energy must be affordable to households, businesses and industry, and motorists – and in particular to disadvantaged customers who rely on California government to ensure that they can afford this fundamental commodity. EAP actions must be taken with clear recognition of cost considerations and trade-offs to ensure reasonably priced energy for all Californians.

The EAP accomplishes these goals in the electricity sector by calling for a "loading order" specifying the priority order for how to balance electricity supply and demand. The loading order identifies energy efficiency and demand response as the State's preferred means of meeting growing electrical energy needs. After cost-effective efficiency and demand response, it relies on renewable sources of power and distributed generation, such as combined heat and power applications. To the extent efficiency, demand response, renewable resources, and distributed generation are unable to satisfy increasing energy and capacity needs or provide services needed to reliably operate the electricity system, the loading order supports clean and efficient fossil-fired generation.

The Role of the Rio Mesa SEGF in Energy Displacement

The Renewables Portfolio Standard (RPS) was established by Senate Bill 1078 (Sher, Chapter 516, Statutes of 2002), effective January 1, 2003, with revisions to the law following as a result of Senate Bill 1250 (Perata, Chapter 512, Statutes of 2006), Senate Bill 107 (Simitian, Chapter 464, Statutes of 2006), and Senate Bill X1 2 (Simitian, Chapter 1, Statutes of 2011, First Extraordinary Session). The RPS originally required California's electric utilities to obtain at least 20 percent of its power supplies from renewable sources by 2010. It now has been expanded to require retail sellers of electricity and local publicly owned electric utilities (POUs) to increase the amount of renewable energy they procure until 33 percent of their retail sales are served with renewable energy by December 31, 2020. Under the law, the Energy Commission is required to certify eligible renewable energy resources that may be used by retail sellers of electricity and POUs to satisfy their RPS procurement requirements, develop an accounting system to verify retail sellers' and POUs' compliance with the RPS, and adopt regulations specifying procedures for enforcement of the RPS for the POUs.

As California moves towards an increased reliance on renewable electrical energy by implementing the RPS, non-renewable electric energy resources will be displaced. A 33 percent RPS is forecasted to require California load-serving entities to procure more than 95,600 GWh of renewable electrical energy, an increase of roughly 55,000 GWh over 2010 levels.[14]

Given an RPS, renewable electrical energy displaces electricity that would otherwise be produced from coal- and natural gas-fired generation. The construction and operation of the Rio Mesa SEGF would not displace other renewable resources as load-serving entities must meet the renewable energy purchase requirements embodied in the RPS. Even in the absence of an RPS, the Rio Mesa SEGF would not replace other renewables. The fuel and other variable costs associated with most forms of renewable generation are much lower than for other resources and, (b) even where this may not be the case (e.g., selected biofuels) the renewable resource will frequently have a "must-take" contract with a load-serving entity requiring that all of electrical energy produced by the project be purchased by the buyer. Hydroelectric generation is not displaced as it has very low variable costs of production; the variable cost of nuclear generation is much lower than for fossil resources as well.

While the Rio Mesa SEGF would combust natural gas and thus emit GHGs as part of its operations, it would produce far less GHG emissions (emitting about 104 lbs CO2/MWh) than the coal- and natural gas-fired resources it would displace. Coal-fired generation requires the combustion of 9,000 – 10,000 Btu/MWh, resulting in more than 1,800 lbs CO2/MWh. Natural gas-fired generation in California requires an average of 8,566 Btu/MWh, yielding approximately 1,000 lbs CO2/MWh (CEC 2011b).[15]

The Role of the Rio Mesa SEGF in Capacity Displacement

The Rio Mesa SEGF would provide up to 500 MW of electrical capacity and associated electrical energy to the grid during early afternoon hours in the summer. Electricity demand in California reaches its peak during mid- to late-afternoon on the hottest weekdays of the summer. Dependable capacity – the amount of capacity that can be counted upon to be available during the peak - is needed to reliably serve loads; the generation fleet, in conjunction with demand response programs, must provide a sufficient amount of dependable capacity to meet demand on the highest load day of the year.[16] Load-serving entities in the California ISO control area, for example, are required by the California ISO to procure dependable capacity in amounts determined by their peak load forecast.

While the Rio Mesa SEGF's dependable capacity value would depend upon its exact performance, its ability to sustain output even when solar irradiance is reduced due to cloud cover, and thus provide energy during extreme peak hours would mean a higher value than would otherwise be the case.

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[14] Retail sales requiring renewable procurement are forecasted to be almost 287,000 GWh in 2022 (CEC 2012); purchases of renewable energy are estimated to have been 41,000 GWh (CEC 2011a)

[15] The Rio Mesa SEGF would displace resources with a higher than average heat rate during most hours, as the most expensive (least efficient) resources would be displaced.

[16] This is usually the hottest weekday in the summer, when residential and commercial cooling loads are at their highest.

The dependable capacity provided by the Rio Mesa SEGF would assist in replacing that lost due to the Emissions Performance Standard (EPS) and the State Water Resources Control Board's (SWRCB) once-through cooling (OTC) policy, both discussed more fully below.

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, 1,549 MW of coal-fired generation capacity will have to reduce GHG emissions or be replaced; these contracts are presented in **Greenhouse Gas Table 4**.

Greenhouse Gas Table 4
Expiring Long-term Contracts with Coal-fired Generation 2013 – 2020

Utility	Facility	Contract Expiration	MW
Department of Water Resources	Reid Gardner	2013 [a]	213
SDG&E	Boardman	2013	84
SCE [b]	Four Corners	2016	720
Turlock Irrigation District	Boardman	2018	55
LADWP	Navajo	2019	477
		TOTAL	**1,549**

Source: Energy Commission staff based on Quarterly Fuel and Energy Report (QFER) filings.
Notes:
[a] Contract not subject to Emission Performance Standard, but the Department of Water Resources has stated its intention not to renew or extend.
[b] The sale of SCE's share of Four Corners to Arizona Public Service has been approved by the CPUC and is awaiting FERC approval.

Retirement of Generation Using Once-Through Cooling

The State Water Resource Control Board's (SWRCB) policy on cooling water intake at coastal power plants has led to the retirement and replacement of several plants that use once-through cooling (OTC), numerous others are likely to retire on or prior to assigned compliance dates,[17] some of which will require replacement.[18] The units with compliance dates on or before the end of 2020 are presented in **Greenhouse Gas Table 5.**

[17] Most of the OTC units are aging facilities, for which extensive retrofits will be uneconomical. While compliance using operational and structural controls is allowed, the ability of units to comply in this manner and still operate in a fashion that yields a sufficient revenue stream is questionable.

[18] The California ISO, CPUC and the Energy Commission are studying amount of OTC capacity that will require replacement.

Greenhouse Gas Table 5
OTC Units with SWRCB Compliance Dates on or before December 31, 2020[19]

Plant, Unit Name	Local Reliability Area	Capacity (MW)
Alamitos 1-6	L.A. Basin	1,970
Contra Costa 6, 7	S.F. Bay	680
El Segundo 3, 4	L.A. Basin	670
Encina 1-5	San Diego	951
Huntington Beach 1, 2	L.A. Basin	430
Huntington Beach 3, 4	L.A. Basin	450
Mandalay 1, 2	Ventura	436
Morro Bay 3, 4	None	600
Moss Landing 6, 7	None	1,404
Moss Landing 1, 2	None	1,080
Ormond Beach 1, 2	Ventura	1,612
Pittsburg 5-7	S.F. Bay	1,332
Redondo Beach 5-8	L.A. Basin	1,343
Total		12,958

Note: Pittsburg Unit 7 (682 MW) does not use once-through cooling but would be required to shut down if Units 5 and 6 retire.

GHG Emissions During Plant Operation

The Rio Mesa SEGF will produce GHG emissions during operations, combusting natural gas in order to provide freeze protection and increase or sustain energy output during periods of reduced solar irradiance (early morning and late afternoon hours, periods of high cloud cover).

The ability to produce energy for both station service and transmission to end-users slightly earlier and slightly later than would otherwise be the case, as well as to smooth out fluctuations in output during periods when solar irradiance is interrupted has not only economic value to the owner, but provides reliability to the electricity system. The substantial amounts of solar capacity anticipated for development during the coming decade and beyond, combined with the retirement of perhaps as much as 13,000 MW of gas-fired generation using once-through cooling, is very likely to shift the system peak to late afternoon/early evening when solar resources will produce little if any energy and gas-fired resources will have to be dispatched to provide reserves. Similarly, gas-fired generation will be needed in the early morning when solar resources have yet to ramp up and wind generation is failing. The ability of the Rio Mesa SEGF to provide energy during early morning and late afternoon/early evening hours using natural gas fueled equipment, as well as to sustain output under less-than-ideal conditions on

[19] Greenhouse Gas Table 6 does not include OTC units that retired prior to January 1, 2012, resources with compliance dates through 2020 that have already been slated for replacement (e.g., LADWP units at Haynes and Scattergood), or units with post-2020 compliance dates (the remaining units at Haynes and Scattergood, LADWP's Harbor combined cycle, and the nuclear facilities at San Onofre and Diablo Canyon)

extreme load days not only reduces the need to dispatch natural gas-fired generation but may, in some cases, obviate the need to build it.

The ability to sustain output levels during periods of extreme loads also reduces the need for regulation services. As the Rio Mesa SEGF would be able to "ride through" brief periods of reduced irradiance, it would reduce the need for resources to be dispatched solely to adjust output in response to short-term changes in intermittent generation levels. This benefit is in addition to increasing the dependable capacity of the project and thus reducing the need for gas-fired capacity to meet dependable capacity requirements.

CONCLUSIONS

The Rio Mesa SEGF 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 would not worsen current conditions, and would thus not result in impacts that are cumulatively significant.

Staff concludes that the GHG emission increases typically from construction and decommissioning activities would not create significant impacts 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 create a significant adverse impact under CEQA.

The project is not subject to the requirements of SB 1368 (Cal. Code Reg., tit. 20, Section 2900 et. seq.) and the Emission Performance Standard; however, it would nevertheless meet the Emission Performance Standard.

PROPOSED CONDITIONS OF CERTIFICATION

No Conditions of Certification related to greenhouse gas emissions are proposed. The project owner would comply with mandatory ARB GHG emissions reporting regulations (California Code of Regulations, tit. 17, Subchapter 10, Article 2, Sections 95100 et. seq.) and any future GHG regulations formulated by the U. S. EPA or the ARB, such as GHG emissions cap and trade requirements.

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HAZARDOUS MATERIALS MANAGEMENT

Geoff Lesh, PE and Rick Tyler

SUMMARY OF CONCLUSIONS

Staff concludes that the use of hazardous materials at the proposed Rio Mesa Solar Energy Generating Facility (Rio Mesa SEGF) would not present a significant impact on the public or environment. With adoption of the proposed mitigation measures/conditions of certification, the proposed project would comply with all applicable laws, ordinances, regulations, and standards (LORS).

These conditions of certification meet the Energy Commission's responsibility to comply with the California Environmental Quality Act and serve as staff's recommendations for the Energy Commission to consider in its decision to avoid or reduce the severity of hazardous material-related impacts to less than significant and for the project to conform to all applicable LORS.

INTRODUCTION

The purpose of this **Hazardous Materials Management** section of this Preliminary Staff Assessment (PSA) is to determine if the proposed Rio Mesa SEGF could potentially cause significant impacts on the public from the use, handling, storage, or transportation of hazardous materials at the proposed project site. If significant adverse impacts on the public are identified, Energy Commission staff must evaluate 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 project site. Employers must inform employees of hazards associated with their work and provide those employees with special protective equipment and training to reduce the potential for health impacts from the handling of hazardous materials. The **Worker Safety and Fire Protection** section of this document describes the protection of workers from those 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. 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. 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 hazardous material liquids, and that volatile chemicals would have a restricted exposure to the atmosphere after capture. Containment basins are designed to be able to hold the contents of a full tank plus the potential rainfall from a 25-year storm without any loss of containment. In the event of a spill, the spilled material, along with any mixed-in water and any contaminated soils, would then be placed into containers and processed and disposed of as required by regulations.

Hazardous materials such as mineral and lubricating oils, corrosion inhibitors, herbicides, and acids and bases to control pH would be present at the proposed project site. Hazardous materials used during the construction phase include gasoline, diesel fuel, motor oil, lubricants, and small amounts of solvents and paint. No acutely toxic hazardous materials would be used on-site during construction. None of these materials 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.

Although no natural gas is stored, the project will involve the handling of moderate amounts of natural gas. Natural gas poses some risk of both fire and explosion. The risk of a fire and/or explosion on-site can be reduced to insignificant levels through adherence to applicable codes and the development and implementation of effective safety management practices.

The Rio Mesa SEGF would also require the transportation of certain liquid and solid hazardous materials to the facility. This document addresses all potential impacts associated with the use, storage, and transport of hazardous materials.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

The following federal, state, and local laws and policies (see **Hazardous Materials Management Table 1** below) 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 (LORS)

Applicable LORS	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)	Establishes a nationwide emergency planning and response program, and imposes 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 to inform 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.
Title 49 Code of Federal Regulations Part 172.800	Requires that the suppliers of hazardous materials prepare and implement security plans in accordance with U.S. Department of Transportation (DOT) regulations.
Title 49 Code of	Requires that suppliers of hazardous materials ensure that their hazardous

Applicable LORS	Description
Federal Regulations Part 1572, Subparts A and B	material drivers comply with personnel background security checks.
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.
Title 6 Code of Federal Regulations Part 27	The CFATS (Chemical Facility Anti-Terrorism Standard) regulation of the U.S. Department of Homeland Security (DHS) requires facilities that use or store certain hazardous materials to submit information to the DHS so that a vulnerability assessment can be conducted to determine what certain specified security measures shall be implemented.
State	
California Health and Safety Code, section 25531 to 25543.4	The California Accidental Release Program (Cal-ARP) may require the preparation of a Risk Management Plan (RMP) and Off-site Consequence Analysis (OCA) and submittal to the local Certified Unified Program Authority (CUPA) for approval.
Title 8, California Code of Regulations, Section 5189	Requires facility owners to develop and implement effective safety management plans to ensure that large quantities of hazardous materials are handled safely. While these requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the RMP process.
Title 8, California Code of Regulations, Section 5189	Sets forth requirements for design, construction, and operation of the vessels and equipment used to store and transfer ammonia. These sections generally codify the requirements of several industry codes including the American Society for Material Engineering (ASME) Pressure Vessel Code, the American National Standards Institute (ANSI) K61.1, and the National Boiler and Pressure Vessel Inspection Code. These codes apply to anhydrous ammonia but are also used to design storage facilities for aqueous ammonia.
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.
California Vehicle Code sections 31303 and 32105	Requires that hazardous materials be transported along the quickest safe route possible and that transporters obtain a Hazardous Materials Transportation License from the CHP
LOCAL	
Riverside County Fire Code, Riverside County Code Chapter 8.32: Ordinance No. 787	Adopts the California Fire Code, 2010 Edition, with some of its appendices, into Riverside County regulations.

Applicable LORS	Description
Disclosure of Hazardous Materials and the Formulation of Business Emergency Plans: Riverside County Ordinance 651	Requires disclosure where businesses handle hazardous materials and requires the development of response plans; designates Riverside County Department of Environmental Health as responsible for administration and enforcement of local codes.
Riverside County Ordinance 615	Establishes requirements for the use, generation, storage and disposal of hazardous materials within Riverside County

The Certified Unified Program Agency (CUPA) with the responsibility to review the Hazardous Materials Business Plan (HMBP) is the Riverside County Environmental Health Department (RCEHD). With regard to seismic safety issues, the site is located in a seismically active region of California. Construction and design of buildings and vessels storing hazardous materials would be required to meet the appropriate seismic requirements of the 2010 California Building Code (BS 2011a, Table 5.16.1), or the most current applicable California Building Code at the time of construction.

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 and natural gas were evaluated. Staff's analysis examines 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 utilizes the most current acceptable public health exposure levels (both acute and chronic) to protect the public from the effects of an accidental chemical release.

In order to assess the potential of released hazardous materials traveling off-site and affecting the public, staff analyzed several aspects of the proposed use of materials at the facility. Staff recognizes that some hazardous materials must be used at power plants. Therefore, staff conducted its analysis by focusing on the choice and amount of chemicals to be used, the manner in which the applicant would use the chemicals, the manner by which they would be transported to the facility and transferred to facility storage tanks, and the way in which the applicant plans to store those materials on-site.

Staff reviewed the applicant's proposed engineering and administrative controls for hazardous material use. Engineering controls are physical or mechanical systems such as storage tanks or automatic shut-off valves that can prevent a spill of hazardous material from occurring, or that can limit the spill to a small amount or confine it to a small area. Administrative controls are rules and procedures that workers must follow to help either prevent accidents or keep them small if they do occur. Both engineering and administrative controls can act as either methods of prevention or methods of response and minimization. In both cases, the goal is to prevent a spill from moving off-site and harming the public.

Staff reviewed and evaluated the proposed use of hazardous materials, as described by the applicant (BS 2011a, section 5.5). Staff's assessment followed the five steps listed below:

- Step 1: Staff reviewed the chemicals and amounts proposed for on-site use, as listed in Tables 5.5-2, 5.5-3, and 5.5.4 of the Application for Certification (AFC) (BS 2011a), and determined the need and appropriateness of their use. Only those that are needed and appropriate are 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.
- 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 the 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 size 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 even with 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, staff would 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 project be allowed to use hazardous materials.

PROPOSED PROJECT

SETTING AND EXISTING CONDITIONS

The Rio Mesa SEGF would be located on the Palo Verde Mesa in Riverside County, California. It would be located about 13 miles southwest of Blythe, California. The project site is located in a rural area and is currently undeveloped and unoccupied.

Several characteristics of an area in which a project is located affect its potential for an accidental release of a hazardous material. 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 health risks. When wind speeds are low and the atmosphere is stable, dispersion is severely reduced and can lead to increased localized public exposure.

Recorded wind speeds and ambient air temperatures are described in the **Air Quality** sections (5.1) of the Application for Certification (AFC) (BS 2011a) and the staff assessment.

TERRAIN CHARACTERISTICS

The proposed project area lies on the Palo Verde Mesa, which slopes eastward at approximately 40 feet per mile toward the Palo Verde Valley within the Colorado River floodplain. The Mule and Palo Verde Mountains form an arc-shaped mountain range that bounds the project site on the north, south and west. The immediate project area is characterized by gently sloping alluvial fans that emanate from these mountains. Gullies and washes, running approximately west to east, dissect the project site, primarily on the north and south sides of the site, as well as the proposed transmission line corridor. The east edge of the project site is near the bluff at the edge of the Mesa, which drops approximately 30 to 40 feet to the Palo Verde Valley below (BS 2011a, Sect 5.11.3.1).

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 large bearing on health risk.

Identification of sensitive receptors is typically done to ensure that notice of possible impacts is provided to the community. No daycare, hospital, park, preschool, or school receptors were found within 6 miles of the project site. The nearest residence[1] to the Rio Mesa SEGF property boundary is approximately 8,700 feet (1.65 miles) south of the Rio Mesa I solar array fence line. The nearest residence to any power block equipment (Rio Mesa I) is approximately 13,770 feet (2.6 miles) (BS 2012v, Section 5.7.4.2 and CEC 2012ar).

[1] The buildings at this site are not currently inhabited. The Applicant assumes for the purpose of this analysis, that there could be a habitable dwelling at this location.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

DIRECT/INDIRECT IMPACTS AND MITIGATION

Proposed Project

Small Quantity Hazardous Materials

In conducting this analysis, staff determined in Steps 1 and 2 that most of the proposed materials, although present at the proposed facility, pose a minimal potential for off-site impacts since they would be stored in either solid form or in small quantities, have low mobility, low vapor pressure, or low levels of toxicity. These hazardous materials, which were eliminated from further consideration, are discussed briefly below.

During the construction phase of the project, the only hazardous materials proposed for use include paint, cleaners, solvents, gasoline, diesel fuel, motor oil, welding gases, and lubricants. Any impact of spills or other releases of these materials would be limited to the site because of the small quantities involved, the infrequent use and hence 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 all have very low volatility and would represent limited off-site hazards, even in larger quantities.

During operations, hazardous chemicals such as cleaning agents, lube oil, sodium hydroxide, diesel fuel, aqueous ammonia (19 percent), sulfuric acid (93 percent) and other various chemicals (see **Hazardous Materials Management Appendix A** for a list of all chemicals proposed to be used and stored at Rio Mesa SEGF) would be used and stored on-site and represent limited off-site hazard due to a combination of their small quantities, low volatility, and/or low toxicity.

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 material: natural gas.

Large Quantity Hazardous Materials

Natural Gas

Although no natural gas is stored, the project would involve the handling of moderate amounts of natural gas. Natural gas poses some risk of both fire and explosion. The solar heat used in the boiler (steam) process would be supplemented by burning natural gas to heat a partial load steam boiler when solar conditions are insufficient. Each solar plant would include a natural gas fired auxiliary boiler that would be used to pre-warm the solar receiver steam generator (SRSG) to minimize the amount of time required for startup each morning, to assist during shutdown cooling operation, and to augment the solar operation during the evening shoulder period as solar energy diminishes.

Natural gas poses a fire and/or possible explosion risk because of its flammability. Natural gas is composed mostly of methane, but also contains ethane, propane, nitrogen, butane, isobutene, and isopentane. It is colorless, odorless, tasteless, and is lighter than air. Natural gas can cause asphyxiation when methane is 90 percent in concentration. Methane is flammable when mixed in air at concentrations of 5 to 14 percent, which is also the detonation range. Natural gas, therefore, poses a risk of fire and/or possible explosion if a release occurs under certain confined conditions. However, it should be noted that, due to its tendency to disperse rapidly (Lees 1998), natural gas is less likely to cause explosions than many other fuel gases such as propane or liquefied petroleum gas, but can explode under certain conditions (as demonstrated by the natural gas detonation in Belgium in July 2004).

While natural gas would be used in significant quantities, it would not be stored on site. It would be delivered via a new gas pipeline to the Rio Mesa SEGF project site. The risk of a fire and/or explosion on site can be reduced to insignificant levels through adherence to applicable codes and the development and implementation of effective safety management practices. The National Fire Protection Association (NFPA) code 85A requires both the use of double-block and bleed valves for gas shut off and automated combustion controls. These measures will significantly reduce the likelihood of an explosion in gas-fired equipment. Additionally, start-up procedures would require air purging of the gas-fired boilers prior to start up, thereby precluding the presence of an explosive mixture. The safety management plan proposed by the applicant would address the handling and use of natural gas and would significantly reduce the potential for equipment failure because of either improper maintenance or human error.

The project's natural gas system will be connected to the TransCanada Gas Transmission Company (TCGT) North Baja Transmission Line. The TCGT line runs adjacent to the existing Western Area Power Administration (WAPA) 161 kilovolt (kV) transmission line. (BS 2011a, Sect 2.1.5.2).

Natural gas will be delivered to the project by installing one or more taps and meter station(s) on the existing TCGT North Baja Pipeline. From the tap, natural gas will go through a master metering station where the total flow of natural gas will be measured. This metering station will require a minimum area of approximately 150 feet by 150 feet. Tap and metering station(s) will be permitted, built, owned and operated by TCGT or its subsidiary. Custody transfer of the natural gas will be downstream from the master metering station(s). Natural gas will be delivered to each plant through a high pressure gas lateral pipe that will run along project roads. Each plant will have its own meter to measure the amount of natural gas delivered to the power block (BS 2011a, Sect 4.3.1). The tap and meter station will be installed adjacent the tap point on the TCGT pipeline. This will be the "master" meter and will measure and record gas volumes for custody transfer. Construction activities related to the metering station will include grading a pad and installing above- and below-ground gas piping, metering equipment, and possible pigging facilities. (BS 2011a, Sect 4.3.2).

The natural gas pipeline will be designed to comply with 49 CFR 192, federal standards for gas transmission pipelines (BS 2011a, section 4.4). The natural gas pipeline must be constructed and operated in accordance with the Federal Department of Transportation (DOT) regulations, Title 49, Code of Federal Regulations (CFR), Parts 190, 191, and 192 (see Table 1 LORS), and ASME B31 piping codes. Staff concludes that existing LORS are sufficient to ensure minimal risks of pipeline failure. Additionally, the gas pipeline that would be constructed for this project would be located almost entirely on-site, which greatly reduces the risks of impacts to the public from a rupture or failure.

Mitigation

Staff believes that this project's use of hazardous materials poses no significant risk 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 prevent accidents and releases (spills) from moving off-site and impacting the community by incorporating engineering safety design criteria into the project's design. Engineering safety features proposed by the applicant include:

- Usage of secondary containment areas surrounding each of the hazardous materials storage areas, designed to contain accidental releases during storage;
- Physical separation of stored chemicals in isolated containment areas, separated by a noncombustible partition in order to prevent the accidental mixing of incompatible materials, which may in turn cause the formation and release of toxic gases or fumes.

Administrative Controls

Administrative controls help prevent accidents and releases (spills) from moving off-site and impacting the community by establishing worker training programs and process safety management programs.

A Worker Health and Safety Program would be prepared by the applicant and include (but not be limited to) the following elements (see the **Worker Safety and Fire Protection** section in this analysis for specific regulatory requirements):

- Worker training on 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 that use hazardous materials;
- Fire safety and prevention; and
- Emergency response actions including facility evacuation, hazardous material spill cleanup, and fire prevention.

At Rio Mesa SEGF, the project owner would be required to designate an individual who would have the responsibility and authority to ensure a safe and healthful workplace. This project health and safety official would oversee the health and safety program and would have the authority to halt any action or modify any work practice in order to protect the workers, facility, and the surrounding community in the event that the health and safety program is violated.

Staff proposes Condition of Certification **HAZ-1** to ensure that no hazardous material would be used at the facility except as listed in the AFC and reviewed for appropriateness, unless there is prior approval by the Energy Commission compliance project manager (CPM). Staff reviewed the chemicals and amounts proposed for on-site use, as listed in Tables 5.5-3 and 5.5-4 of the amended AFC (BS 2012v) and determined the need and appropriateness of their use. **HAZ-1** also requires changes to the allowed list of hazardous materials and their maximum amounts as listed in **Hazardous Materials Management Appendix A** to be approved by the CPM. 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.

A Hazardous Materials Business Plan (HMBP) would also be prepared by the project owner that would incorporate state requirements for the handling of hazardous materials (BS 2011a, section 5.5.2.2). Staff proposes Condition of Certification **HAZ-2** which ensures that the HMBP, which includes the Inventory and Site Map, Emergency Response Plan, owner/operator Identification, and Employee Training, would be provided to the Riverside County Fire Department (RCFD) so that RCFD can better prepare emergency response personnel for handling emergencies which could occur at the facility. In accordance with Condition of Certification **HAZ-3**, the project owner would also be responsible to develop and implement a Safety Management Plan for delivery of liquid hazardous materials. The plan would include procedures, protective equipment requirements, training and a checklist. It would also include a section describing all measures to be implemented to prevent mixing of incompatible hazardous materials. This plan would be applicable during construction, commissioning, and operation of Rio Mesa SEGF.

On-site Spill Response

In order to address spill response, the facility would prepare and implement an emergency response plan which includes information on hazardous materials contingency and emergency response procedures, spill containment and prevention systems, personnel training, spill notification, on-site spill containment, prevention equipment and capabilities, etc. Emergency procedures would be established which include evacuation, spill cleanup, hazard prevention, and emergency response.

A Spill Prevention Control and Countermeasure (SPCC) Plan is required by Federal Regulations (see LORS above) and would be prepared for the petroleum-containing hazardous materials (BS 2011a, Sect 5.5.2.1).

The three closest Riverside County Fire stations that would respond to an incident at the proposed project are Station # 44, located at 13984 Main St., Ripley, CA, Station #43, located at 140 West Barnard Street, Blythe, CA, and Station #45 located at 17280 West Hobson Way, Blythe, CA. Riverside County Fire Station #44 is located approximately 10 miles from the project site, Station #43 is located approximately 18 miles from the project site, and Station #45 is located approximately 21 miles from the proposed site. The response times for Engines #44, #43, and #45 are approximately 12, 23, and 24 minutes respectively after dispatch. Riverside County Fire Department Fire Stations are staffed full-time, 24 hours/7 days a week, with a minimum 3 person crew, including paramedics, operating a "Type-1" structural fire fighting apparatus. Each member of the engine company is a certified Emergency Medical Technician and certified to the level of Hazardous Materials First Responder Operational (URS 2012e, Draft Fire Protection and Emergency Services Needs Assessment).

In the event of a hazardous materials incident, The Riverside County Fire Department Hazardous Materials Response Team will respond to the project area. The estimated response time is approximately 2 hours. The Hazardous Materials Response Team #81 is located at 37955 Washington Street in Palm Desert, CA. (URS 2012e).

Staff concludes that, given the remote location and the very unlikely potential for any spill to cause an off-site impact, the hazardous material response time is acceptable. The remote location lengthens the response but, at the same time, eliminates the risk of off-site consequences to the public.

Transportation of Hazardous Materials

Containerized hazardous materials and cleaning chemicals would be transported periodically to the facility via truck over prearranged routes. While many types of hazardous materials would be transported to the site, previous modeling of spills involving much larger quantities of more toxic materials, (aqueous ammonia and sulfuric acid) - two hazardous materials that would be used, stored, and transported at the proposed power plant – has demonstrated that minimal airborne concentrations would occur at short distances from the spill.

During construction and operation of the Rio Mesa SEGF, staff believes that the minimal amounts, small shipment sizes, and types, of hazardous materials (water treatment chemicals, paint, cleaners, solvents, gasoline, diesel fuel, motor oil, lubricants, and welding gases in standard-sized cylinders) do not pose a significant risk of either spills or public impacts along any transportation route. Staff therefore does not recommend a specific route.

Transportation of hazardous materials will comply with the applicable regulations for transporting hazardous materials, including the U.S. Department of Transportation, California Environmental Protection Agency, California Department of Toxic Substances Control, California Highway Patrol (CHP), and California State Fire Marshal. Specifically, California Vehicle Code sections 31303 and 32105 require that hazardous materials be transported along the quickest safe route possible and that transporters obtain a Hazardous Materials Transportation License from the CHP.

Seismic Issues

The possibility exists that an earthquake could cause the failure of a hazardous materials storage tank. A quake could also cause the failure of the secondary containment system (berms and dikes), as well as electrically controlled valves and pumps. The failure of all these preventive control measures might then result in a vapor cloud of hazardous materials that could move off-site and impact residents and workers in the surrounding community. The effects of the Loma Prieta earthquake of 1989, the Northridge earthquake of 1994, and the earthquake in Kobe, Japan, in January 1995, heighten concerns about earthquake safety.

Information obtained after the January 1994 Northridge earthquake showed that some damage was caused to several large and small storage tanks at the water treatment system of a cogeneration facility. The tanks with the greatest damage, including seam leakage, were older tanks, while newer tanks sustained lesser damage with displacements and attached line failures. Therefore, staff conducted an analysis of the codes and standards, which should be followed to adequately design and build storage tanks and containment areas that, could withstand a large earthquake. Staff also 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 were impacted by this quake. Referring to the sections on **Geologic Resources and Hazards** and **Facility Design** in the AFC, staff notes that the proposed facility would be designed and constructed to the applicable standards of the 2010 California Building Standards Code (BS 2011a, Table 5.16-1), or the most current applicable California Building Code at the time of construction. Therefore, on the basis of occurrences at 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 likely and do not represent a significant risk to the public.

Site Security

The Rio Mesa SEGF proposes to use hazardous materials where 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. 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-4** and **HAZ-5** 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 Rio Mesa SEGF 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. Department of Transportation (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 Energy Commission’s 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 the North American Electric Reliability Corporation (NERC), after consultation with appropriate law enforcement agencies and the applicant.

Intentional Destructive Acts

Solar generation projects can be the subject of intentional destructive acts ranging from random vandalism and theft to sabotage and acts of terrorism intended to disable the facility. Acts of vandalism and theft are far more likely to occur than sabotage or terrorism. Theft usually involves equipment at substations and switchyards that contain salvageable metal when metal prices are high. Vandalism usually occurs in remote areas and is more likely to involve spontaneous acts such as shooting at equipment.

Theft or opportunistic vandalism is more likely than sabotage or terrorist acts, which are considered to be a negligible risk.

As indicated above, in order to keep the project infrastructure secure from threats from intentional destructive acts, the project site would be physically secured and staffed. Furthermore, uncontrolled access would be prevented through the use of access controls. Discussion of the project’s site security plan also occurs in the **Socioeconomics** and **Worker Safety and Fire Protection** sections of this PSA.

Protection of widely dispersed electrical generation equipment, substations, and thousands of miles of transmission lines from destructive acts is not practical. Damaged equipment and transmission lines may be quickly repaired or replaced in the same manner that storm damaged equipment are returned to service. The results of any such acts could be expensive to repair, but no substantial impacts to continued electrical service would be anticipated. No significant environmental impacts would be expected from physical damage to the proposed Rio Mesa SEGF project or from loss of power delivery.

Facility Closure and Decommissioning

The requirements for handling of hazardous materials remain in effect until such materials are removed from the site, regardless of facility closure. Therefore, the facility owners are responsible for continuing to handle such materials in a safe manner, as required by applicable laws. In the event that the facility owner abandons the facility in a manner that poses a risk to surrounding populations, staff would coordinate with the California Office of Emergency Services, the Riverside County Environmental Health Department, and the California Department of Toxic Substances Control (DTSC) to ensure that any unacceptable risk to the public is eliminated.

CEQA Level of Significance

Staff's analysis of impacts associated with the storage, use, and handling of hazardous materials at the proposed Rio Mesa SEGF has determined that impacts would be below the level of significance if staff's proposed conditions of certification are adopted.

CUMULATIVE IMPACTS AND MITIGATION

Staff considered the potential for impacts due to a simultaneous release of any of the hazardous chemicals from the proposed Rio Mesa SEGF with other existing or foreseeable nearby facilities as listed in **Table 1** of the **Executive Summary** section. Because of the small amounts of the hazardous chemicals to be stored at the facility, staff determined that there was essentially no possibility of producing an offsite impact. Because of this determination, and the additional fact that there are no nearby facilities using large amounts of hazardous chemicals (the closest proposed major projects in the general area such as the Rice Solar Power Project, Blythe Solar Power Project, Palen Solar Power Project, Desert Sunlight solar Project, and Gestamp Asetym Energy Plant being five or more miles away, see **Executive Summary Figure 1**), there is little (if any) possibility that vapor plumes would combine to produce an airborne concentration that would present a significant risk.

COMPLIANCE WITH LORS

Staff concludes that construction and operation of the Rio Mesa SEGF would be in compliance with all applicable LORS for both long-term and short-term project impacts in the area of hazardous materials management.

Staff has reviewed the **Socioeconomics Figure 1**, which shows the environmental justice population (see the **Socioeconomics** and **Executive Summary** sections of this PSA for further discussion of environmental justice) is not greater than fifty percent within a six-mile buffer of the proposed Rio Mesa SEGF and therefore there would not be a disproportionate **Hazardous Materials Management** impact resulting from construction and operation of the proposed project to an environmental justice population.

CONCLUSIONS

Staff's evaluation of the proposed project (with proposed mitigation measures) indicates that hazardous materials use, storage, and transportation would not pose a significant impact on the public. Staff's analysis also shows that there would be no significant cumulative impact. 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 proposed conditions of certification, presented below, be adopted 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.

Staff concludes that the potential for a hazardous materials release to cause significant impact beyond the facility boundary is extremely low, and therefore concludes that the potential for significant impact to the environment is also extremely low. 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 **Biological Resources**, **Air Quality**, **Soil and Surface Water, Water Supply**, and **Waste Management** sections of this PSA.

Staff proposes six conditions of certification, some of which are mentioned in the text (above), and listed below. **HAZ-1** ensures that no hazardous material would be used at the facility except as listed in the AFC, 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. **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, that 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. Site security during the construction phase is addressed in **HAZ-4** and **HAZ-5** addresses site security during the operational phase.

PROPOSED CONDITIONS OF CERTIFICATION

HAZ-1 The project owner shall not use any hazardous materials not listed in **Hazardous Materials Management Appendix A**, below, or in greater quantities than those identified by chemical name in **Hazardous Materials Management Appendix A,** 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 to the Hazardous Materials Division of the Riverside County Fire Department and the CPM for review. After receiving comments from the Hazardous Materials Division of the Riverside County Fire Department and the CPM, the project owner shall reflect all received recommendations in the final documents. If no comments are received from the county within 30 days of submittal, the project owner may proceed with preparation of final documents upon receiving comments from the CPM. Copies of the final Hazardous Materials Business Plan shall then be provided to the Hazardous Materials Division of the Fire Department 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 to the CPM for approval.

HAZ-3 The project owner shall develop and implement a Safety Management Plan for delivery of liquid 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 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 At least thirty (30) days 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-5 The project owner shall prepare a site-specific Operation Security Plan for the operational phase and shall be made available to the CPM for review and approval. The project owner shall implement site security measures addressing 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[2]).

The Operation Security Plan shall include the following:

1. Permanent full perimeter fence or wall, at least eight feet high around the Power Block and Solar Field;

2. Main entrance security gate, either hand operable 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;

6. 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 ascertain the accuracy of employee identity and employment history, and shall be conducted in accordance with state and federal law 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 contractor personnel that visit the project site.

7. Site access controls for employees, contractors, vendors, and visitors;

8. Closed Circuit TV (CCTV) monitoring system, recordable, and viewable in the power plant control room and security station (if separate from the

[2] North American Electric Reliability Council, www.nerc.com/files/V1-Communications.pdf

control room) capable of viewing, at a minimum, the main entrance gate; and

9. Additional measures to ensure adequate perimeter security consisting of either:

   a. Security guard present 24 hours per day, seven days per week, **OR**

   b. Power plant personnel on-site 24 hours per day, seven days per week and **one** of the following:

      1) The CCTV monitoring system required in number 8 above shall include cameras that are able to pan, tilt, and zoom (PTZ), have low-light capability, are recordable, and are able to view 100% of the perimeter fence to the power block, the outside entrance to the control room, and the front gate from a monitor in the power plant control room; **OR**

      2) Perimeter breach detectors **<u>or</u>** on-site motion detectors for the power block.

The project owner shall fully implement the security plans and obtain CPM approval of any substantive modifications to the security plans. The CPM may authorize modifications to these measures, or may require additional measures, such as protective barriers for critical power plant components (e.g., transformers, gas lines, compressors, etc.) depending on 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 appropriate law enforcement agencies and the applicant.

<u>Verification:</u> At least 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 updated certification statements are 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.

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.

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Hazardous Materials Management
Appendix A

Hazardous Materials Proposed for Use
At the
RIO MESA SEGF

Source: Tables 5.5-3 and 5.5-4, Data Response #'s 16 and 26

Table 5.5-3
Hazardous Materials Usage and Storage During Operation Based on Title 22 Hazard Characterization

Material	Hazard Characteristics[1]	Purpose	Storage Location	Maximum Stored[2]	Storage Type
Nalco Elimin-OX (Oxygen scavenger)	Ignitability	Oxygen scavenger for boiler chemistry control	Power Block: Containers near power tower	1,600 gal	400 gallon totes
Aqueous Ammonia (19% concentration)	Reactivity, toxicity	pH control for boiler chemistry	Power Block: Containers near power tower	1,600 gal	400 gallon totes
Sulfuric Acid 93% (66° Baumé)	Corrosivity, reactivity, toxicity	pH control	Power Block and Common Area: Containers located in Water Treatment Building	2,400 gal	400 gallon totes
Sulfuric Acid (Batteries)	Corrosivity, reactivity, toxicity	Electrical power	Power Block: Contained within the main electrical room and the power tower Common Area: Contained within main electrical room	12,000 gal	Batteries
Sodium Hydroxide (50% concentration)	Corrosivity, reactivity, toxicity	pH control	Power Block and Common Area: Containers located in Water Treatment Building	2,400 gal	400 gallon totes
Diesel Fuel (No. 2)	Ignitability	Emergency generator	Power Block: Near fire pump, beneath emergency diesel generator, and adjacent to the mirror wash machines water filling station Common Area: beneath emergency diesel generator and near fire pump	40,000 gal	Aboveground storage tanks and in equipment
Paint, solvents, adhesives, cleaners, sealants, lubricants	Toxicity	Equipment Maintenance,	Power Block: Maintenance Shop	500 gal	1 gal and 5 gal containers
Hydraulic Oil	Mildly toxic	Miscellaneous equipment control oil	Power Block: Contained within equipment, drums during replacement Common Area; Contained within equipment, spare capacity stored in Warehouse	6,000 gal	Contained within equipment and misc. drums during replacement
Sodium Hypochlorite 12% (trade) solution	Irritant, Corrosivity, reactivity	Biocide	Power Block and Common Area: Containers located in Water Treatment Building	2,400 gal	400 gal totes

Table 5.5-3
Hazardous Materials Usage and Storage During Operation Based on Title 22 Hazard Characterization

Source: BrightSource Engineers, 2011.

Notes:

1 Hazardous characteristics based on material properties and potential health hazards provided by those properties

2 All numbers are approximate. Typically assumes two totes could be required per chemical and location. Operational volumes are expected to vary but not to exceed maximum stored.

cf = cubic feet

gal = gallons (s)

WSAC = Wet-Surface Air Cooler

WWTS = Wastewater Treatment System

HAZARDOUS MATERIALS MANAGEMENT
Appendix B

Basis for Staff's Use of 75 Parts Per Million Ammonia Exposure Criteria

BASIS FOR STAFF'S USE OF 75 PARTS PER MILLION AMMONIA EXPOSURE CRITERIA

Staff uses a health-based airborne concentration of 75 parts per million (PPM) to evaluate the significance of impacts associated with potential accidental releases of ammonia. While this level is not consistent with the 200-ppm level used by the U.S. Environmental Protection Agency and the California Environmental Protection Agency in evaluating such releases pursuant to the Federal Risk Management Program and State Accidental Release Program, it is appropriate for use in staff's analysis of the proposed project. The Federal Risk Management Program and the State Accidental Release Program are administrative programs designed to address emergency planning and ensure that appropriate safety management practices and actions are implemented in response to accidental releases. However, the regulations implementing these programs do not provide clear authority to require design changes or other major changes to a proposed facility.

The preface to the Emergency Response Planning Guidelines states that "these values have been derived as planning and emergency response guidelines, **not** exposure guidelines, they do not contain the safety factors normally incorporated into exposure guidelines. Instead they are estimates, by the committee, of the thresholds above which there would be an unacceptable likelihood of observing the defined effects." It is staff's contention that these values apply to healthy adult individuals and are levels that should not be used to evaluate the acceptability of avoidable exposures for the entire population. While these guidelines are useful in decision making in the event that a release has already occurred (for example, prioritizing evacuations), they are not appropriate for and are not binding on discretionary decisions involving proposed facilities where many options for mitigation are feasible. The California Environmental Quality Act requires permitting agencies making discretionary decisions to identify and mitigate potentially significant impacts through feasible changes or alternatives to the proposed project.

Staff has chosen to use the National Research Council's 30-minute Short Term Public Emergency Limit (STPEL) for ammonia to determine the potential for significant impact. This limit is designed to apply to accidental unanticipated releases and subsequent public exposure. Exposure at this level should not result in serious effects but would result in "strong odor, lacrimation, and irritation of the upper respiratory tract (nose and throat), but no incapacitation or prevention of self-rescue." It is staff's opinion that exposures to concentrations above these levels pose significant risk of adverse health impacts on sensitive members of the general public. It is also staff's position that these exposure limits are the best available criteria to use in gauging the significance of public exposures associated with potential accidental releases. It is, further, staff's opinion that these limits constitute an appropriate balance between public protection and mitigation of unlikely events and are useful in focusing mitigation efforts on those release scenarios that pose real potential for serious impacts on the public. Table 1 provides a comparison of the intended use and limitations associated with each of the various criteria that staff considered in arriving at the decision to use the 75-ppm STPEL.

HAZARDOUS MATERIALS MANAGEMENT Appendix B Table-1
Acute Ammonia Exposure Guidelines

Guideline	Responsible Authority	Applicable Exposed Group	Allowable Exposure Level	Allowable* Duration of Exposures	Potential Toxicity at Guideline Level/Intended Purpose of Guideline
IDLH[2]	NIOSH	Workplace standard used to identify appropriate respiratory protection.	300 ppm	30 minutes	Exposure above this level requires the use of “highly reliable” respiratory protection and poses the risk of death, serious irreversible Injury, or impairment of the ability to escape.
IDLH/10[1]	EPA, NIOSH	Work place standard adjusted for general population factor of 10 for variation in sensitivity	30 ppm	30 minutes	Protects nearly all segments of general population from irreversible effects.
STEL[2]	NIOSH	Adult healthy male workers	35 ppm	15 minutes, 4 times per 8-hour day	No toxicity, including avoidance of irritation.
EEGL[3]	NRC	Adult healthy workers, military personnel	100 ppm	Generally less than 60 minutes	Significant irritation, but no impact on personnel in performance of emergency work; no irreversible health effects in healthy adults. Emergency conditions one-time exposure.
STPEL[4]	NRC	Most members of general population	50 ppm 75 ppm 100 ppm	60 minutes 30 minutes 10 minutes	Significant irritation, but protects nearly all segments of general population from irreversible acute or late effects. One-time accidental exposure.
TWA[2]	NIOSH	Adult healthy male workers	25 ppm	8 hours	No toxicity or irritation on continuous exposure for repeated 8-hour work shifts.
ERPG-2[5]	AIHA	Applicable only to emergency response planning for the general population (evacuation) (not intended as exposure criteria) (see preface attached)	200 ppm	60 minutes	Exposures above this level entail** unacceptable risk of irreversible effects in healthy adult members of the general population (no safety margin).

1) (EPA 1987) 2) (NIOSH 1994) 3) (NRC 1985) 4) (NRC 1972) 5) (AIHA 1989)

* The (NRC 1979), (WHO 1986), and (Henderson and Haggard 1943) all conclude that available data confirm the direct relationship to increases in effect with both increased exposure and increased exposure duration.

** The (NRC 1979) describes a study involving young animals, which suggests greater sensitivity to acute exposure in young animals. The WHO (1986) warned that the young, elderly, asthmatics, those with bronchitis, and those that exercise should also be considered at increased risk based on their demonstrated greater susceptibility to other non-specific irritants.

REFERENCES FOR HAZARDOUS MATERIALS MANAGEMENT APPENDIX B, TABLE 1

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ABBREVIATIONS FOR HAZARDOUS MATERIALS MANAGEMENT APPENDIX B, TABLE 1

ACGIH, American Conference of Governmental and Industrial Hygienists
AIHA, American Industrial Hygienists Association
EEGL, Emergency Exposure Guidance Level
EPA, Environmental Protection Agency
ERPG, Emergency Response Planning Guidelines
IDLH, Immediately Dangerous to Life and Health Level
NIOSH, National Institute of Occupational Safety and Health
NRC, National Research Council
STEL, Short Term Exposure Limit
STPEL, Short Term Public Emergency Limit
TLV, Threshold Limit Value
WHO, World Health Organization

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NOISE AND VIBRATION

Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

The Rio Mesa Solar Electric Generation Facility (Rio Mesa SEGF), if built and operated in conformance with the proposed conditions of certification below, would comply with all applicable noise and vibration laws, ordinances, regulations and standards, and would produce no significant adverse noise impacts on people within the affected area, directly, indirectly, or cumulatively. The applicant has proposed appropriate mitigation, in the form of good design practice and selection of appropriate project equipment that would avoid any significant adverse impacts.

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 all combine to determine whether the facility would meet applicable noise control laws and ordinances and whether it would cause significant adverse environmental impacts. In some cases, vibration may be produced as a result of power plant construction practices such as blasting or pile driving. The ground-borne 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 Rio Mesa SEGF project, 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). For an explanation of technical terms used in this section, please refer to **Noise Appendix A**, immediately following.

For noise and vibration impacts on biological resources, please see the **Biological Resources** section of this Preliminary Staff Assessment (PSA).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHODS AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires that significant environmental impacts be identified and either eliminated or mitigated to the extent feasible. Section XI of Appendix G of CEQA’s guidelines (Cal. Code Regs., tit. 14, App. G) describes some characteristics that could 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 more than 5 dBA at the nearest sensitive receptor.

Staff has concluded that a permanent increase in background noise levels up to and including 5 dBA in a residential setting is insignificant; an increase of more than 10 dBA, however, is significant. An increase of above 5 and up to10 dBA should be considered adverse, but could be either significant or insignificant, depending upon the particular circumstances of a case.

Factors to be considered in determining the significance of an adverse impact as defined above include:

1. the resulting noise level[1];

2. the duration and frequency of the noise;

3. the number of people affected; and

4. the land use designation of the affected receptor sites.

Noise due to construction activities is usually considered to be insignificant in terms of CEQA compliance if:

- the construction activity is temporary; and
- the use of heavy equipment and noisy[2] activities is limited to daytime hours.

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[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 be insignificant.

[2] Noise that draws legitimate complaint (for the definition of “legitimate complaint”, see the footnote in Condition of Certification **NOISE-4**)

Staff uses the above method and thresholds to protect the most sensitive populations.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Noise Table 1
Laws, Ordinances, Regulations and Standards

Applicable LORS	Description
Federal	
Occupational Safety & Health Act (OSHA): 29 U.S.C. § 651 et seq.	Protects workers from the effects of occupational noise exposure.
U.S. Environmental Protection Agency (USEPA)	Assists state and local government entities in development of state and local LORS for noise.
State	
California Occupational Safety & Health Act (Cal-OSHA): 29 U.S.C. § 651 et seq., Cal. Code Regs., tit. 8, §§ 5095-5099	Protects workers from the effects of occupational noise exposure.
Local	
County of Riverside General Plan, Chapter 7, p.N-11	Establishes acceptable levels for noise.
Riverside County Ordinance No. 847, § 4	Establishes hourly limits for construction activities within ¼-mile of an occupied residence.

FEDERAL

Under the Occupational Safety and Health Act of 1970 (OSHA) (29 U.S.C. § 651 et seq.), the Department of Labor, Occupational Safety and Health Administration, (OSHA) adopted regulations (29 C.F.R. § 1910.95) designed to protect workers against the effects of occupational noise exposure. 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.

Guidelines are available from the U.S. Environmental Protection Agency (USEPA) to assist state and local government entities in developing state and local LORS for noise. Because there are existing local LORS that apply to this project, the USEPA guidelines are not applicable.

There are no federal laws governing off-site (community) noise.

The Federal Transit Administration (FTA) has published guidelines for assessing the impacts of ground-borne vibration associated with construction of rail projects, which have been applied by other jurisdictions to 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 ground-borne vibration. The FTA measure of the threshold of perception is 65 vibrational decibel (VdB), which correlates to a peak particle velocity of about 0.002 inches per second (in/sec). 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 of California, Office of Noise Control, prepared the Model Community Noise Control Ordinance, which provides guidance for acceptable noise levels in the absence of local noise standards. This model also defines a simple tone, or "pure tone," as one-third octave band sound pressure levels that can be used to determine whether a noise source contains annoying tonal components. The Model Community Noise Control Ordinance further recommends that, when a pure tone is present, the applicable noise standard should be lowered (made more stringent) by five A-weighted decibels (dBA).

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 federal OSHA standards (see **Noise Appendix A, Table A4**).

LOCAL

The project is located within Riverside County. The County of Riverside General Plan and Riverside County Ordinance apply to this project.

County of Riverside General Plan

The County of Riverside General Plan, Chapter 7, p.N-11 requires that facility-related noise, as projected to any portion of any surrounding property containing a sensitive receiver, habitable dwelling, hospital, school, library or nursing home, must not exceed 45 dBA – 10-minute L_{eq}, between the hours of 10 p.m. and 7 a.m. and 65 dBA – 10-minute L_{eq}, between the hours of 7 a.m. and 10 p.m. (Riverside 1998).

Riverside County Ordinance

Riverside County Ordinance No. 847, § 4 requires that no construction activities shall be undertaken within 1/4-mile of an occupied residence between the hours of 6:00 p.m. to 6:00 a.m. during the months of June through September and between the hours of 6:00 p.m. to 7:00 a.m. during the months of October through May (Riverside 2007).

SETTING AND EXISTING CONDITIONS

The Rio Mesa SEGF would be located on approximately 3,805 acres in Riverside County, California, 13 miles southwest of the city of Blythe (see the **Project Description** section of this PSA for more details).

The project vicinity largely comprises agricultural uses with rural residential land use. The dominant sound sources are farm equipment and vehicular traffic on

State Route 78. The noise-sensitive receptors[3] identified in the project vicinity include residential properties along State Route 78 between Lugo Road and 32nd Avenue, and a small cluster of mobile homes located northwest of the intersection of Palo Verde Road and Spencer Road. There are no schools or hospitals within a two- mile distance from the project boundary (see **Noise Figure 1**).

AMBIENT NOISE MONITORING

In order to establish a baseline for the comparison of predicted project noise with existing ambient noise, the applicant has presented the results of an ambient noise survey (BS 2011a, AFC § 5.7.4.2; Tables 5.7-3, 5.7-4).The noise survey was conducted continuously from July 25 to July 26, 2011. During this survey, short-term (1-hour) noise measurements were also taken at additional locations. The survey was performed using acceptable equipment and techniques. The noise survey monitored existing noise levels at or near the noise-sensitive receptors shown in **Noise Figure 1**. Following are the descriptions of the closest of these locations in each direction relative to the project site.

1. LT1a: Located approximately 8,700 feet from the closest project heliostat. This location represents the nearest receptors southeast of the project site. Long-term measurements were taken at this location.

2. LT2: Located approximately 9,180 feet from the closest project heliostat. This location represents the nearest receptors east/northeast of the project site. Long-term measurements were taken at this location.

3. ST2: Located approximately 9,840 feet from the closest project heliostat. This location represents the nearest receptor east of the project site. Short-term measurements were taken at this location.

Noise Table 2 summarizes the ambient noise measurements (BS 2011a, AFC § 5.7.4.2; Tables 5.7-4, 5.7-8).

Noise Table 2
Summary of Measured Noise Levels

Measurement Sites	Measured Noise Levels, dBA Existing Ambient Hourly L_{eq} Quietest Daytime Average
LT1a	41
LT2	53
ST2	59

Source: BS 2011a, AFC § 5.7.4.2; Tables 5.7-4, 5.7-8

[3] A noise-sensitive receptor, also referred to as a sensitive noise receptor, is a receptor at which there is a reasonable degree of sensitivity to noise (such as residences, schools, hospitals, elder care facilities, libraries, cemeteries, and places of worship).

DIRECT AND INDIRECT IMPACTS AND MITIGATION

Noise impacts associated with the project can be created by short-term construction activities and normal long-term operation of the project.

CONSTRUCTION IMPACTS AND MITIGATION

Construction noise is usually a temporary phenomenon. Construction of the Rio Mesa SEGF project is expected to be typical of similar projects in terms of equipment used and other types of activities (BS 2012v, § 5.7.5.1).

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.

The applicant has predicted construction noise levels at the noise-sensitive receptors. They are shown here in **Noise Table 3**.

Noise Table 3: Predicted Construction Noise Levels

Receptor	Highest Construction Noise Level L_{eq} (dBA) [1]	Existing Ambient Hourly L_{eq} (dBA) [2]	Cumulative, Construction Plus Ambient	Change
LT1a	38	41	43	+2
LT2	37	53	53	+0
ST2	36	59	59	+0

Sources: [1] BS 2012v, AFC Table 5.7-8
[2] NOISE Table 2, above

The applicable local noise LORS do not limit the loudness of construction noise, but staff compares the projected noise levels with ambient levels (please see the following discussion under **CEQA Impacts**).

No construction activities would be undertaken within 1/4-mile of an occupied residence or residences between the hours of 6:00 p.m. to 6:00 a.m. during the months of June through September and between the hours of 6:00 p.m. to 7:00 a.m. during the months of October through May. To ensure that these hours are, in fact, enforced, staff proposes Condition of Certification **NOISE-6**.

Therefore, the noise impacts of the Rio Mesa SEGF project construction activities would comply with the noise LORS.

CEQA IMPACTS

Since construction noise typically varies with time, it is most appropriately measured by, and compared with, the L_{eq} (energy average) metric. As seen in **Noise Table 3** (last column) above, the increases in the existing ambient noise levels at the nearest noise-sensitive receptors would be no more than 2 dBA. Staff considers an increase of 2 dBA to be insignificant.

To ensure project construction would create less than significant adverse impacts at the most noise-sensitive receptors, in addition to Condition of Certification **NOISE-6**, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a public notification and noise complaint process to resolve any complaints regarding construction noise.

With implementation of the above proposed conditions of certification, the noise impacts of the Rio Mesa SEGF project construction activities would be less than significant.

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 feed water and steam systems, the piping and tubing that comprise the steam path have 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. Traditionally, high pressure steam is then raised in the boiler or a temporary boiler and allowed to escape to the atmosphere through the steam piping. This flushing action, referred to as a “high pressure steam blow”, is quite effective at cleaning out the steam system. A series of short steam blows, lasting two or three minutes each, are performed several times daily over a period of two or three weeks. At the end of this procedure, the steam lines are connected to the steam turbine, which is then ready for operation. Alternatively, high pressure compressed air can be substituted for steam.

High pressure steam blows, if unsilenced, would produce roughly 63 dBA at LT1a (nearest residence to this activity) (BS 2012v, Table 5.7-10). Unsilenced steam blows could be disturbing at the nearest noise-sensitive receptor, depending on the frequency, duration, and noise intensity of venting. With a silencer installed on the steam blow piping, noise levels would be reduced to levels that would not increase the existing daytime ambient levels at the above receptor by more than 10 dBA. An increase of above 5 and up to10 dBA could be either significant or insignificant, depending upon the particular circumstances of a case. Because steam blow would be temporary, steam blow activities would occur during the daytime hours, and silencers would be used, staff believes steam blow noise would not have a significant adverse impact on the project’s noise-sensitive receptors. To ensure this, staff proposes Condition of Certification **NOISE-7** in order to limit steam blow noise to no greater than 10 dBA above the existing average daytime ambient level at LT1a, and to limit steam blow to daytime hours.

A quieter steam blow process, referred to as “low pressure steam blow” and marketed under names such as QuietBlow™ or Silentsteam™, has become popular. This method utilizes lower pressure steam over a continuous period of about 36 hours. Proposed

Condition of Certification **Noise-7**allows for a low pressure continuous steam blow process, but would require the submittal of a description of the process with the expected noise levels and planned hours of blow operation for review and approval by the compliance project manager.

Linear Facilities

Construction of linear facilities typically moves along at a rapid pace, thus not subjecting any one receptor to noise impacts for more than two or three days. Further, construction activities would be limited to daytime hours (please see Condition of Certification **NOISE-6**). In addition, recommended Conditions of Certification **NOISE-1** and **NOISE-2** would establish a public notification and noise complaint process to resolve any noise complaints regarding construction of linear facilities.

Vibration

The only construction operation likely to produce vibration that could be perceived off site would be pile driving. The applicant anticipates that pile driving would be required for installing heliostats posts (BS 2012v, § 5.7.5.1).

Pile driving for the Rio Mesa SEGF could be expected to reach 91 dBA at a distance of 50 feet. The noise levels from pile driving at Solar Plant II would thus be projected to reach a maximum level of roughly 46 dBA at LT1a (staff calculations), the closest receptor to the heliostats is 8,700 feet away. Using the daytime noise level at LT1a of 41 dBA, adding pile driving noise to the daytime ambient levels would produce an increase of 6 dBA at LT1a. Since pile driving is only a temporary operation lasting a week or two in the areas near the noise-sensitive receptors, staff believes that limiting pile driving to daytime hours would result in impacts that are tolerable to residents. Staff proposes Condition of Certification **NOISE-6**, to limit this operation to daytime hours.

Worker Effects

The applicant has acknowledged the need to protect construction workers from noise hazards and has recognized applicable LORS that would protect construction workers (BS 2011a, AFC p.5.7-16). To ensure that construction workers are, in fact, adequately protected, staff has proposed Condition of Certification **NOISE-3** which requires the project owner to submit, for review and approval, a noise control program to reduce employee exposure to high noise levels during construction.

OPERATION IMPACTS AND MITIGATION

The primary noise sources of the Rio Mesa SEGF project would be the power blocks, where the steam turbine generators, air-cooled condensers, electric transformers, and various pumps and fans would be located. The closest power block to any noise-sensitive receptor (the southern power block) (see **Noise Figure 1**) would be approximately 2.6 miles from the closest receptor, LT1a. The overall noise generated by the project's various noise sources would be based on the configuration of the sources, the number and power rating of the equipment, and any noise-reducing measures incorporated. Staff compares the projected project noise with applicable LORS, in this case the Riverside County noise 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 (see **CEQA Impacts**, below). The project would avoid the creation of annoying tonal (pure-tone) noises by balancing the noise emissions of various power plant features during plant design as required by Condition of Certification **NOISE-4**.

Compliance with LORS

The applicant performed noise modeling to determine the project's noise impacts on sensitive receptors (BS 2012v, § 5.7.5.2). The applicant has predicted the operational noise levels at the nearest sensitive receptors. The project's highest noise level would be 36 dBA L_{eq}, at ST2 (BS 2012v, Table 5.7-13).The County of Riverside General Plan, Chapter 7, p.N-11, requires that facility-related noise, as projected to any portion of any surrounding property containing a sensitive receiver, habitable dwelling, hospital, school, library or nursing home, must not exceed 45 dBA L_{eq} between the hours of 10 p.m. and 7 a.m. and 65 dBA L_{eq} between the hours of 7 a.m. and 10 p.m. (Riverside 1998). As seen above, a project level of 36 dBA would be well below these limits. Therefore, the project would comply with the applicable noise LORS.

To ensure compliance, staff proposes Condition of Certification **NOISE-4** which limits the project's noise levels to less than the LORS limits at the nearest noise-sensitive receptor. Also to ensure compliance, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2** which would establish a public notification and noise complaint process requiring the applicant to resolve any problems caused by operational noise.

CEQA IMPACTS

The Rio Mesa SEGF project would operate during the daylight hours (when the sun is shining). Thus, staff compares the project's noise levels to the existing daytime ambient noise levels at the project's noise-sensitive receptors. (Please see below for limited nighttime activities.) Typically, daytime ambient noise consists of both intermittent and constant noises. The noise that stands out during this time is therefore best represented by the average noise level, referred to as L_{eq}. Staff's evaluation of the above noise surveys shows that the daytime noise environment in the project area consists of both intermittent and constant noises. Thus, staff compares the project's noise levels to the daytime ambient L_{eq} level at the project's nearest noise-sensitive receptor, LT1a. The applicant has predicted the operational noise level at LT1a; it is shown here in **Noise Table 4**.

Noise Table 4: Predicted Operational Noise Level at the Nearest Identified Sensitive Residential Receptor

Receptor	Project Alone Operational Noise Level (dBA) [1]	Measured Existing Ambient, Quietest Daytime L_{eq} (dBA) [2]	Cumulative L_{eq} (dBA)	Increase in Existing Ambient (dBA)
LT1a	33	41	42	+1

Sources: [1] BS 2012v, Table 5.7-13
[2] NOISE Table 2, above

Combining the ambient noise level of 41 dBA L_{eq} (**Noise Table 4**, above) with the project noise level of 33 dBA at LT1a would result in 42 dBA L_{eq}, 1 dBA above the ambient. As described above (in **Method and Threshold for Determining Significance**), staff regards an increase of up to 5 dBA to be less than significant.

Adverse impacts on residential receptors can also be identified by comparing predicted power plant noise levels with the nighttime ambient background noise levels at the nearest sensitive residential receptors. The project would have limited nighttime activities related to maintenance. Given the solar nature of this project, activity at night would be limited to primarily maintenance-related activities such as mirror washing. Mirror washing activities are expected to be similar in sound level to a heavy truck. Mirror washing would move around the project area returning to a particular group of mirrors approximately every three weeks, not having the potential to cause annoyance at the noise-sensitive residential receptors, due to its short-term nature. Therefore, staff considers this impact to be less than significant.

Tonal Noises

One possible source of annoyance could be strong tonal noises. Tonal noises are individual sounds (such as pure tones) which, while not louder than permissible levels, stand out in sound quality. To ensure that tonal noises do not cause public annoyance, staff proposes Condition of Certification **NOISE-4**, which would require mitigation measures, if necessary, to ensure the project would not create tonal noises.

Linear Facilities

All water pipes and gas pipes would be underground and therefore silent during plant operation. Noise effects from electrical interconnection lines typically do not extend beyond the lines' right-of-way easements and would be inaudible to receptors.

Vibration

Vibration from an operating power plant could be transmitted through two primary means: ground (ground-borne vibration), and air (airborne vibration).

The operating components of the Rio Mesa SEGF plant would consist of high-speed steam turbine generators and various pumps and fans. All of these pieces of equipment would be carefully balanced in order to operate; permanent vibration sensors would be attached to the turbines and generators. Based on experience with numerous previous projects employing similar equipment, staff believes that ground-borne vibration from the Rio Mesa SEGF project 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. However, none of the project equipment is known to produce noticeable low frequency noise beyond the project site boundaries. Therefore, staff believes that the Rio Mesa SEGF would not cause perceptible airborne vibration effects at any offsite noise-sensitive receptor.

Worker Effects

The applicant acknowledges the need to protect plant operating and maintenance workers from noise hazards and commits to compliance with all applicable LORS (BS 2011a, AFC p.5.7-22). Signs would be posted in areas of the plant with noise levels exceeding 85 dBA (the level that OSHA recognizes as a threat to workers' hearing), and hearing protection would be required and provided. To ensure that plant operation and maintenance workers are adequately protected, staff proposes Condition of Certification **NOISE-5** which requires the applicant to conduct an occupational noise survey to identify any noise hazardous areas in the facility and ensure that all applicable regulations are complied with. For further discussion of proposed worker safety conditions of certification, please see **Worker Safety and Fire Protection** section of this PSA.

CUMULATIVE IMPACTS AND MITIGATION

Section 15130 of the CEQA Guidelines (Cal. Code Regs., tit. 14) requires a discussion of cumulative environmental impacts. Cumulative impacts are two or more individual impacts that, when considered together, are considerable or that compound or increase other environmental impacts. The CEQA Guidelines require that the discussion reflect the severity of the impacts and the likelihood of their occurrence, but need not provide as much detail as the discussion of the impacts attributable to the project alone.

Staff considered the potential for cumulative noise impacts due to construction and operation of the proposed Rio Mesa SEGF with other existing or foreseeable nearby facilities noted in **Table 1** of the **Executive Summary** and determined that none of these projects, when combined with the Rio Mesa SEGF, would create cumulative noise impacts in the project area. Therefore, the project's cumulative noise impact is considered to be less than significant.

FACILITY CLOSURE

In the future, upon closure of the Rio Mesa SEGF, all operational noise from the project would cease, and no further adverse noise impacts from operation of the Rio Mesa SEGF 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 would be treated similarly. That is, noisy work would be performed during daytime hours, with machinery and equipment properly equipped with mufflers. Any noise LORS that were in existence at that time would apply. Applicable conditions of certification included in the Energy Commission decision would also apply unless modified.

CONCLUSIONS

Staff concludes that the Rio Mesa SEGF project, 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.

Additionally, staff has reviewed **Socioeconomics Figure 1**, which shows the environmental justice population is not greater than fifty percent within a six-mile buffer of the proposed Rio Mesa SEGF and therefore there would not be a disproportionate **Noise and Vibration** impact resulting from construction and operation of the proposed project to an environmental justice population. (See the **Socioeconomics** and **Executive Summary** sections of this PSA for further discussion of environmental justice.)

PROPOSED CONDITIONS OF CERTIFICATION

PUBLIC NOTIFICATION PROCESS

NOISE-1 At least 15 days prior to the start of ground disturbance, the project owner shall notify all residents within one mile of the project site boundaries and ½-mile of the linear facilities, by mail or by 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. If the telephone is not staffed 24 hours a 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 where it is 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. This communication shall also verify that the telephone number has been established and posted at the site, and shall provide that telephone number.

NOISE COMPLAINT PROCESS

NOISE-2 Throughout the construction and operation of the project, 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 in the complaint;
- if the noise is project related, take all feasible measures to reduce the source of the noise; and
- submit a report documenting the complaint and actions taken. The report shall include: a complaint summary, including the final results of noise reduction efforts and, if obtainable, a signed statement by the complainant, stating that the noise problem has been resolved to the complainant's satisfaction.

Verification: Within five days of receiving a noise complaint, the project owner shall file a Noise Complaint Resolution Form, shown below, with both the local jurisdiction and the CPM that documents the resolution of the complaint. If mitigation is required to resolve the 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 performed and complete.

EMPLOYEE NOISE CONTROL PROGRAM

NOISE-3 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 (above permissible) noise levels during construction in accordance to the applicable OSHA and Cal-OSHA standards.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall submit the noise control program to the CPM. The project owner shall make the program available to Cal-OSHA upon request.

NOISE RESTRICTIONS

NOISE-4 The project design and implementation shall include appropriate noise mitigation measures adequate to ensure that the operation of the project will not cause the noise levels due to plant operation alone to exceed an average of 33 dBA L_{eq} measured at or near monitoring location LT1a.

No new pure-tone components shall be caused by the project. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints[4].

When the project first achieves a sustained output of 90 percent or greater of rated capacity, the project owner shall conduct a 25-hour community noise survey at monitoring location LT1a, or at a closer location acceptable to the CPM. This survey shall also include measurements of one-third octave band sound pressure levels to ensure that no new pure-tone noise components have been caused by the project.

The measurement of power plant noise for the purposes of demonstrating compliance with this condition of certification may alternatively be made at a location, acceptable to the CPM, closer to the plant (e.g., 400 feet from the plant boundary) and this measured level then mathematically extrapolated to determine the plant noise contribution at the affected residence. The character of the plant noise shall be evaluated at the affected receptor location to determine the presence of pure tones or other dominant sources of plant noise.

[4] A legitimate complaint refers to a complaint about noise that is caused by the Rio Mesa SEGF project as opposed to another source (as verified by the CPM). A legitimate complaint constitutes a violation by the project of any noise condition of certification (as confirmed by the CPM), which is documented by an individual or entity affected by such noise.

If the results from the noise survey indicate that the power plant noise at the affected receptor site exceeds the above value during the above time period, mitigation measures shall be implemented to reduce noise to a level of compliance with this limit.

If the results from the noise survey indicate that pure tones are present, mitigation measures shall be implemented to eliminate the pure tones.

Verification: The survey shall take place within 30 days of the project first achieving a sustained output of 90 percent or greater of rated capacity. Within 15 days after completing the survey, the project owner shall submit a summary report of the survey to the CPM. Included in the survey report will be a description of any additional mitigation measures necessary to achieve compliance with the above listed noise limit, and a schedule, subject to CPM approval, for implementing these measures. When these measures are in place, the project owner shall repeat the noise survey.

Within 15 days of completion of the new survey, the project owner shall submit to the CPM a summary report of the new noise survey, performed as described above and showing compliance with this condition.

OCCUPATIONAL NOISE SURVEY

NOISE-5 Following the project's attainment of a sustained output of 90 percent or greater of its rated capacity, the project owner shall conduct an occupational noise survey to identify any 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 (Article 105) 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 mitigation measures to be employed in order 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 RESTRICTIONS

NOISE-6 Heavy equipment operation and noisy construction work relating to any project features, including pile driving, within ¼-mile of a noise-sensitive receptor shall be restricted to the times delineated below:

June through September:	6 a.m. to 6 p.m.
October through May:	7 a.m. to 6 p.m.

Concrete pouring during hot summer days may be performed outside the above hours, with the CPM approval.

Haul trucks and other engine-powered equipment shall be equipped with adequate mufflers. 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.

At least 5 days prior to pouring of concrete outside of the above hours, the project owner shall submit a statement to the CPM, specifying the time of night and the number of nights for which concrete pouring will occur, and the approximate distance of this activity to the nearest noise-sensitive receptor.

NOISE-7 If a traditional, high-pressure steam blow process is used the project owner shall equip the steam blow piping with a temporary silencer that quiets the noise of steam blows to no greater than 10 dBA above the existing average daytime ambient level at LT1a. The steam blows shall be conducted between 8:00 a.m. and 5:00 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 used, the project owner shall submit to the CPM a description of the process, with expected noise levels and planned hours of steam blow operation.

Verification: At least 15 days prior to the first steam blow, the project owner shall notify all residents or business owners within one mile of the project site boundary. The notification may be in the form of letters, phone calls, fliers, or other effective means as approved by the CPM. The notification shall include a description of the purpose and nature of the steam blow(s), the planned schedule, the expected sound levels, and an explanation that it is a one-time activity and not a part of normal plant operation.

Exhibit 1 - Noise Complaint Resolution Form

Rio Mesa Solar Electric Generating Facility (11-AFC-4)
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).

REFERENCES

BS 2011a – Bright Source/J. Woolard (tn 62584). Rio Mesa Application for Certification - Volumes 1, 2, and 3, dated October 14, 2011. Submitted to CEC Docket Unit on October 14, 2011.

BS 2012v – Bright Source/ T. Stewart (tn 66292) Applicant's Environmental Enhancement Proposal dated July 23, 2012. Submitted to CEC Dockets Unit on July 23, 2012.

Riverside 1998 – County of Riverside General Plan, Chapter 7, 1998

Riverside 2007 – Riverside County Ordinance No. 847, Effective on 07/19/2007

NOISE APPENDIX A

FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE

To describe noise environments and to assess impacts on noise-sensitive areas, 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, they 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 what 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>Effects of Noise on People</u>, U.S. Environmental Protection Agency, December 31, 1971).

In order to help the reader understand the concept of noise in decibels (dBA), **Noise Table A2** has been provided to illustrate 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 (often used for an existing or pre-project noise condition for comparison study).
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	
Transformer (200')	40	Quiet Residential Area Library	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 one dB cannot be perceived.

2. Outside of the laboratory, a three dB change is considered a barely noticeable difference.

3. A change in level of at least five dB is required before any noticeable change in community response would be expected.

4. A ten 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 three dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus three dB). The rules for decibel addition used in community noise prediction are:

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:

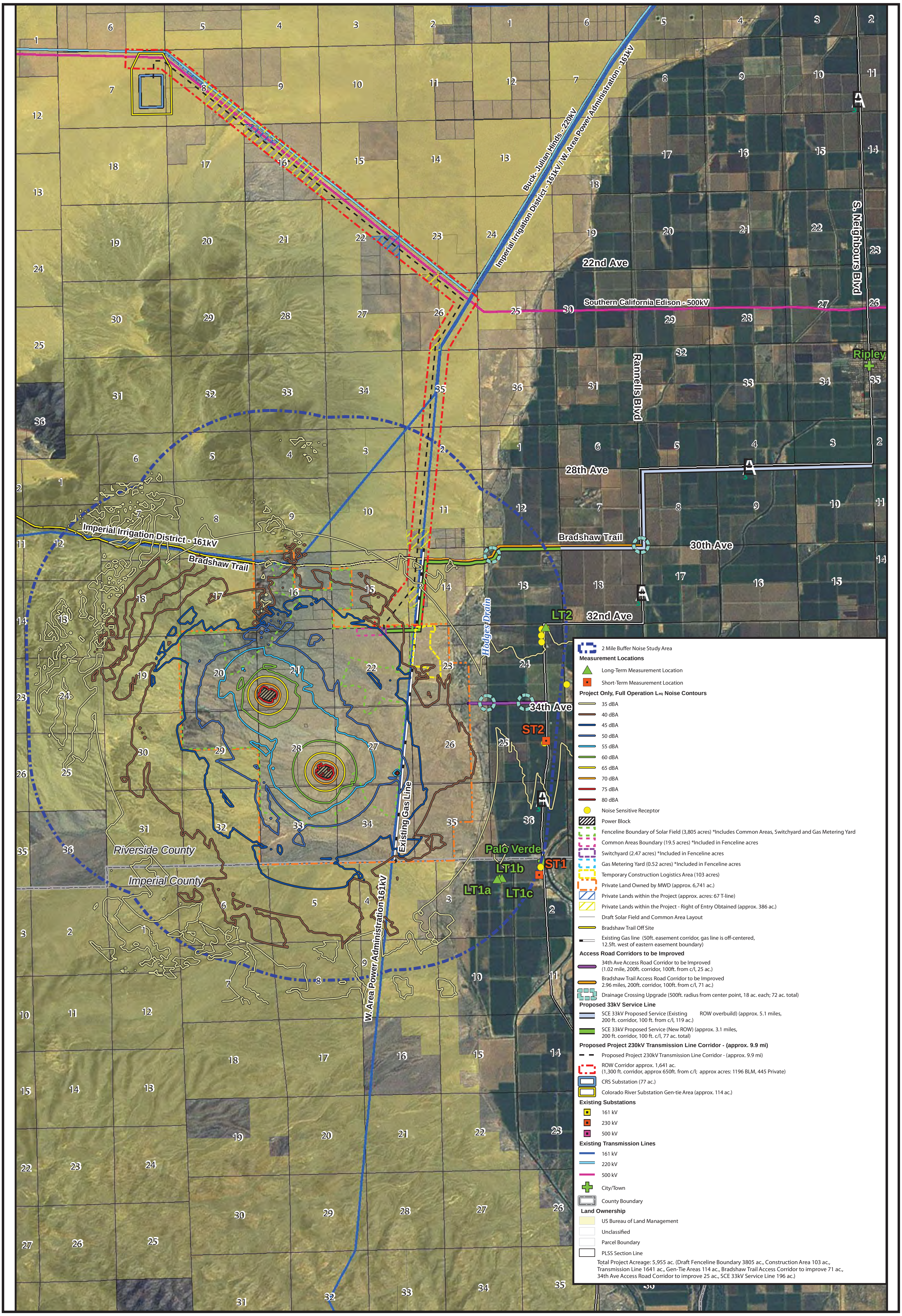
Noise Table A4
OSHA Worker Noise Exposure Standards

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 C.F.R. § 1910.

NOISE - FIGURE 1

Rio Mesa Solar Electric Generating Facility - Sound Level Measurement Locations



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Ammended AFC 7/23/2012, Fig. 5.7-1 (Rev)

PUBLIC HEALTH

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SUMMARY OF CONCLUSIONS

The California Energy Commission staff analyzed the potential human health risks associated with construction and operation of the proposed Rio Mesa Solar Electric Generating Facility (Rio Mesa SEGF) project and does not expect any significant adverse cancer or short- or long-term noncancer health effects from the project's toxic emissions. Staff's analysis of potential health impacts uses a highly conservative methodology that accounts for impacts to the most sensitive individuals in a given population, including newborns and infants. According to staff's assessment, emissions from the Rio Mesa SEGF would not contribute significantly to morbidity or mortality in any age or ethnic group residing in the project area.

INTRODUCTION

The purpose of this Preliminary Staff Assessment (PSA) is to determine if emissions of toxic air contaminants (TACs) from the proposed Rio Mesa SEGF 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 would identify and recommend mitigation measures necessary to reduce such impacts to insignificant levels.

Energy Commission staff address the potential impacts of regulated, or criteria, air pollutants in the **Air Quality** section of this PSA, and assess the impacts on public and worker health from accidental releases of hazardous materials in the **Hazardous Materials Management** and **Worker Safety and Fire Protection** sections. The health and nuisance effects from electric and magnetic fields are discussed in the **Transmission Line Safety and Nuisance** section. Pollutants released from the project's wastewater streams are discussed in the **Soil and Surface Water** and **Water Supply** sections. Releases in the form of hazardous and nonhazardous wastes are described in the **Waste Management** section.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Public Health Table 1 lists the federal, state, and local laws and policies applicable to the control of TAC emissions and mitigation of public health impacts for the Rio Mesa SEGF. This section evaluates compliance with these requirements and summarizes the applicable laws, ordinances, regulations and standards (LORS).

Public Health Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
Federal	
Clean Air Act section 112 (Title 42, U.S. Code section 7412)	Section 112 of the Clean Air Act addresses emissions of hazardous air pollutants (HAPs). This act requires new sources that emit more than 10 tons per year of any specified HAP or more than 25 tons per year of any combination of HAPs to apply Maximum Achievable Control Technology (MACT).
40 Code of Federal Regulations (CFR) Part 68 (Risk Management Plan)	Requires facilities storing or handling significant amounts of acutely hazardous materials to prepare and submit Risk Management Plans.
State	
California Health and Safety Code section 25249.5 et seq. (Safe Drinking Water and Toxic Enforcement Act of 1986—Proposition 65)	These sections establish thresholds of exposure to carcinogenic substances above which Prop 65 exposure warnings are required.
California Health and Safety Code, Article 2, Chapter 6.95, Sections 25531 to 25541; California Code of Regulations (CCR) Title 19 (Public Safety), Division 2 (Office of Emergency Services), Chapter 4.5 (California Accidental Release Prevention Program)	Requires facilities storing or handling significant amounts of acutely hazardous materials to prepare and submit Risk Management Plans
California Health and Safety Code section 41700	This section states that “a person shall not 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 that 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 44360 to 44366 (Air Toxics “Hot Spots” Information and Assessment Act—AB 2588)	Requires preparation and biennial updating of facility emission inventory of hazardous substances; risk assessments.
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	
Mojave Desert Air Quality Management District (MDAQMD) Rule 1320, New Source Review For Toxic Air Contaminants	Requires the evaluation of the potential impact of toxic air contaminants (TACs) from new sources and modifications.

SETTING

This section describes the environment in the vicinity of the proposed project site from the public health perspective. Characteristics of the natural environment, such as meteorology and terrain, affect the project's potential for impacts on public health. An emissions plume from a facility may affect elevated areas before lower terrain areas because of reduced opportunity for atmospheric mixing. Consequently, areas of elevated terrain can often be subjected to increased pollutant impacts compared to lower-level areas. Also, the land use around a project site can influence the surrounding population in terms of population distribution and density, which, in turn, can affect public exposure to project emissions. Additional factors affecting potential public health impacts include existing air quality and environmental site contamination. The area around the proposed Rio Mesa SEGF is rural and sparsely populated, and is primarily zoned as open space and agricultural land (BS 2011a, section 5.6).

SITE AND VICINITY DESCRIPTION

The proposed Rio Mesa SEGF site is located on the Palo Verde Mesa in Riverside County, California, about 13 miles southwest of Blythe, California, within the Mojave Desert Air Quality Management District (MDAQMD). It would be located on the southeast side of Riverside County and is adjacent to several other counties: Imperial County (of California) to the south and La Paz County (of Arizona) to the east.

The Rio Mesa SEGF would include two solar thermal power plants (Rio Mesa I and Rio Mesa II) and a shared common area. Each solar plant would generate 250 megawatts (MW) (nominal), for a total net facility output of 500 MW. Each solar plant would include a 750-ft-tall solar power tower (along with one 10-ft-tall lightning rod) and two natural-gas-fired boilers: one medium-sized auxiliary boiler and one small-sized night-time preservation boiler. The auxiliary boiler would be used to minimize the amount of time required for startup each morning, and for power augmentation. It is expected that power augmentation would occur primarily in the later afternoon/early evening or when clouds block the sun. The nighttime preservation boiler would be used to provide overnight heat to systems to provide freeze protection. (BS 2012v, section 2.0).

According to the Application for Certification (AFC), there are no sensitive receptor locations such as daycare, hospitals, parks, preschools or schools within 6 miles of the project site (BS 2011a, section 5.9.3). However, there is some very low density residential use in the vicinity of the project site. The nearest residence[1] to the Rio Mesa SEGF property boundary is approximately 8,200 feet (1.55 miles) south of the Rio Mesa I solar array fence line. The nearest residence to any power block equipment is approximately 13,770 feet (2.61 miles) east of the Rio Mesa I power block (BS 2012v, section 5.7.4.2 and section 5.9.3).

The closet community to the project site is Palo Verde, which is approximately 2.3 miles east of the southeast corner of the project site boundary on the border of Riverside and

[1]The buildings at this site are not currently inhabited. The Applicant assumes for the purpose of this analysis, that there could be a habitable dwelling at this location.

Imperial Counties and located within Imperial County. According to the 2010 U.S. Census, Palo Verde had a population of 171 in 2010 (U.S. Census, 2010). The second closest community is Ripley, which is approximately 6.8 miles from the project site, with a 2010 estimated population of 692 (U.S. Census, 2010). The closest city to the project is Blythe, located approximately 13 miles northeast of the project area, with a 2010 estimated population of 20,817 (BS 2011a, section 5.6.3.1).

METEOROLOGY AND CLIMATE

Meteorological conditions, including wind speed, wind direction, and atmospheric stability, affect the extent to which pollutants are dispersed into the air as well as the direction of pollutant transport. This, in turn, affects the level of public exposure to emitted pollutants along with the associated health risks. When wind speeds are low and the atmosphere is stable, for example, dispersion is reduced, and localized exposures may increase.

Atmospheric stability is one characteristic related to turbulence, or the ability of the atmosphere to disperse pollutants from convective air movement. Mixing heights (the height marking the extent of the space within which the air is well mixed and from which pollutants can be dispersed to other areas) are lower during mornings because of temperature inversions and increase during the warmer afternoons. Staff's **Air Quality** section presents a more detailed description of meteorological data for the area.

Eastern Riverside County is characterized by an arid climate: low precipitation, hot summers, and mild winters. The area's climatic conditions are strongly influenced by the large-scale sinking and warming of air in the semi-permanent subtropical high-pressure center over the eastern Pacific. This high-pressure system effectively blocks out most mid-latitude storms, except in winter when the ridge is weaker and farther south. The coastal mountains to the west also have a major influence on climate, serving as a meteorological boundary that effectively removes moisture from the marine air flowing from the Pacific. (BS 2011a, section 5.1.3.2)

The 2006-2010 wind roses provided in the AFC Figures 5.1-1 through 5.1-5 (BS 2011a) show that the prevailing winds that blow to the proposed project site were either from the north or from the south and only a small percent of prevailing winds are in the east-west direction. Approximately 3 percent of prevailing winds blow to Arizona and less than 3 percent of prevailing winds blow from Arizona. This means that the project area is not significantly impacted by emissions from Arizona. Please refer to the **Air Quality** section for more details.

EXISTING SETTING

As previously noted, the proposed Rio Mesa SEGF site is located within the Mojave Desert Air Basin (MDAB) and within the Mojave Desert Air Quality Management District (MDAQMD). By examining average toxic concentration levels from representative air monitoring sites together with the cancer risk factors specific to each carcinogenic contaminant, a lifetime cancer risk can be calculated to provide a background risk level for inhalation of ambient air. When examining such risk estimates, staff considers it important to note that the overall lifetime risk of developing cancer for the average female in the United States is about 1 in 3, or 333,333 in 1 million and about 1 in 2, or 500,000 in 1 million for the average male (American Cancer Society, 2011). From 2004 to 2008, the cancer incidence rates in California are 51.28 in 1 million for males and 39.69 for females. Meanwhile, the cancer incidence rates in Arizona are 44.75 in 1 million for males and 36.06 for females. Also, from 2004 to 2008, the cancer death rates for California are 19.74 in 1 million for males and 14.34 in 1 million for females. Meanwhile, the cancer death rates in Arizona are 18.67 in 1 million for males and 13.24 in 1 million for females (American Cancer Society, 2012).

EXISTING PUBLIC HEALTH CONCERNS

When evaluating a new project, staff usually conducts a detailed study and analysis of existing public health issues in the project vicinity. This analysis is prepared to identify the current rates of respiratory diseases (including asthma) and cancer, together with childhood mortality rates in the area around the proposed project site. Such assessment of existing health concerns provides staff with a basis on which to evaluate the significance of any additional health impacts from the proposed Rio Mesa SEGF project and assess the need for further mitigation.

The asthma diagnosis rates in Riverside County are lower[2] than the average rates in California for both adults (age 18 and over) and children (ages 1-17). The percentage of adults diagnosed with asthma was, for example, reported as 6.6 percent in 2005 and 2007, compared to 7.7 percent for the general California population. Rates for children for the same 2005-2007 period were reported as 7.0 percent compared to 10.1 percent for the state in general (Wolstein et al., 2010).

By examining the State Cancer Profiles as presented by the National Cancer Institute, staff found that cancer death rates in Riverside County have been falling between 2005 and 2009. These rates (of 16.94 per 1,000,000, combined male/female) were similar to the statewide average of 16.31 per 1,000,000 (National Cancer Institute, 2012).

There is an ambient monitor for Toxic Air Contaminants (TACs) in the upwind South Coast Air Basin (SCAB) portion of Riverside County. Data from this station would be higher than an ambient monitor located in the vicinity of the proposed project, and use of these data should conservatively represent site conditions. Air quality and health risk data in Table C-25 of California Almanac of Emissions and Air Quality – 2009 Edition (ARB, 2009) are for Riverside County for years 1990 and 2005 and the data show a downward trend in Toxic Air Contaminant (TAC) annual average concentrations, along with related cancer risks (BS 2011a, section 5.9.3).

[2] In AFC, it was written that “Asthma diagnosis rates in Riverside County are higher than average rates throughout the state for adults and children (Wolstein et al., 2010). The percentage of adults who have been diagnosed with asthma was 8.8 percent in 2005 and 2007, compared with 7.7 percent of the population statewide. Rates for children were 11.5 percent compared with 10.1 percent statewide for the same time period (Wolstein et al., 2010).” However, staff checked the report of Wolstein et al. (2010) and found the asthma rates in AFC were wrong. The asthma rates quoted by applicant actually are values for San Bernardino County.

Rio Mesa SEGF is proposed at a location where the fungus that causes valley fever[3] (*Coccidioidomycosis)* occurs naturally. It was reported by Desert Sun in Feb 23, 2011 that Riverside County saw an increase in one year in valley fever cases, from 67 to 106 cases, which is a 58 percent jump in the number of “valley fever” cases in 2010. The increase might be due to heavy spring rains followed by dry summers and a windy autumn, or because of a change in state reporting in 2010[4] (The Desert Sun, 2011).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

This section discusses TAC emissions to which the public could be exposed during project construction and routine operation. Following the release of TACs into the air, water or soil, 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 non-criteria pollutants. Unlike criteria pollutants such as ozone, carbon monoxide, sulfur dioxide, or nitrogen dioxide, non-criteria pollutants have no ambient (outdoor) air quality standards that specify levels considered safe for everyone[5]. Since non-criteria pollutants do not have such standards, a health risk assessment (HRA) is used to determine if people might be exposed to those types of pollutants at unhealthy levels.

The standard approach currently used for health risk assessment (HRA) involves four steps: 1) hazard identification, 2) exposure assessment, 3) dose-response assessment, and 4) risk characterization. These four steps are briefly discussed below (OEHHA, 2003).

First, hazard identification is conducted to determine the potential health effects that could be associated with project emissions. For air toxics sources, the main purpose is to identify whether or not a hazard exists. If this hazard exists, staff evaluates the exact toxic air contaminant(s) of concern and whether a TAC is a potential human carcinogen or is associated with other types of adverse health effects.

Second, an exposure assessment is conducted to estimate the extent of public exposure to project emissions, including: (1) the worst-case concentrations of project emissions in the environment using dispersion modeling; and (2) the amounts of pollutants that people could be exposed to through inhalation, ingestion, and dermal contact. Therefore, this step involves emissions quantification, modeling of environmental transport and

[3] Valley fever is an infection that occurs when the spores of the fungus Coccidioides immitis enter human body through the lungs.
[4] Valley fever (*Coccidioidomycosis*) became laboratory-reportable in California in 2010 (Hector el al., 2011). California Code of Regulations, Title 17, Section 2505 requires laboratories to report laboratory testing results suggestive of the disease of valley fever (*Coccidioidomycosis*) to the local health department. Source: http://www.cdph.ca.gov/HealthInfo/Documents/TITLE_17_SECTION_2505.pdf
[5] Carbon dioxide (CO_2) is also a non-criteria pollutant, but it is also not considered a TAC at normal consideration and is not evaluated in this analysis.

dispersion, evaluation of environmental fate, identification of exposure routes, identification of exposed populations and sensitive subpopulations, and estimation of short-term and long-term exposure levels.

Third, a dose-response assessment is conducted to characterize the relationship between exposure to an agent and incidence of an adverse health effect in exposed populations. The assumptions and methodologies of dose-response assessment are different between cancer and noncancer health effects. In carcinogenic risk assessment, the dose-response relationship is expressed in terms of a potency (or slope) factor that is used to calculate the probability of getting cancer associated with an estimated exposure. It is assumed in cancer risk assessments that risk is directly proportional to dose and that there is no threshold for carcinogenesis below which there is no risk. In non-carcinogenic risk assessment, dose-response data developed from animal or human studies are used to develop acute and chronic non-cancer Reference Exposure Levels (RELs). The acute and chronic RELs are defined as the concentration at which no adverse non-cancer health effects are anticipated. Unlike cancer health effects, non-cancer acute and chronic health effects are generally assumed to have thresholds for adverse effects. In other words, acute or chronic injury from a TAC will not occur until exposure to the pollutant has reached or exceeded a certain concentration (i.e., threshold).

Finally, risk characterization is conducted to integrate the health effects and public exposure information and to provide quantitative estimates of health risks resulting from project emissions. Staff characterizes potential health risks by comparing worst-case exposure to safe standards based on known health effects.

Staff conducts its public health analysis by evaluating and then adopting the information and data provided in the AFC by the applicant. Staff also relies upon the expertise and guidelines of the California Environmental Protection Agency (Cal/EPA) Office of Environmental Health Hazard Assessment (OEHHA) to: (1) identify contaminants that cause cancer or other noncancer health effects, and (2) identify the toxicity and cancer potency factors of these contaminants. Staff relies upon the expertise of the California Air Resources Board (ARB) and the local air districts to conduct ambient air monitoring of TACs and on the California Department of Public Health to evaluate pollutant impacts in specific 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.

For each project, a screening-level risk assessment is initially performed using simplified assumptions that are intentionally biased toward protection of public health. That is, staff uses an analysis designed to overestimate public health impacts from exposure to project emissions. In reality, it is likely that the actual risks from the source in question would be much lower than the risks as estimated by the screening-level assessment. The risks for such screening purposes are based on examining conditions that would lead to the highest, or worst-case, risks and then using those assumptions in the assessment. Such an approach usually involves the following:

- 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 carcinogenic (cancer-causing) agents would occur continuously for 70 years; and
- using health-based objectives aimed to protect the most sensitive members of the population (i.e., the young, elderly, and those with respiratory illnesses).

A screening-level risk assessment would, at a minimum, include the potential health effects from inhaling hazardous substances. Some facilities may also emit certain substances (e.g. semi-volatile organic chemicals and heavy metals) that could present a health hazard from non-inhalation pathways of exposure (OEHHA 2003, Tables 5.1, 6.3, 7.1). When these multi-pathway substances are present in facility emissions, the screening-level analysis would include the following additional exposure pathways: soil ingestion, dermal exposure, consumption of locally grown plant foods, and mother's milk (OEHHA 2003, p. 5-3).

The HRA process addresses three categories of health impacts: (1) acute (short-term) health effects, (2) chronic (long-term) noncancer effects, and (3) cancer risk (also long-term).

Acute Noncancer Health Effects

Acute health effects are those that result from short-term (one-hour) exposure to relatively high concentrations of pollutants. Such effects are temporary in nature and include symptoms such as irritation of the eyes, skin, and respiratory tract.

Chronic Noncancer Health Effects

Chronic noncancer health effects are those that result from 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 noncancer health effects include diseases such as reduced lung function and heart disease.

Reference Exposure Levels (RELs)

The analysis for both acute and chronic noncancer health effects compares the maximum project contaminant levels to safe levels known as Reference Exposure Levels, or RELs. These are amounts of toxic substances to which even sensitive individuals could be exposed without suffering any adverse health effects (OEHHA 2003, p. 6-2). These exposure levels are specifically designed to protect the most sensitive individuals in the population, such as infants, the aged, and people with specific illnesses or diseases which makes them more sensitive to the effects of toxic substance exposure. The RELs are based on the most sensitive adverse health effect reported in the medical and toxicological literature and include specific margins of safety. The margins of safety account for uncertainties associated with inconclusive scientific and technical information available at the time of standard setting. They are therefore meant to provide a reasonable degree of protection against hazards that research has not yet identified.

Concurrent 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 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 exposures, the health risk assessment could underestimate or overestimate the risks.

Cancer Risk and Estimation Process

For carcinogenic substances, the health assessment considers the risk of developing cancer and assumes that continuous exposure to the carcinogen would occur 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 estimate based on the worst-case assumptions.

Cancer risk is expressed in terms of chances per million of developing cancer and is a function of the maximum expected pollutant concentration, the probability that a particular pollutant would cause cancer (called potency factors and established by OEHHA), and the length of the exposure period. Cancer risks for individual carcinogens are added together to yield a total cancer risk for each potential source. The conservative nature of the screening assumptions used means that the actual cancer risks from project emissions would be considerably lower than estimated.

As previously noted, the screening analysis is performed to assess the worst-case risks to public health associated with the proposed project. If the screening analysis were to predict a risk below significance levels, no further analysis would be necessary and the source would be considered acceptable with regard to carcinogenic effects. If however, the risk were to be above the significance level, then further analysis using more realistic site-specific assumptions would be performed to obtain a more accurate estimate.

Significance Criteria

Energy Commission staff assesses the maximum cancer impacts from specific carcinogenic exposures by first estimating the potential impacts on the maximum exposed individual. This is a person hypothetically exposed to project emissions at a location where the highest ambient impacts were calculated using the worst-case assumptions as described above. Since the individual's exposure would produce the maximum impacts possible around the source, staff uses this risk estimate as a marker for acceptability of the project's carcinogenic impacts.

Acute and Chronic Noncancer Health Risks

As described earlier, non-criteria pollutants are evaluated for short-term (acute) and long-term (chronic) non-cancer health effects, as well as the noted cancer impacts from long-term exposures. The significance of project-related impacts is determined separately for each of the three health effects categories. Staff assesses the noncancer health effects by calculating a hazard index. A hazard index is a ratio obtained by comparing exposure from facility emissions to the safe exposure level (i.e. Reference Exposure Level, or REL) for that pollutant. A ratio of less than 1.0 suggests that the worst-case exposure would be below safe levels and would thus be insignificant with regard to health effects. The hazard indices for all toxic substances with the same type of health effect are added together to yield a Total Hazard Index for the source. The Total Hazard Index is calculated separately for acute effects and chronic effects. A Total Hazard Index of less than 1.0 would indicate that cumulative worst-case exposures would be not lead to significant noncancer health effects. In such cases, noncancer health impacts from project emissions would be considered unlikely even for sensitive members of the population, and staff would conclude that there would be no significant noncancer project-related public health impacts. This assessment approach is consistent with risk management guidelines of both California OEHHA and U.S. EPA.

Cancer Risk

Staff relies 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 in establishing significance levels for carcinogenic exposures. 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 or less excess cancer cases within an exposed population of 100,000, assuming lifetime exposure." This risk level is equivalent to a cancer risk of 10 in 1 million, which is also written as 10×10^{-6}. In other words, under state regulations, an incremental cancer risk of greater than 10 in 1 million from a project should be regarded as suggesting a potentially significant carcinogenic impact on public health. The 10 in 1million risk level is also used by the Air Toxics "Hot Spots" (AB 2588) program as the public notification threshold for air toxic emissions from existing sources.

An important distinction between staff's and the Proposition 65 risk characterization approach 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 the cancer-causing pollutants to which the individual might be exposed in the given case. Thus, the manner in which the significance level applied by staff is more conservative (health-protective) than the manner applied by Proposition 65. The significant risk level of 10 in 1 million is also consistent with the level of significance adopted by many California air districts. In general, these air districts would not approve a project with a cancer risk estimate of more than 10 in 1 million.

As described above, 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 could be ensured. Staff's analysis also addresses potential impacts on all segments of the population including the young, the elderly, people with existing medical conditions that may render 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 (both acute and chronic) set to protect the public from the effects of air toxics in question. When a screening analysis shows the cancer risks to be above the significance level, refined assumptions would be applied for likely a lower, more realistic risk estimate. If after refined assumptions, the project's risk is still found to exceed the significance level of 10 in 1 million, staff would require appropriate measures to reduce the risk to less than significance levels. If, after all feasible risk reduction measures have been considered and a refined analysis still identifies a cancer risk of greater than 10 in 1 million, staff would deem such a risk to be significant and would not recommend project approval.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Proposed Project's Construction Impacts and Mitigation Measures

Construction of the Rio Mesa SEGF is expected to take place from the fourth quarter of 2013 to the first quarter of 2016. Construction of the shared facilities would occur concurrently with the construction of Solar Plant I. Solar Plant II construction would begin about 3 months behind that of Solar Plant I (BS 2011v, section 2.3.15). The applicant conducted the Construction Emissions and Impact Analysis[6] for this site and concluded that "no significant public health effects are expected during construction." (BS 2011a, Appendix 5.1F) Staff concurs with the applicant based upon staff's evaluation of the mitigation measures specified by the applicant as necessary to minimize such impacts. Such potential construction risks are normally associated with exposure to fugitive dust and combustion emissions.

Fugitive Dust

Fugitive dust is dust particles that are introduced into the air through certain activities such as soil cultivation, or vehicles operating on open fields or dirt roadways. Fugitive dust is the potential source of valley fever, so its emission has to be minimized. Fugitive dust emissions during construction of the proposed project could occur from:

- dust entrained during site preparation and grading/excavation at the construction site;
- dust entrained during onsite movement of construction vehicles on unpaved surfaces;

[6] The applicant did not update their analysis for the Construction Emissions and Impact Analysis because they expected "no expected increase in peak hourly, daily, or annual construction emissions" when they changed the proposed project from the original 3 unit configuration to the environmentally enhanced 2 unit configuration. Staff concurs with this rationale and agrees the analysis based on the design of the original 3 unit project configuration should be more conservative.

- fugitive dust emitted from an onsite concrete batch plant; and
- wind erosion of areas disturbed during construction activities.

Diesel Exhaust

Combustion emissions during construction would result from:

- exhaust from diesel construction equipment used for site preparation, grading, excavation, trenching, and construction of onsite and offsite (transmission- and gas pipeline-related) structures;
- exhaust from water trucks used to control construction dust emissions;
- exhaust from portable welding machines, small generators, and compressors;
- exhaust from pickup trucks and diesel trucks used to transport workers and materials around the construction areas;
- exhaust from diesel trucks used to deliver concrete, fuel, and construction supplies to the construction areas; and
- exhaust from automobiles used by workers to commute to and from the construction areas.

The operation of construction equipment would result in air emissions from diesel-fueled construction equipment. Diesel exhaust is a complex mixture of thousands of gases and fine particles and contains over 40 substances listed by the U.S. Environmental Protection Agency (U.S. EPA) as hazardous air pollutants (HAPs) and by the California Air Resources Board (ARB) as toxic air contaminants (TACs). The diesel particulate matter (DPM) is primarily composed of aggregates of spherical carbon particles coated with organic and inorganic substances. Diesel exhaust deserves particular attention mainly because of its ability to induce serious noncancer effects and its status as a likely human carcinogen. The DPM emissions from on-site Rio Mesa SEGF construction activities are summarized in **Public Health Table 2**.

Public Health Table 2
Maximum Onsite DPM Emissions during Construction

Emitting Activity	Pounds per Day	Tons per Year
Construction Equipment	11.2	1.3

Source: BS 2011a, Table 5.9-3.

Diesel exhaust is characterized by ARB as “Particulate Matter from Diesel-Fueled Engines.” The impacts from human exposure may include both short- and long-term health effects. Short-term effects can include increased coughing, labored breathing, chest tightness, wheezing, and eye and nasal irritation. Effects from long-term exposure can include increased coughing, chronic bronchitis, reductions in lung function, and inflammation of the lung. Epidemiological studies strongly suggest a causal relationship between occupational diesel exhaust exposure and lung cancer. Diesel exhaust is listed by the EPA as “likely to be carcinogenic to humans”. (US. EPA, 2003)

Based on a number of health effects studies, the Scientific Review Panel (SRP) on Toxic Air Contaminants in 1998 recommended a chronic REL for diesel exhaust particulate matter of 5 micrograms of diesel particulate matter per cubic meter of air (µg/m3) and a cancer unit risk factor of 3×10^{-4} $(\mu g/m3)^{-1}$. The Scientific Review Panel did not recommend a specific 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 the panel's recommendations regarding health effects. (OEHHA 2009, Appendix A) In the year 2000, ARB developed a "Risk Reduction Plan to Reduce Particulate Matter Emissions From Diesel-Fueled Engines and Vehicles" and has been developing regulations to reduce diesel particulate matter emissions since that time.

The applicant conducted a health risk assessment for diesel exhaust from construction activities and the results are listed in **Public Health Table 3**. They used the Hot Spots Reporting Program (HARP)--derived risk values for diesel particulate matter together with a nine-year exposure period to calculate this construction-related cancer risk. This approach is as specified in OEHHA guidelines (OEHHA, 2003). The maximum modeled annual average concentration of diesel particulate matter at any location calculated by the applicant was 0.045 $\mu g/m^3$. The cancer unit risk value from HARP for the assumed a 9-year exposure is 5.33×10^{-5} per $\mu g/m^3$. This is lower than the cancer unit risk of 3×10^{-4} $(\mu g/m^3)^{-1}$ from SRP since the results from SRP are derived for longer-term exposures. The calculated cancer risk is approximately 2.4 in one million[7], which is below the significance level of 10 in one million. As described above, construction of the two power plants is anticipated to take place over a period under three years, which is shorter than the 9 year period assumed in the applicant's calculations. Therefore, the applicant's analysis should be regarded as conservative because of the inherently conservative exposure-related assumptions made in the modeling analysis (BS 2011a, Appendix 5.1F). Staff regards the related conditions of certification in the **Air Quality** section as adequate to ensure that cancer-related public health impacts of diesel exhaust emissions are mitigated during construction to a point where they are not considered significant.

The chronic hazard index for diesel exhaust during construction activities is 0.009 as calculated by staff using a chronic noncancer REL of 5 $\mu g/m^3$. This index is lower than the significance level of 1.0 meaning that there would also be no chronic non-cancer impacts from construction activities. The potential levels of criteria pollutants from operation of the construction-related equipment are discussed in staff's **Air Quality** section along with mitigation measures and related conditions of certification. The pollutants of most concern in this regard are particulate matter (PM), carbon monoxide (CO), sulfur dioxide (SO_2), and nitrogen dioxide (NO_2).

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[7] The risk of 2.4 in one million was calculated using the following formula:
Cancer Risk = Concentration of Diesel Exhaust × Cancer Unit Risk = 0.045 $\mu g/m^3$ × 5.33x10-5 per $\mu g/m^3$ = 2.4×10^{-6}

Public Health Table 3
Construction Hazard/Risk from DPMs

Cancer Unit Risk Used ($\mu g/m^3)^{-1}$	Cancer Risk (in one million)	Significance Level	Significant?
$5.33x10^{-5}$ [a]	2.4	10	No
Chronic Noncancer REL ($\mu g/m^3$)	**Hazard Index (HI)**		
5 [b]	0.009	1	No

[a] Obtained by the applicant from HARP for a 9-year exposure period (the derived adjusted method). Source: Applicant.
[b] Source: OEHHA and ARB.

The Rio Mesa SEGF is proposed in an area where the fungus that causes valley fever[8] (*Coccidioidomycosis)* occurs naturally. Construction could disturb a certain percentage of approximately 3,805 acres[9] of top soil which could harbor the *Coccidioides* spores possibly exposing humans to the risk of valley fever. On-site workers could be exposed from inhaling these fungal spores from wind-blown dust generated from soil excavation construction activities.

To minimize the risk of getting valley fever, the Center for Disease Control and Prevention (CDC) recommends the following measures:

- wear an N95 mask if a person must be in or near a dusty environment, such as a construction zone;
- avoid activities that involve close contact to dust including yard work, gardening, and digging;
- use air quality improvement measures indoors such as HEPA filters;
- take prophylactic anti-fungal medication if deemed necessary by a person's healthcare provider; and
- clean skin injuries well with soap and water, especially if they have been exposed to soil or dust.

The California Department of Public Health (CDPH) also recommends that, "those exposed to dust during their jobs or outside activities in these areas should consider respiratory protection, such as a mask, during such activities." (CDPH, 2010)

Based on CDC and CDPH's recommendations, staff recommends that workers in the vicinity of such dust generation areas wet the soil before any excavation activities, wear protective masks and stay indoors during dust storms and close all doors to avoid dust inhalation. Staff considers the applicant's dust suppression plans adequate to minimize

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[8] Valley fever is an infection that occurs when the spores of the fungus *Coccidioides immitis* enter human's lung through inhalation. When people breathe in these *Coccidioides* spores, they are at risk of developing valley fever.
[9] Each 250 MW plant requires about 1,850 acres of land to operate. The total area required for both plants, including the shared facilities, is approximately 3,805 acres (BS 2012v, section 2.1.3).

the risk of getting valley fever in areas where *Coccidioides* spores are found. Please refer to staff's **Worker Safety and Fire Protection** section for more information.

As for the concerns of valley fever on public health, in the **Air Quality** section, staff recommends some mitigation measures, including **AQ-SC3 (Construction Fugitive Dust Control)**, **AQ-SC4 (Dust Plume Response Requirement)** and **AQ-SC7 (Site Operation Dust Control Plan)** for the purposes of preventing all fugitive dust plumes from leaving the project boundary. As long as the dust plumes are kept within the project boundary, there won't be any significant concern for valley fever adversely affecting public health.

Small quantities of hazardous wastes may be generated during construction of the project. The applicant stated that "hazardous waste management plans will be in place so the potential for public exposure is minimal". Please refer to staff's **Waste Management** section for more information on the safe handling and disposal of these and all project-related wastes.

Proposed Project's Operational Impacts and Mitigation Measures

Emission Sources

As previously noted, the proposed Rio Mesa SEGF would be a nominal 500-Megawatt (MW) power tower thermal solar electrical generating facility comprised of two plants, Rio Mesa SEGF I (250 MW) and Rio Mesa SEGF II (250 MW). The direct emission of air toxics from solar power generation is minimal; however, the facility would start-up each day with input of energy from natural gas-fired boilers associated with each plant. These boiler-related emissions, including each solar plant's 249-MMBtu[10]/hr natural-gas-fired auxiliary boiler and 15 MMBtu/hr nighttime preservation boiler, would be the source of most of the combustion emission from the facility. The other sources would include specific operational and maintenance activities necessary to operate and maintain the proposed facility, including diesel-fueled emergency generators, the emergency fire pump engines, wet-surface air coolers (WSACs), and mirror washing machines (MWM). It is these sources that would be mostly responsible for most toxic exposures within the Rio Mesa SEGF (BS 2011a, section 5.1.4.3).

The potentially emitted pollutants are listed in **Public Health Table 4** and include both criteria and non-criteria pollutants. These pollutants include certain volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs). Criteria pollutant emissions and impacts from such non-solar sources are examined in staff's **Air Quality** analysis. Since the facility would use dry cooling, there would be no emissions of toxic metals or volatile organic compounds from cooling tower mist or drift. Also, there would be no health risk from the potential presence of the Legionella bacterium responsible for Legionnaires' disease.

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[10] The term MMBtu stands for one million BTUs. BTU is a standard unit of measurement used to denote the amount of heat energy in fuels. One BTU is the amount of heat required to increase the temperature of a pint of water (which weighs exactly 16 ounces) by one degree Fahrenheit.

Tables 5.9-4, 5.9-5, 5.1B-14R2, 5.1B-15R2 and 5.1B-16R1 of the AFC (BS 2011a, BS 2012o and BS 2012v) list the specific non-criteria pollutants that may be emitted as combustion byproducts from the Rio Mesa SEGF boilers and its small wet surface air coolers (WSACs). The emission factors for these pollutants were obtained from the Environmental Protection Agency (EPA) AP-42 database of emission factors.

The health risk from exposure to each project-related pollutant is assessed using the "worst case" emission rates and impacts. 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.

Public Health Table 4
The Main Pollutants Emitted from the Proposed Project

Criteria Pollutants	Non-criteria Pollutants
Carbon monoxide	Acetaldehyde
Oxides of nitrogen	Acrolein
Particulate matter	Ammonia
Oxides of sulfur	Benzene
Volatile Organic Compounds (VOCs)	1,3-Butadiene
	Ethylbenzene
	Formaldehyde
	Hexane
	Naphthalene
	PAHs (as BaP)
	Propylene
	Toluene
	Xylene
	Diesel Particulate Matter

Source: BS 2011a, Table 5.9-4 and Table 5.9-5

Hazard Identification

Numerous health effects have been linked to exposure of TACs, including development of asthma, heart disease, Sudden Infant Death Syndrome (SIDS), respiratory infections in children, lung cancer and breast cancer (OEHHA, 2003). According to the AFC, the toxic air contaminants emitted from the natural gas-fired boilers include Acetaldehyde, Acrolein, Benzene, Ethylbenzene, Formaldehyde, Hexane, Napthalene, Polycyclic Aromatics, Propylene, Toluene and Xylene. The toxic air contaminant emitted from emergency engines, fire pump engines and mirror cleaning vehicles and pump engines is Diesel Particulate Matter. **Public Health Table 5** lists each such pollutant.

Public Health Table 5
Types of Health Impacts and Exposure Routes Attributed to Toxic Emissions

Substance	Oral Cancer	Oral Noncancer	Inhalation Cancer	Noncancer (Chronic)	Noncancer (Acute)
Acetaldehyde			✔	✔	✔
Acrolein				✔	✔
Ammonia				✔	✔
Benzene			✔	✔	✔
1,3-Butadiene			✔	✔	
Ethylbenzene			✔	✔	
Formaldehyde			✔	✔	✔
Hexane				✔	
Napthalene		✔	✔	✔	
Polycyclic Aromatic Hydrocarbons (PAHs, as BaP)	✔		✔		
Propylene				✔	
Toluene				✔	✔
Xylene				✔	✔
Diesel Exhaust			✔	✔	

Source: OEHHA / ARB 2011 and BS 2011a, Table 5.9-5

Exposure Assessment

Public Health Table 5 shows the exposure routes of TACs and how they would contribute to the total risk obtained from the risk analysis. The applicable exposure pathways for the toxic emissions include inhalation, dermal (through the skin) absorption, soil ingestion, and mother’s milk. This method of assessing health effects is consistent with OEHHA’s Air Toxics Hot Spots Program Risk Assessment Guidelines (OEHHA 2003) referred to earlier.

The next step in the assessment process is to estimate ambient concentrations using a screening air dispersion model and assuming conditions that would result in maximum impacts. The applicant used the EPA-recommended air dispersion model, AERMOD, along with 5 years (2006–2010) of compatible meteorological data from the Blythe Airport meteorological station.

Dose-Response Assessment

Public Health Table 6 (modified from Table 5.9-5 of the AFC) lists the toxicity values used to quantify the cancer and noncancer health risks from the project's combustion-related pollutants. The listed toxicity values include RELs and the cancer unit risks as published in the OEHHA's Guidelines (OEHHA 2003) and OEHHA/ARB Consolidation Table of OEHHA/ARB Approved Risk Assessment Health Values (ARB 2011). RELs are used to calculate short-term and long-term noncancer health effects; while the cancer unit risks are used to calculate the lifetime risk of developing cancer.

Public Health Table 6
Toxicity Values Used to Characterize Health Risks

Toxic Air Contaminant	Inhalation Cancer Potency Factor $(mg/kg\text{-}d)^{-1}$	Chronic REL $(\mu g/m^3)$	Acute REL $(\mu g/m^3)$
Acetaldehyde	0.010	140	470 (1-hr) 300 (8-hr)
Acrolein	—	0.35	2.5 (1-hr) 0.7 (8-hr)
Ammonia	—	200	3,200
Benzene	0.10	60	1,300
1,3-Butadiene	0.60	20	—
Ethylbenzene	0.0087	2,000	—
Formaldehyde	0.021	9	55 (1-hr) 9 (8-hr)
Hexane	—	7,000	—
Napthalene	0.12	9.0	—
Polycyclic Aromatic Hydrocarbons (PAHs, as BaP)	3.9	—	—
Propylene	—	3000	—
Toluene	—	300	37,000
Xylene	—	700	22,000
Diesel Exhaust	1.1	5	-

Sources: ARB 2011 and BS 2011a, Table 5.9-5

Characterization of Risks from TACs

As described above, the last step in HRA is to integrate the health effects and public exposure information, provide quantitative estimates of health risks resulting from project emissions, and then characterize potential health risks by comparing worst-case exposure to safe standards based on known health effects.

The applicant's HRA was prepared using the ARB's HARP model, version 1.4d (ARB, 2009b), the ARB February 2011 health database (ARB, 2011), and the OEHHA Hot Spots Program Guidance Manual (OEHHA, 2003). Emissions of non-criteria pollutants from the project were analyzed using emission factors previously approved by ARB. Air dispersion modeling combined the emissions with site-specific terrain and meteorological conditions to analyze the mean short-term and long-term concentrations in air for use in the HRA. Because HARP was based on a previous EPA-approved air dispersion model, Industrial Source Complex Short Term, Version 3 (ISCST3), the HARP On-Ramp (ARB, n.d.) was used to integrate the air dispersion modeling output from the required air dispersion model, AERMOD, with the risk calculations in the HARP risk module. Ambient concentrations were used in conjunction with Reference Exposure Levels (RELs) and cancer unit risk factors to estimate the cancer and noncancer risks from operations. In the following sub-sections, staff reviews and summarizes the work of applicant, and evaluated the adequacy of applicant's analysis by conducting another HRA.

Health risks potentially associated with ambient concentrations of carcinogenic pollutants were calculated in terms of excess lifetime cancer risks. The total cancer risk at any specific location is found by summing the contributions from the individual carcinogens. Health risks from non-cancer health effects were calculated in terms of hazard index as a ratio of ambient concentration of TACs to RELs for that pollutant.

Cancer Risk at the Point of Maximum Impact (PMI)

The applicant first presented the numerical cancer risk for the maximally exposed individual (MEI) which is the individual located at the point of maximum impact (PMI) as well as risks to the MEI at a residence (MEIR). Human health risks associated with emissions from the proposed and similar projects are unlikely to be higher at any other location than at the PMI. Therefore, if there is no significant impact associated with concentrations at the PMI location, it can be reasonably assumed that there would not be significant impacts in any other location in the project area. The cancer risk to the MEI at the PMI is referred to as the Maximum Incremental Cancer Risk (MICR). However, the PMI (and thus the MICR) is not necessarily associated with actual exposure because in many cases, the PMI is in an uninhabited area. Therefore, the MICR is generally higher than the maximum residential cancer risk. MICR is based on 24 hours per day, 365 days per year, 70 year lifetime exposure. As shown in **Public Health Table 7**, total worst-case individual cancer risk was calculated by the applicant to be 3.6 in 1 million at the PMI (BS 2012v, Table 5.9-6).

Chronic and Acute Hazard Index (HI)

The applicant's screening health risk assessment for the project including emissions from all sources resulted in a maximum acute Hazard Index (HI) of 0.0007 and a maximum chronic HI of 0.0018 (BS 2012v, Table 5.9-6). As **Public Health Table 7** shows, both acute and chronic hazard indices are less than 1.0, indicating that no short- or long-term adverse health effects are expected.

Project-Related Impacts at Area Residences

Staff's specific interest in the risk to the maximally exposed individual (MEI) in a residential setting (or MEIR) is because this risk most closely represents the maximum project-related lifetime cancer risk. Residential risk is presently assumed by the regulatory agencies to result from exposure lasting 24 hours per day, 365 days per year, over a 70- year lifetime.

There are only six residential receptors for the proposed Rio Mesa SEGF project. Residential risks were presented by applicant in terms of MIRC and health hazard index (HHI) at residential receptors in Table 5.9-6 of AFC (BS 2011v) and are summarized in

Public Health Table 7. The cancer risk for maximally exposed individual (MEI) of residential receptors is 0.07, which is below the significance level.

Risk to Workers

Cancer risk to potentially exposed workers was presented by the applicant in terms of risk to the maximally exposed individual worker or MEIW at PMI and is summarized in **Public Health Table 7**. The applicant's assessment is for potential workplace risks, due to exposure of shorter duration than for residential risks from 70 years of exposure. Workplace risk is presently assumed by the regulatory agencies to result from exposure lasting 8 hours per day, 245 days per year, over a 40- year period. As shown in **Public Health Table 7**, the cancer risk for workers at MEIW (i.e. 0.6 in 1 million) is below the significance level.

Public Health Table 7
Operation Hazard/Risk at Point of Maximum Impact: Applicant Assessment

Type of Hazard/Risk	Hazard Index/Risk	Significance Level	Significant?
Acute Noncancer	0.0007	1.0	No
Chronic Noncancer	0.0018	1.0	No
Cancer Risk			
PMI[a]	3.6 in one million	10 in one million	No
MEIR[b]	0.07 in one million		No
MEIW[c]	0.6 in one million		No

[a] PMI = Point of Maximum Impact
[b] MEIR = MEI of residential receptors
[c] MEIW = MEI for workers
Source: BS 2012v, Table 5.9-6

To evaluate the applicant's analysis, staff used data from 2010 and conducted another analysis of cancer risks and acute and chronic hazards due to combustion-related emissions from the proposed Rio Mesa SEGF project. The analysis was conducted for the general population, sensitive receptors, nearby residences and the project's work force. The sensitive receptors, as previously noted, are subgroups that may be at greater risk from exposure to emitted pollutants, and include the very young, the elderly, and those with existing illnesses. However, according to the Application for Certification (AFC), there are no sensitive receptor locations such as daycare, hospitals, parks, preschools or schools within 6 miles of the project site (BS 2011a, section 5.9.3).

The following is a summary of the most important elements of staff's heath risk assessment for the Rio Mesa SEGF:

- the analysis was conducted using the latest version (1.4f) of ARB/OEHHA Hotspots Analysis and Reporting Program (HARP);
- emissions are based upon concurrent operation of all four natural-gas-fired boilers, three emergency diesel generators (one in common facility area), three diesel fire pump engines (one in common facility area) and mirror washing machines (MWM). Because evaporative drift emissions from the wet surface air coolers (WSACs) would be so low and potential impacts would be minimized through the use of high efficiency drift eliminators and deionized water with very relatively low total dissolved

solids (TDS) levels, these units were not included in the staff's HRA;

- exposure pathways included inhalation, dermal absorption, soil ingestion, and mother's milk;
- the local meteorological data, local topography and receptor, source elevations and site-specific and building-specific input parameters used in the HARP model were obtained from the AFC and modeling files provided by the applicant;
- the emission factors and toxicity values used in staff's analysis of cancer risk and hazard were obtained from the AFC and are listed in **Public Health Table 6**;
- cancer risk was determined using the derived (OEHHA) risk assessment method; and
- the following receptor locations were quantitatively evaluated in staff's analysis:
  - point of maximum impact (PMI), approximately 0.05 mile north of the common area (70-year residential scenario);
  - location of the residence of the highest risk, approximately 2.24 mile east of the common area and approximately 1.7 mile east of the Rio Mesa SEGF project boundary (70-year residential scenario);
  - Palo Verde community, approximately 3.05 mile southeast of the center of Rio Mesa I and approximately 2.3 mile east of the southeast corner the Rio Mesa SEGF site boundary (70-year residential scenario);
  - Facility workers: occupational exposure patterns assuming exposure of 8 hours/day, 145 days/year for 40 years.

Results of staff's analysis are summarized in **Public Health Table 8** and are compared to the results estimated by the applicant and presented in the AFC. The results estimated by staff and applicant are very similar, which verify the analysis done by the applicant. It can also be seen from these results that the cancer and noncancer risks from the Rio Mesa SEGF operation would be significantly below their respective significance levels meaning that no health impacts would occur within all segments of the surrounding population. Since the project's combustion emissions of concern reflect the efficacy of the applicant's proposed emission controls, (use of natural gas as fuel and oxidative catalyst for emission minimization) staff concludes there is no need for conditions of certification to protect public health.

As for potential impacts in Arizona, the results show that the risks of receptors in California close to the Rio Mesa SEGF are lower than the significance levels. Therefore, staff concludes that there will not be any public health impacts from the Rio Mesa SEGF in either California or Arizona.

Public Health Table 8
Results of Staff's and Applicant's Analyses for Cancer Risk and Chronic Hazard – Rio Mesa SEGF Operations

	Staff's Analysis (by using data from 2010)			Applicant's Analysis		
Receptor Location	Cancer Risk[a] (per million)	Chronic HI[b]	Acute HI[b]	Cancer Risk[a] (per million)	Chronic HI[b]	Acute HI[b]
PMI	3.73	0.0018	0.0006	3.6	0.0018	0.0007
Residence [c] MEIR	0.08	0.00004	0.0003	0.07	0.00004	0.0003
Worker MEIW	0.57	-	-	0.6	-	-
Palo Verde	0.04	0.000019	0.00018	-	-	-

[a] Significance level = 10 per million.
[b] HI = Hazard Index, Significance level = 1.
[c] Location of the residence of the highest risk with a 70-year residential scenario.

CUMULATIVE IMPACTS AND MITIGATION

The geographic scope of analysis for cumulative effects to public health is a six-mile buffer zone around the project site. This is the same six-mile buffer zone for localized significant cumulative air quality impacts described and evaluated in **Air Quality** section. Staff considered the potential impacts due to construction and operation of the Rio Mesa SEGF with existing or foreseeable nearby facilities and none of them fall within the 6-mile buffer zone. Therefore, staff concludes that there would likely not be any cumulatively significant impacts associated with public health risks.

COMPLIANCE WITH LORS

Staff has conducted a human health risk assessment for the proposed Rio Mesa SEGF project and found no potentially significant adverse impacts for any receptors, including sensitive receptors. 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 towards 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—would not experience any acute or chronic significant health risk or any significant cancer risk as a result of that exposure.

Staff 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 cumulatively significant public health impact on any population in the area. Staff therefore concludes that construction and operation of the Rio Mesa SEGF would comply with all applicable LORS regarding long-term and short-term project impacts in the area of public health.

Additionally, staff has reviewed the **Socioeconomics Figure 1**, which shows the environmental justice population (see the **Socioeconomics** and **Executive Summary** sections of this PSA for further discussion of environmental justice) is not greater than fifty percent within a six-mile buffer of the proposed Rio Mesa SEGF and therefore, there would not be a disproportionate **Public Health** impact resulting from construction and operation of the proposed project to an environmental justice population.

NOTEWORTHY PUBLIC BENEFITS

It is noteworthy that a solar electric generating facility such as the proposed Rio Mesa SEGF project would emit significantly less TACs to the environment than most other energy sources available in California such as natural gas or biomass, thereby reducing the general public's health risks that would otherwise occur with these other energy sources.

PUBLIC AND AGENCY COMMENTS

No comments have been received from the public or from agencies regarding public health.

CONCLUSIONS

Staff has analyzed the potential public health risks associated with construction and operation of the Rio Mesa SEGF 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 Rio Mesa SEGF uses a highly conservative 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, both construction and operating emissions from the Rio Mesa SEGF would not contribute significantly or cumulatively to morbidity or mortality in any age or ethnic group residing in the project area.

PROPOSED CONDITIONS OF CERTIFICATION

No public health conditions of certification are proposed.

ACRONYMS

AFC	Application for Certification
ARB	California Air Resources Board
ATC	Authority to Construct
Btu	British thermal unit
CAA	Clean Air Act (Federal)
CAL/EPA	California Environmental Protection Agency
CAPCOA	California Air Pollution Control Officers Association
CEC	California Energy Commission (or Energy Commission)
CEQA	California Environmental Quality Act
CO	Carbon Monoxide
CO_2	Carbon Dioxide
DPMs	Diesel Particulate Matters
FSA	Final Staff Assessment
MDAQMD	Mojave Desert Air Quality Management District
GVAB	Great Valleys Air Basin
HAPs	Hazardous Air Pollutants
HARP	Hot Spots Reporting Program
HRA	Health Risk Assessment
Rio Mesa SEGF	Rio Mesa Solar Electric Generating Facility (proposed project)
HI	Hazard Index
lbs	Pounds
LORS	Laws, Ordinances, Regulations and Standards
MACT	Maximum Achievable Control Technology
mg/m^3	Milligrams per Cubic Meter
MMBtu	Million British thermal units
MW	Megawatts (1,000,000 Watts)
MWM	Mirror Washing Machines
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NO_3	Nitrates
NOx	Oxides of Nitrogen *or* Nitrogen Oxides
O_2	Oxygen

O_3	Ozone
OEHHA	Office of Environmental Health Hazard Assessment
PAHs	Polycyclic Aromatic Hydrocarbons
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
PSA	Preliminary Staff Assessment (this document)
RELs	Reference Exposure Levels
SEGF	Solar Electric Generating Facility
SO_2	Sulfur Dioxide
SO_3	Sulfate
SOx	Oxides of Sulfur
SJVAB	San Joaquin Valley Air Basin
SRP	Scientific Review Panel
SRSG	Solar Receiver Steam Generator
TACs	Toxic Air Contaminants
TDS	Total Dissolved Solids
VOCs	Volatile Organic Compounds
WSACs	Wet Surface Air Coolers

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SOCIOECONOMICS

James Adams

SUMMARY OF CONCLUSIONS

Energy Commission staff concludes that construction and operation of the Rio Mesa Solar Electric Generating Facility (Rio Mesa SEGF) would not cause significant direct, indirect, or cumulative socioeconomic impacts on the project area's housing, schools, law enforcement, and parks, and would not have a socioeconomic impact on any environmental justice population. Staff also concludes that the project would not induce a substantial population growth or displacement of population, or induce substantial increases in demand for housing or public services. Staff-proposed Conditions of Certification **SOCIO-1** and **SOCIO-2** would ensure project compliance with applicable state and local laws, ordinances, regulations, and standards (LORS).

INTRODUCTION

Staff's socioeconomics impact analysis evaluates the project's changes on existing population and employment patterns, and community services. Staff discusses the estimated impacts of the construction and operation of the Rio Mesa SEGF as described in the Application for Certification (AFC) (2011a) and the project amendment (2012v) on local communities, community resources, and public services. It also provides a discussion of the estimated beneficial economic impacts of the construction and operation of the proposed project.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Socioeconomics Table 1 contains socioeconomics laws, ordinances, regulations, and standards (LORS) applicable to the proposed project.

Socioeconomics Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
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, §§ 65996-65997	Except for a fee, charge, dedication, or other requirement authorized under Section 17620 of the Education Code, state and local public agencies may not impose fees, charges, or other financial requirements to offset the cost for school facilities.
California Revenue & Taxation Code 73	Allows property tax exclusion for certain types of solar energy systems. Assembly Bill 1451 extended the current property tax exclusion for new construction of solar energy systems to January 1, 2017. If a project has started construction prior to the expiration date it would be eligible for the exclusion. After the exclusion sunsets, any solar energy system constructed remains exempt from property tax as long as the property does not change ownership.

SETTING

The proposed project site is located in eastern Riverside County, in the Palo Verde Valley area 13 miles south of the city of Blythe, on lands leased from the Metropolitan Water District of Southern California. Portions of the project gen-tie line, upgraded Bradshaw Trail, access road, and 33kv construction emergency back-up power supply line would be located on public lands administered by the U.S. Bureau of Land Management (BLM) (BS 2012v). The project site is vacant and undeveloped, with some agricultural lands to the east.

Riverside County's population has increased by 41 percent (1,557,271 to 2,191,449) from 2000 to 2010. Riverside County's workforce is predominantly employed in trade, transportation & utilities (22 percent, 116,900 workers), government (20 percent, 107,800 workers), and the leisure and hospitality industry (13 percent, 68,500 workers). About 6.6 percent of Riverside County's workforce is employed in the construction industry (36,000 workers) (CA EDD 2012).

To assess project impacts, the AFC identified a Study Area as a two-hour commute shed from the project site. The applicant's Study Area includes eastern Riverside and Imperial counties in California and La Paz, Maricopa, and Yuma counties in Arizona (BS 2011a, pg. 5.10-9). The applicant expects construction labor would come from labor unions affiliated with the Building and Construction Trades Council (BTC) in Riverside, California and would be willing to hire workers from unions with territory closest to the project site (BS 2011a, pg. 5.10-25).

The applicant provided a copy of the Construction Craft Resources Survey (URS 2012a). The Bechtel Study provides information on the availability of skilled craft workers required for the construction of the Rio Mesa SEGF, and identifies potential staffing challenges. The Bechtel Study notes that the local unions having jurisdiction over the physical location of the project would be the primary source of the construction workforce for the project. Other local unions in the surrounding area would be considered the secondary source for the construction workforce and could involve securing workers in other parts of California, Arizona and Nevada (URS 2012a).

Staff defines the study area related to project impacts on population and workforce projections as Riverside and San Bernardino counties in California and La Paz, Maricopa, and Yuma counties in Arizona. Staff did not include Imperial County in the study area for population and workforce because the major population centers are located along I-10 in California and Arizona, and Imperial County has a small construction workforce (approximately 2 percent of county employment) (BS 2011a, pg. 5.10-18). The study area for impacts to housing is Riverside and La Paz counties. The study area for law enforcement and parks is Riverside County and the study area for environmental justice is a six-mile buffer around the project site.

USING THE 2010 US CENSUS AND US CENSUS BUREAU'S AMERICAN COMMUNITY SURVEY IN STAFF ASSESSMENTS

The detailed social, economic, and housing information previously collected only in the decennial census was not collected for the 2010 Census (US Census 2011a). This information is now collected through the U.S. Census Bureau's American Community Survey (ACS). Decennial census data is a 100 percent count collected once every ten years and represents information from a single reference point (April 1st). The main function of the decennial census is to provide counts of people for the purpose of congressional apportionment and legislative redistricting. ACS estimates are collected from a sample of the population based on information compiled continually and aggregated into one, three, and five-year estimates ("period estimates") released every year. The primary purpose of the ACS is to measure the changing social and economic characteristics of the U.S. population. As a result, the ACS does not provide official counts of the population in between censuses. Instead, the Census Bureau's Population Estimates Program will continue to be the official source for annual population totals, by age, race, Hispanic origin, and sex.

ACS collects data at every geographic level from the largest level (national) to the smallest level available (block group[1]). Census Bureau staff recommend the use of data no smaller than the census tract[2] level. Data from the five-year estimates is used for staff's analysis as it provides the greatest detail at the smallest geographic level. Because ACS estimates come from a sample population, a certain level of variability is associated with these estimates. The data represents a period estimate, meaning the numbers represent an area's characteristics for the specified time period. This variability is expressed as a margin of error (MOE). The MOE is used to calculate the coefficient of variation (CV). CVs are a standardized indicator of the reliability of an estimate. While not a set rule, the US Census Bureau considers the use of estimates with a CV of more than 15 percent cause for caution when interpreting patterns in the data (US Census 2009a). In situations where CVs for estimates are high, the reliability of estimates improves by using estimates for a larger geographic area. When projects are proposed in remote locations, there may be very little population within a six-mile radius of the project site. In these cases, the sample size would most likely be too small to yield estimates with a reasonable CV.

PROJECT-SPECIFIC DEMOGRAPHIC SCREENING

Staff's demographic screening is designed to determine the existence of a minority or below-poverty-level population or both within a six-mile area of the proposed project site. The demographic screening process is based on information contained in two documents: *Environmental Justice: Guidance Under the National Environmental Policy* Act (CEQ 1997) and *Final Guidance for Incorporating Environmental Justice Concerns*

[1] Census Block Group - A statistical subdivision of a census tract. A block group (BG) consists of all tabulation blocks whose numbers begin with the same digit in a census tract; for example, for Census 2000, BG 3 within a census tract includes all blocks numbered between 3000 and 3999. The BG is the lowest-level geographic entity for which the Census Bureau tabulates sample data from the decennial census. http://www.census.gov/dmd/www/glossary.html.

[2] Census Tract - A small, relatively permanent statistical subdivision of a county or statistically equivalent entity, delineated for data presentation purposes by a local group of census data users or the geographic staff of a regional census center in accordance with Census Bureau guidelines. Designed to be relatively homogeneous units with respect to population characteristics, economic status, and living conditions at the time they are established, census tracts generally contain between 1,000 and 8,000 people, with an optimum size of 4,000 people. Census tract boundaries are delineated with the intention of being stable over many decades, so they generally follow relatively permanent visible features. http://www.census.gov/dmd/www/glossary.html.

in EPA's Compliance Analyses (US EPA 1998). Due to the change in the sources and methods of collection used by the U.S. Census Bureau, the screening process relies on Year 2010 U.S. Census data to determine the number of minority populations and data from the 2006-2010 ACS to calculate the population below-poverty-level. Staff determined the 2006-2010 ACS data at the county census division (CCD) level is appropriate to use for the Rio Mesa SEGF because the estimate yielded a reasonable CV (13.64). A CCD is a relatively permanent statistical area established cooperatively by the Census Bureau and state and local government authorities for purposes of presenting statistical data (U.S. Census 2000). The Blythe CCD is a useful geographic area to help identify minority populations and individuals living below the poverty threshold.

Minority Populations

According to *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. An environmental justice population is identified when the minority population of the potentially affected area is greater than fifty percent or 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.

Socioeconomics Figure 1 shows the total population in the six-mile buffer of the proposed site to be 273 persons with a minority population of 85 persons, or about 31 percent of the total population (US Census 2010c). When compared with minority populations in the city of Blythe, the Blythe CCD, and Riverside County, the minority population in the six-mile buffer totals about half of the minority populations of these reference geographies (**Socioeconomics Table 2).** Based on the comparisons, staff concludes that the minority population in the six-mile project buffer is not meaningfully greater than the minority populations in the general population in the local area or Riverside County. Therefore, the minority population in the six-mile buffer does not constitute an environmental justice population as defined by *Environmental Justice: Guidance Under the National Environmental Policy Act* and would not trigger further scrutiny for purposes of an environmental justice analysis.

The population identified in the six-mile buffer lives within unincorporated Riverside County and the community of Palo Verde. **Socioeconomics Table 2** presents the minority population data for the communities of Palo Verde and Ripley plus Riverside County, the city of Blythe and the Blythe CCD.

Socioeconomics Table 2
Minority Populations within the Project Area Plus Riverside County

	Six-Mile Buffer Around Project Site	Riverside County	Blythe CCD	City of Blythe	Palo Verde	Ripley
Total	273	2,189,641	15,045	20,817	171	692
Not Hispanic or Latino: White alone	188	869,068	5,140	5,894	122	59
Minority	85	1,320,573	9,905	14,923	49	633
Percent Minority	31	60	66	72	29	91

Source: US Census Bureau 2010a

Below-Poverty-Level-Populations

Staff also identified the below-poverty-level population based on 2006-2010 American Community Survey 5-year Estimates from the U.S. Census. Poverty status excludes institutionalized people, people in military quarters, people in college dormitories, and unrelated individuals under 15 years old. Approximately 18.8 percent, or 2,697 people in the Blythe CCD live below the poverty threshold. The Blythe CCD includes a portion of eastern Riverside County including the communities of Ripley and Palo Verde. **Socioeconomics Table 3** presents poverty data for the Blythe CCD and Riverside County for reference purposes.

Socioeconomics Table 3
Poverty Data within the Project Area

Area	Total			Income in the past 12 months below poverty level			Percent below poverty level	
	Estimate	MOE[1]	CV[2]	Estimate	MOE	CV	Estimate	MOE
Blythe CCD	14,321	±588	2.5	2,697	±601	13.64	18.80	±4.0
Riverside County	2,075,782	±1,762	0.05	278,358	±7,362	1.60	13.40	±0.40

[1] MOE is the margin of error term used to express variability associated with population estimates.
[2] CV is the coefficient of variation term used to express reliability of an estimate.
Source: US Census Bureau 2010b.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

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, title 14, California Code of Regulations, Section 15382).

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) also states 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. "

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;
- Result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services including police protection, schools, and parks; or
- 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 include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

Staff's assessment of impacts on population, housing, police protection, schools, and parks is based on professional judgments, input from local and state agencies, and the industry-accepted two-hour commute range for construction workers and one-hour commute range for operational workers. The commuting range indicates that construction and operation workers are willing to commute for a considerable time and distance to reach a project on a daily basis rather than relocate to the project area.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Induce Substantial Population Growth

For the purpose of this analysis, staff defines "induce substantial population growth" as a substantial number of workers moving into the project area because of project construction and operation, thereby encouraging construction of new homes or extension of roads or other infrastructure. To determine whether a project would induce population growth, staff analyzes the availability of the workforce and the population within the region. For Rio Mesa SEGF, the region includes Riverside and San Bernardino counties, which staff believes would be the primary source for construction workers for the project. A secondary source of workers would be from other parts of California and La Paz, Maricopa, and Yuma counties in Arizona.

Affected Environment

Socioeconomics Table 4 shows the historical and projected populations for Riverside and San Bernardino counties.

Socioeconomics Table 4
Historical and Projected Populations

Area	Population					
	2000	2010	2020	2030	Population Change 2010-2030	Percent Growth 2010-2030
Riverside County, CA	1,557,271	2,191,449	2,626,222	3,145,948	954,499	43.5
San Bernardino County, CA	1,719,190	2,038,445	2,283,798	2,588,990	550,545	27
La Paz County, AZ	19,579	22,632	25,487	28,074	8,304	24
Maricopa County, AZ	3,097,620	4,063,802	5,276,074	6,207,980	2,144,178	53
Yuma County, AZ	160,656	198,637	271,361	377,598	178,961	90

Source: CA DOF 2012, BS 2011a, Table 5.10-3, pg. 5.10-11, Arizona Department of Economic Security 2012

Socioeconomics Table 5 shows the total labor by skill for Riverside and San Bernardino counties.

Socioeconomics Table 5
Total Labor by Skill for Riverside and San Bernardino Counties (2008-2018)

	Boilermaker	Carpenter	Cement Finisher	Electrician	Iron Worker	Laborer	Millwright	Pipefitter
Riverside and San Bernardino Counties*								
Total Workforce, 2008	78,560	18,380	3,780	5,020	78,560	17,950	120	4,330
Total Projected Workforce, 2018	81,300	18,910	3,910	4,850	81,300	19,500	120	4,340
Growth from 2008	2740	530	130	-170	2740	1550	0	0
Percent Growth from 2008	0.03	0.3	0.03	-0.03	0.03	8.33	0	0
Highest Number of Workers for Project Construction by Craft**								
	374	148	21	498	140	158	166	675

Notes: *Riverside-San Bernardino-Ontario Metropolitan Statistical Area
**Highest number of workers by trade in a month needed for project construction
Source: CA EDD 2010, BS 2012v, Table 5.10-17, pg. 5.10-7

Socioeconomics Table 6 shows construction employment for La Paz, Maricopa, and Yuma counties in Arizona.

Socioeconomics Table 6
Arizona Counties Construction Employment

	La Paz County	Maricopa County	Yuma County
Construction*	191	111,791	3,578

*Most recent data is from 2010
Source: U.S. Bureau of Economic Analysis 2012

Construction Impacts

The applicant notes that construction (from site preparation and grading to commercial operation) would take approximately 30 months. The two solar plants would be constructed in a staggered fashion with Rio Mesa I construction beginning in the fourth quarter of 2013 and Rio Mesa II in the first quarter in 2014, (BS 2012v, pg. 5.10-5). Table 5.10-17 in the project amendment identifies the number of workers needed at the project site. The workforce need would range from a high of 2,188 workers in month 23, to a low of 14 workers in month 3, and an average of 840 workers during the entire construction period. The applicant anticipates that most construction workers would commute daily to the project site. Staff considers the applicant's assumptions regarding local and non-local workforce during project operation, 90 percent and 10 percent, respectively, an appropriate estimation for the project construction workforce. Staff anticipates that the 90 percent local construction workforce would commute daily from their primary residences in Riverside and San Bernardino counties, while the10 percent non-local workers would temporarily relocate closer to the project site during construction.

The applicant would make every effort to hire workers from both primary and secondary unions closest to the project site, but some workers may be drawn from areas beyond a two-hour commuting distance (BS 2012v, pg. 5.10-3). The Rio Mesa SEGF would require a large construction workforce and the AFC and the Bechtel Study noted that seven critical crafts would account for the majority of the construction: boilermakers, iron workers, pipefitters, carpenters, laborers, electricians, and operating engineers. Both the Bechtel Study and the AFC anticipate that some workers would be secured from unions based in other parts of California, and in Arizona and Nevada (URS 2012a). Staff believes that the construction workforce would not cause a significant increase in population in the local area because only an estimated 10 percent of the workforce (218 during peak and 84 on average throughout construction) would relocate temporarily to the project area during construction.

Operation Impacts

Socioeconomics Table 7 presents the operations force for the crafts specifically needed for the Rio Mesa SEGF. As noted in the AFC, an operations workforce of 100 workers would be needed for the project.

Socioeconomics Table 7
Operation Workforce

	Rio Mesa I	Rio Mesa II	Common Area	Total
Solar Field and Power Block Workers	12	12		24
Technicians	8	8		16
Operators			15	15
Warehouse and Maintenance Personnel	-	-	13	15
Administration Personnel (day shift only)	-	-	12	12
TOTAL (including spare laborers)	30	30	40	100

Source: BS 2012v, Table 5.10-20, pg. 5.10-14

The applicant estimates that 90 percent of the operation workforce would come from Riverside County, though some positions (primarily engineering occupations) may be recruited from larger statewide or national labor markets. Staff agrees with the applicant's assumptions about the operations workforce and does expect 10 percent or 10 specialized personnel from outside the region to relocate to the project area for operations employment at Rio Mesa SEGF (BS 2011a, pg. 5.10-51). Ten operational personnel relocating to the project area would not induce substantial population growth.

Conclusion

Staff concludes that the project's construction and operation workforce would not directly or indirectly induce substantial population growth in the project area, and therefore, the project would have a less than significant impact on population growth.

Housing Supply

As of April 1, 2010, there were a total of 800,707 housing units in Riverside County within about a two-hour commute of the project site, with a vacancy of 114,447 units, representing a 14 percent vacancy rate (US Census 2010c). In addition, there were 16,049 units in La Paz County with a vacancy of 6,851 units, representing a 43 percent vacancy rate. A five percent vacancy is largely accepted as a minimum benchmark for a sufficient amount of housing available for occupancy (Virginia Tech 2006). As **Socioeconomics Table 8** shows, the housing counts in the study area indicate a greater supply of available housing units than demand.

Socioeconomics Table 8
Housing Unit Supply Within Two-Hour Commute of the Project Site
In Riverside County and La Paz County in Arizona

Geographic Area	Total	Occupied	Vacant	Percent Vacant
City of Blythe, CA	5,473	4,513	960	17.5
Palo Verde CDP, CA	211	84	127	60

Geographic Area	Total	Occupied	Vacant	Percent Vacant
Indio, CA	28,971	23,378	5,593	19
Indian Wells, CA	5,137	2,745	2,392	46
Palm Desert, CA	37,073	23,117	13,956	38
Palm Springs, CA	34,794	2,274	12,048	35
Cathedral City, CA	20,995	17,047	3,948	19
Riverside County, CA	800,707	686,260	114,447	14
Quartzite, AZ	3,378	2,027	1,351	40
Ehrenberg, CDP, AZ	948	645	303	32
La Paz County, AZ	16,049	9,198	6,851	43
Total	816,756	695,458	121,298	28.5

* CDP – Census Designated Place
Source: US Census Bureau 2010c

Socioeconomics Tables 9 and **10** presents a sample of the available temporary lodging within an approximate two-hour commute range from the project site. **Socioeconomics Table 9** identifies over 12,500 motel/hotel rooms within a two-hour commute of the project site in selected cities in Riverside County and the nearby communities of Ehrenberg and Quartzite in Arizona. **Socioeconomic Table 10** shows abundant RV park spaces in the Blythe and Quartzite area.

Socioeconomics Table 9
Hotel/Motel Supply within Two Hour Commute of the Project Site
in Riverside County, CA. & Ehrenberg and Quartzsite, AZ.

Geographic Area	Hotels/Motels	Total Number of Rooms
Blythe, CA	21	1,032
Indio, CA	13	808
Indian Wells, CA	5	1,508
Palm Desert, CA	14	2,300
Palm Springs, CA	55	5,232
Rancho Mirage, CA	6	1,598
Ehrenberg, AZ	1	84
Quartzite AZ	1	50
Totals	116	12,612

Sources: BS 2011a - Adapted from Table 5.10-6, Pg. 5.10-16

Socioeconomics Table 10
RV Parks Near the Project Site

Geographic Area	RV Spaces
Blythe, CA	795
Quartzite, AZ	1,876

Sources: BS 2011a – Adapted from Table 5.10-7, Pg. 5.10-17, URS 2012a

The Bechtel Study discussed a survey of housing availability in Blythe that identified almost 800 hotel/motel rooms, 7 RV parks and 13 apartment complexes. In addition, there were 79 active home listings at the time of the survey (URS 2012a). Given the ample lodging options in Riverside and La Paz counties and the size of the construction and operations workforces, staff does not expect that the project would necessitate any new housing construction to accommodate construction and operations workers.

Construction Impacts

As noted earlier, 10 percent of the construction workforce would temporarily relocate for construction. **Socioeconomics Tables 8, 9** and **10** indicate that the construction workers (218 during peak and 84 on average) would use a small number of housing/motel/RV park units compared to the overall supply.

Operation Impacts

The project would require 100 full-time employees during project operation. Most of the workforce would come from Riverside County though some may be drawn from larger labor markets and would permanently relocate to the project area (BS 2012v, pg. 5.10-15). The applicant estimates most operational workers would commute from their existing residences to the project site. Staff agrees with these assumptions regarding the operational workforce. Staff has identified 30 cities/communities within a sixty-mile radius of the project including Blythe, Palo Verde, Quartzite, and Ehrenberg where operations workers may currently either live or would have available housing if workers relocated for operations employment (**Socioeconomics Figure 2**). As presented above in **Socioeconomics Table 8**, there would be an adequate housing supply in the cities/communities identified above to accommodate the project's operational workforce if workers wanted to move closer to the project site for ease of commuting.

Conclusion

Staff concludes that the project's construction and operation workforce would not have a significant impact on the housing supply in the project area or Riverside County and La Paz County in Arizona.

Displace Existing Housing and Substantial Numbers of People, Necessitating the Construction of Replacement Housing Elsewhere

As noted earlier, the proposed project site and construction laydown area are located in an unincorporated area of Riverside County known locally as the Palo Verde Valley. The site is vacant and located primarily on undeveloped private land though a portion would be on public land administered by the BLM. The site is in an area comprised primarily of open space and agricultural land.

Conclusion

Staff concludes the project would have no significant impact on area housing as the project would not displace any people from existing homes or necessitate the construction of replacement housing elsewhere.

Public Services

Result in Substantial Physical Impacts to Government Facilities

As discussed under the subject headings below, the Rio Mesa SEGF would not cause significant impacts to law enforcement, parks, or schools.

Law Enforcement

Affected Environment

The Rio Mesa SEGF proposed project site is located within the jurisdiction of the Riverside County Sheriff's Department. There is one sheriff station in Blythe (Colorado River Station) with two to three deputies. The response time from Blythe is approximately 20 to 40 minutes or more depending on if a call for assistance is deemed a priority. Officers on patrol would likely respond from their current location as they are usually on patrol and on call in the service area and not present at the station. In response to a letter sent to the Riverside County Sheriff's Department, staff was advised by a representative of the Sheriff's Department that specific measures such as fencing material, location of lighting, gates, signage and address would reduce the potential for crime (RCSD 2012a). The **Hazardous Materials Management** section of this PSA proposes Conditions of Certification **HAZ-4** and **HAZ-5,** which require the preparation of a Construction Site Security Plan and an Operation Security Plan to ensure site security. The plans also include a protocol for contacting law enforcement and the Energy Commission Compliance Project Manager (CPM) in the event of suspicious activity or emergency. Conditions of Certification **HAZ-4** and **HAZ-5** would reduce impacts to law enforcement services during construction and operation to less than significant.

In addition, the Riverside County Sheriff's Department advised staff that a "No Trespassing" letter should be on file at the sheriff station during construction and operation of the project. This letter would state the following: no one, other than employees, are permitted on the property; the owner or designee is requesting enforcement of trespass laws by the Riverside County Sheriff's Department; the owner or designee will testify in court; the property has been posted with "No Trespassing" signs; and, contact information of the owner/designee. Staff is proposing Condition of Certification **SOCIO-2**, which would require the project owner to submit a "No Trespassing" letter to the Colorado River Station of the Riverside County Sheriff's Department. This letter would remain on file during construction and operation of the Rio Mesa SEGF and would allow law enforcement to take more effective action in dealing with trespassers (CEC 2012ax).

The Riverside County Sheriff's Department also indicated that there is a moderate probability that project-related construction traffic could affect circulation and access on roads near the project site to the extent that emergency response times might be impacted (RCSD 2012a). The **Traffic and Transportation** section of this PSA proposes Condition of Certification **TRANS-2**, which would require the preparation of a Traffic Control, Heavy Haul and Parking/Staging Plan that includes a park-and-ride program for construction workers to reduce congestion on local roads, and means of access for emergency vehicles to the project site. Implementation of proposed Condition of Certification **TRANS-2** would ensure that impacts to emergency response times for law enforcement services would be less than significant during project construction.

The California Highway Patrol (CHP) is the primary law enforcement agency for state highways and roads. CHP has a field office in Blythe with 23 officers on staff. CHP services include law enforcement, traffic control, accident investigation, and the management of hazardous materials spill incidents (BS 2011a, pg. 5.10-36). The officers patrol the Palo Verde area and if called can respond from the patrol area, or if off duty and needed, the officers can respond from their resident posts. The CHP has mutual aid agreements with the Riverside County Sheriff’s Department and the Arizona Department of Public Safety, which is the functional equivalent of the CHP (CEC 2012ay).

Conclusion

Energy Commission staff contacted Riverside County Sheriff Department staff to discuss the proposed project, ascertain their ability to provide law enforcement services to the project, and solicit comments or concerns they might have about the project. A Sheriff Department representative noted that the construction and operation of the project would not require additional facilities or staffing. The Sheriff’s Department representative also noted that during project construction, there is a moderate probability that emergency response times might be impacted (RCSD 2012a). Implementation of proposed Condition of Certification **TRANS-2** noted above would ensure that impacts to law enforcement services (Sheriff’s Department and CHP), including response times would be less than significant during project construction. Based on staff’s communication with the Riverside County Sheriff’s Department, the Rio Mesa SEGF construction and operation would not significantly impact law enforcement services.

Education

Affected Environment

The Rio Mesa SEGF site is located within the Palo Verde Unified School District (PVUSD). There are seven schools in the PVUSD with a current enrollment of 3,486 students for the 2011/2012 school year. This is a reduction of 109 students from the 2009-2010 school year (CA DOE 2012).

Construction Impacts

During construction, staff believes that 90 percent (an average of 756 workers) of the labor force would commute daily from the region. Staff’s research with Building Trades Councils and unions regarding commuting habits of construction workers shows that union workers do not bring their families with them if they temporarily relocate closer to job sites. Therefore, staff does not expect a significant adverse impact to the schools from construction of the proposed project.

Operation Impacts

A total of 100 workers are needed to operate the Rio Mesa SEGF. The applicant believes, and staff concurs, that 90 percent of the operational employees would be drawn from areas within Riverside County. If 10 percent (10) of the operation workers permanently relocate to the Palo Verde area, 11 children could be added to the PVUSD based on the average household size of 3.14 for Riverside County (US Census 2010d). Given the reduction of 109 students since the 2009-2010 school year, the PVUSD has the capacity to absorb these additional students.

The current statutory school fee for the 2011-2012 fiscal year for commercial or industrial development within the PVUSD is $0.51 per square foot of covered and enclosed space (PVUSD 2012). Based on the preliminary project design, approximately 35,460 square feet would be considered occupied structures (BS 2011a, pg. 5.10-54). Based on this preliminary estimate, approximately $18,085 in school fees would be assessed for the Palo Verde Unified School District. Staff is proposing Condition of Certification **SOCIO-1** to ensure the payment of fees to this school district. Rio Mesa SEGF would comply with Section 17620 of the Education Code through the one-time payment of statutory school impact fees to the Palo Verde Unified School District.

Conclusion

Staff concludes the project would not adversely impact service levels for schools and would have a less than significant impact on schools.

Parks

The city of Blythe oversees eight parks that close at 10 pm and do not allow overnight camping (City of Blythe 2012). Riverside County Parks offers outdoor recreation by the Colorado River. The closest facility is the Palo Verde Park, which is located approximately three miles east of the project site on SR-78 along an oxbow of the Colorado River. Recreational activities include boating, fishing, camping, and a playground (BS 2011a, pg. 5.6-20; RCRPOSD 2012).

Conclusion

Some construction and operation workers may use the local parks, but staff does not expect the construction or operation workforce to have a substantial impact on parks and recreation or necessitate construction of new parks in the area.

CUMULATIVE IMPACTS AND MITIGATION

A project may result in significant adverse cumulative impacts when its effects are cumulatively considerable; that is, when the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects [Public Resources Code Section 21083; California Code of Regulations, Title 14, Sections 15064(h); 15065 (c); 15130; and 15355]. Mitigation requires taking feasible measures to avoid or substantially reduce the impacts.

In a socioeconomic analysis, cumulative impacts could occur when more than one project in the area has an overlapping construction schedule, thus creating a demand for workers that cannot be met locally, or when multiple projects' demand for public services does not match a local jurisdiction's ability to provide such services. An influx of non-local workers and their dependents can strain housing, schools, parks and recreation, and law enforcement.

The project site is in eastern Riverside County. The applicant acknowledges that the project's impacts will combine with socioeconomic impacts from other present and reasonably foreseeable future projects in the project vicinity, including the Blythe Solar Power Project, the Rice Solar Energy Project, the Desert Sunlight Solar Farm, and the Genesis Solar Energy Project. Construction of these solar projects could overlap with the construction of the Rio Mesa SEGF (BS 2012v).

In April 2012, the U.S. Bureau of Land Management (BLM) released a Draft Environmental Impact Statement (DEIS) and Draft California Desert Conservation Area Plan Project Amendment for the Desert Harvest Solar Project (US BLM 2012a). The project would be a 150-megawatt (MW) photovoltaic solar energy facility and generation-intertie and would be located in Riverside County near the community of Desert Center (about 30 miles west of Blythe) on lands administered by the BLM. In May 2012, the BLM released a DEIS for McCoy Solar Energy Project, an up to 750-MW photovoltaic solar energy facility in Riverside County. Both documents identify dozens of renewable energy projects in the California Desert District on federal, state, and private land that could have significant cumulative impacts on the environment. They also note that with respect to the social and economic setting of Riverside County, one element to consider is the impact to the labor force (US BLM 2012b).

In a more expansive review, the Bechtel Study noted that there are 118 major projects anticipated to be constructed within a 300-mile radius of the Rio Mesa SEGF with 48 of these projects located within 150 miles. The study acknowledged that many of the 118 competing projects have not received permitting or financial closure. Staff included in its cumulative impact analysis the 23 projects within 120 miles identified in the Bechtel Study plus 46 projects displayed in **Socioeconomics – Appendix A**, for a total of 69 potential projects, including eight transmission line and substation projects. Staff included these 69 projects because they would potentially compete for the same skilled construction craft workers required to build Rio Mesa SEGF. Of the 69 projects, 46 are in California, 20 in Arizona, and three in Nevada.

Using the Rio Mesa SEGF project as a model to determine the construction workforce, staff estimates that the workforce for each project would require about 840 construction workers. This estimation is extremely conservative as many of the projects are of a significantly smaller scale than the Rio Mesa SEGF, including small residential and commercial developments. The eight transmission line and substation projects would require six percent of this amount, or 50 workers during construction. The number of construction workers required for the projects identified above would total approximately 51,640.

To assess the construction workforce cumulative impacts of the 68 projects, staff has reviewed construction employment in selected metropolitan statistical areas (MSAs) in California, Arizona, and Nevada. **Socioeconomics Table 11** shows that in 2012 there were over 390,000 construction workers in the southwestern U.S. that could be available to work on the 69 projects within 120 miles of the Rio Mesa SEGS.

Socioeconomics Table 11
Construction Workforce in Selected MSAs in California, Arizona, Nevada - Within Two Hour Commute

California	Construction
San Diego-Carlsbad-San Marcos	57,900
El Centro	1,500*
Riverside-San Bernardino-Ontario	59,100
Los Angeles-Long Beach-Glendale	110,600
Bakersfield-Delano	17,500
Arizona	
Phoenix-Mesa-Glendale	86,300
Tucson	17,400
Nevada	
Las Vegas-Paradise	36,500
Reno	8,300
Totals	**395,100**

*El Centro MSA combines mining, logging and construction data.
Sources: CA EDD 2012, Arizona Department of Administration 2012, Nevada Department of Employment, Training and Rehabilitation 2012, U.S. Bureau of Labor Statistics 2012

Staff has identified the unemployment rate for each selected MSA from the sources noted in **Socioeconomics Table 11**. The unemployment rate in 2012 ranges from 28.2 percent (El Centro) to 7.2 percent (Phoenix-Tucson-Glendale), with an average of 12.9 percent. Given the large number of construction workers identified in **Socioeconomics Table 11**, staff believes there is an adequate workforce to construct the projects identified in the Bechtel Study, or whatever projects identified in the BLM documents that are permitted and built, as well as the Rio Mesa SEGF.

Using the Rio Mesa SEGF project as a model to determine the operations workforce, staff estimates that the workforce for each project would be about 100. The eight transmission line/ substation projects identified in the list of cumulative projects would likely have a small operation workforce and are not included in the estimate of permanent workers. As discussed in the direct impacts analysis, staff' estimates that ten percent of the operations workforce would permanently relocate to the project area. Staff has identified 49 projects within 60 miles of the Rio Mesa SEGF for the cumulative operational analysis, as this represents a reasonable work commute. The operational workforce for the 49 projects that would relocate to the local area would be about 410 workers.

As shown in **Socioeconomics Table 11**, the labor force within California, Arizona, and Nevada MSAs is more than sufficient to accommodate the labor needs for construction and operation of the Rio Mesa SEGF and other foreseeable cumulative projects. Further, 410 operational workers moving into the 60-mile study area does not constitute population growth, and would not impact schools, housing, parks, and law enforcement services.

The project construction and operation would not directly or indirectly induce population growth, displace substantial numbers of people and/or existing housing, or contribute to a cumulative impact on parks, housing, and schools. As noted above, the Riverside

County Sheriff's Department indicated that there is a moderate probability that project-related construction traffic could affect circulation and access on roads near the project site to the extent that emergency response times might be impacted (RCSD 2012a). Implementation of Condition of Certification **TRANS-2** would ensure that impacts to emergency response times for law enforcement services would be less than significant during project construction. Even if the Sheriff's Department had not raised concerns regarding construction traffic and response times, **TRANS-2** is a condition of certification that staff proposes for the majority of projects to ensure the construction or operation of a project would not significantly impact emergency response times. If a substantial number of the cumulative projects are constructed in a relatively small geographic area during the same time period, mitigation similar to **TRANS-2** could be implemented by CEQA lead agencies. Staff concludes that the construction impact of the Rio Mesa SEGF on law enforcement emergency response times would not be cumulatively considerable.

NOTEWORTHY PUBLIC BENEFITS

The AFC provided an estimate of the direct, indirect, and induced impacts resulting from the construction and operation of the Rio Mesa SEGF based on an IMPLAN model analysis. IMPLAN is an input-output model that relies on a series of multipliers to provide estimates of the number of times each dollar of input or direct spending cycles through the economy in terms of indirect and induced output, or additional spending, personal income, and employment. The IMPLAN model is widely used by governmental agencies, trade associations, and public interest research groups.

According to the AFC, direct impacts consist of expenditures made specifically for the project, such as construction labor and materials. These direct impacts generate economic activity elsewhere in the local economy through the multiplier effect, as initial changes in demand "ripple" through the local economy and generate indirect and induced impacts. Indirect impacts are generated by the expenditures by suppliers who provide goods and services to the construction project. Induced impacts are generated by the spending of households who benefit from the additional wages and business income they earn through the direct or indirect activity (BS 2011a, pg. 5.10-47).

Socioeconomics Tables 12 and **13** present the IMPLAN results presented in the project amendment for the four-county study area (construction) and Riverside County (operations and maintenance).

Socioeconomics Table 12
Rio Mesa SEGF Economic Benefits (2012) Dollars
From Project Construction

Capital Cost (in millions)	$2,000
Four-County Study Area (Riverside, San Bernardino, and Los Angeles, CA and Maricopa, AZ)	
Local Materials and Supply Purchases (in millions)	$71.4
Total Construction Payroll (in millions)	$462.4

Annual Local Construction Expenditures (in millions)	$23.8
Average Annual Local Construction Payroll (in millions)	$154.1
Average Monthly Direct Construction Employment	840
Indirect Employment	172
Induced Employment	3,274
Indirect Income (in millions)	$11
Induced Income (in millions)	$159.1
Total Sales Tax	$5,535,873

Notes: Values in millions are rounded. All values are approximate.
Source: BS 2012v, Adapted from Table 5.10-19, Pg. 5.10-13

PROPERTY TAX

The proposed Rio Mesa SEGF would generate property tax revenue to Riverside County. Because the Rio Mesa SEGF is a renewable energy power-generating facility, the county has jurisdiction over the valuation. As the legislation currently stands, Rio Mesa SEGF qualifies for the exclusion of certain parts from valuation per the Revenue and Taxation Code, Section 73.

Socioeconomics Table 13
Rio Mesa SEGF Economic Benefits (2012) dollars
From Operations and Maintenance (O&M)

Riverside County	
Annual Local (O&M)	$589,600
Total Annual O&M Payroll	$12,300,000
Annual O&M Employment	100
Indirect Employment	0.8
Induced Employment	69
Indirect Income	$36,605
Induced Income	$2,778,257
Total Annual Sales Tax	$45,694
Total Annual Property Taxes	$7,000,000
Palo Verde Unified School District	
One-time School Impact Fee	$18,805

All values are approximate.
Source: BS 2012v, Adapted from Table 5.10-21, Pg. 5.10-17
PVUSD 2012

The applicable property tax rate for the project site is 1.05 percent (RCOT-TC 2012. Assuming the property tax exemptions apply, Riverside County would receive about $7 million annually. This additional property tax revenue would constitute a 2.6 percent increase in the total estimated $266.4-millioncounty property taxes for fiscal year 2011-12 (RC 2011).

RESPONSE TO COMMENTS

Riverside County Transportation and Land Management sent a letter dated January 20, 2012 to Energy Commission staff regarding the Rio Mesa SEGF. Regarding Socioeconomics, the County noted that the Energy Commission should evaluate feasible means to ensure the County can meet demands that the project may have on public services such as law enforcement, housing growth and infrastructure. The County noted that the AFC briefly mentions the anticipated financial benefits of the project, including sales tax and property tax revenues. However, at the time the letter was sent, the County did not have enough information to evaluate the accuracy of the benefits identified by the applicant in the AFC. As a result, the County was unable to determine whether any or all of the benefits will accrue to the County (RCTLM 2012a). Staff has relied on the applicant's estimated benefits of the project related to employment and wages, purchase of materials and supplies, and revenues to the local economy such as sales and property taxes in this analysis. These estimated benefits are similar to those identified in all the solar projects before the Energy Commission during the past two years and staff believes they are reasonable.

CONCLUSIONS

Staff concludes the Rio Mesa SEGF would not cause a significant adverse direct, indirect, or cumulative socioeconomic impact as a result of the construction or operation of the proposed project in the areas of population, housing, schools, parks and recreation as further noted below:

- The minority population in the six-mile buffer does not constitute an environmental justice population as defined by *Environmental Justice: Guidance Under the National Environmental Policy Act* and would not trigger further scrutiny for purposes of an environmental justice analysis.
- The project's construction and operation workforces would not directly or indirectly induce substantial population growth in the project area.
- The project's construction and operation workforce would not have a significant adverse impact on housing within the project area and would not displace any people or housing, or necessitate construction of replacement housing elsewhere.
- The project would not result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services including police protection, schools, and parks.

- The project would not 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 include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

PROPOSED CONDITIONS OF CERTIFICATION

SOCIO-1 The project owner shall pay the one-time statutory school facility development fee to the Palo Verde Unified School District as required by Education Code Section 17620.

Verification: At least 30 days prior to the start of project construction, the project owner shall provide to the Compliance Project Manager (CPM) proof of payment to the Palo Verde Unified School District of the statutory development fee.

SOCIO-2 The project owner shall submit a "No Trespassing" letter to the satisfaction of the Colorado River Station of the Riverside County Sheriff's Department. The "No Trespassing" letter shall remain on file throughout construction and operation of the Rio Mesa SEGF.

Verification: At least 30 days prior to the start of construction, the project owner shall provide a copy of the letter to the Colorado River Station of the Riverside County Sheriff's Department for review and to the CPM for review and approval.

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Socioeconomics - Appendix A

Rio Mesa Solar Electric Generating Facility Cumulative Projects

Project Name	Location	Ownership	Status	Project Description
Devers-Palo Verde No. 2 Transmission Line Project	From the Midpoint Substation to Devers Substation	SCE	CPUC petition to modify request to construct CA-only portion approved by CPUC 11/2009	New 500 kV transmission line parallel to the existing Devers-Palo Verde Transmission Line from Midway Substation, approximately 10 miles southeast of Blythe, to the SCE Devers Substation, near Palm Springs. The ROW for the 500 kV transmission line would be adjacent to existing DPV ROW
Colorado River Substation Expansion	10 miles southwest of Blythe	SCE	Approved 7/2011	500/230kV substation, constructed in an area approximately 1000 ft by 1900 ft
Desert Southwest Transmission Line	118 miles primarily parallel to DPV	Imperial Irrigation District	Approved	118 mile 500kV transmission line from a new substation/switching station near the Blythe Energy Project to the existing Devers Substation located approximately 10 miles north of Palm Springs.
Blythe Energy Project II	Near Blythe Airport	Blythe Energy	Approved	520 MW combined-cycle power plant located entirely within the Blythe Energy Project site boundary, located on 30 acres of a 76-acre site.
Eagle Mountain Pumped Storage Project	Eagle Mountain iron ore mine, north of Desert Center	Eagle Crest Energy	FERC draft EIS published 12/2010	1,300 MW pumped storage project on 2,200 acres of public and private land, designed to store off-peak energy to use during peak hours.
Palen Solar Energy Project	North of I-10, 10 miles east of Desert Center	Solar Millennium	Approved	500 MW solar trough project on 5,200 acres
Blythe Solar Power Project	North of I-10, north of Blythe Airport	Solar Millennium	Approved	1,000 MW solar trough facility on 7,540 acres
NextEra (FPL) McCoy	13 miles northwest of Blythe	McCoy Solar	NOI to prepare an EIS 8/29/11	Up to 750 MW solar PV project on 7,700 acres of BLM land, 470 acres of private land, with a 16 mile gen-tie
McCoy Soleil Project	10 miles northwest of Blythe	EnXco	Plan of Development to Palm Springs BLM	300 MW solar power tower project located on 1,959 acres. Requires a 14 mile transmission line to proposed SCE Colorado Substation south of I-10
Genesis Solar Energy Project	North of I-10, 25 miles west of Blythe, 27 miles east of Desert Center	NextEra (FPL)	Approved, under construction	250 MW solar trough power project on 1,950 acres north of the Ford Dry Lake. 6 mile natural gas pipeline and 5.5 mile gen-tie line to the Blythe Energy Center to Julian Hindes

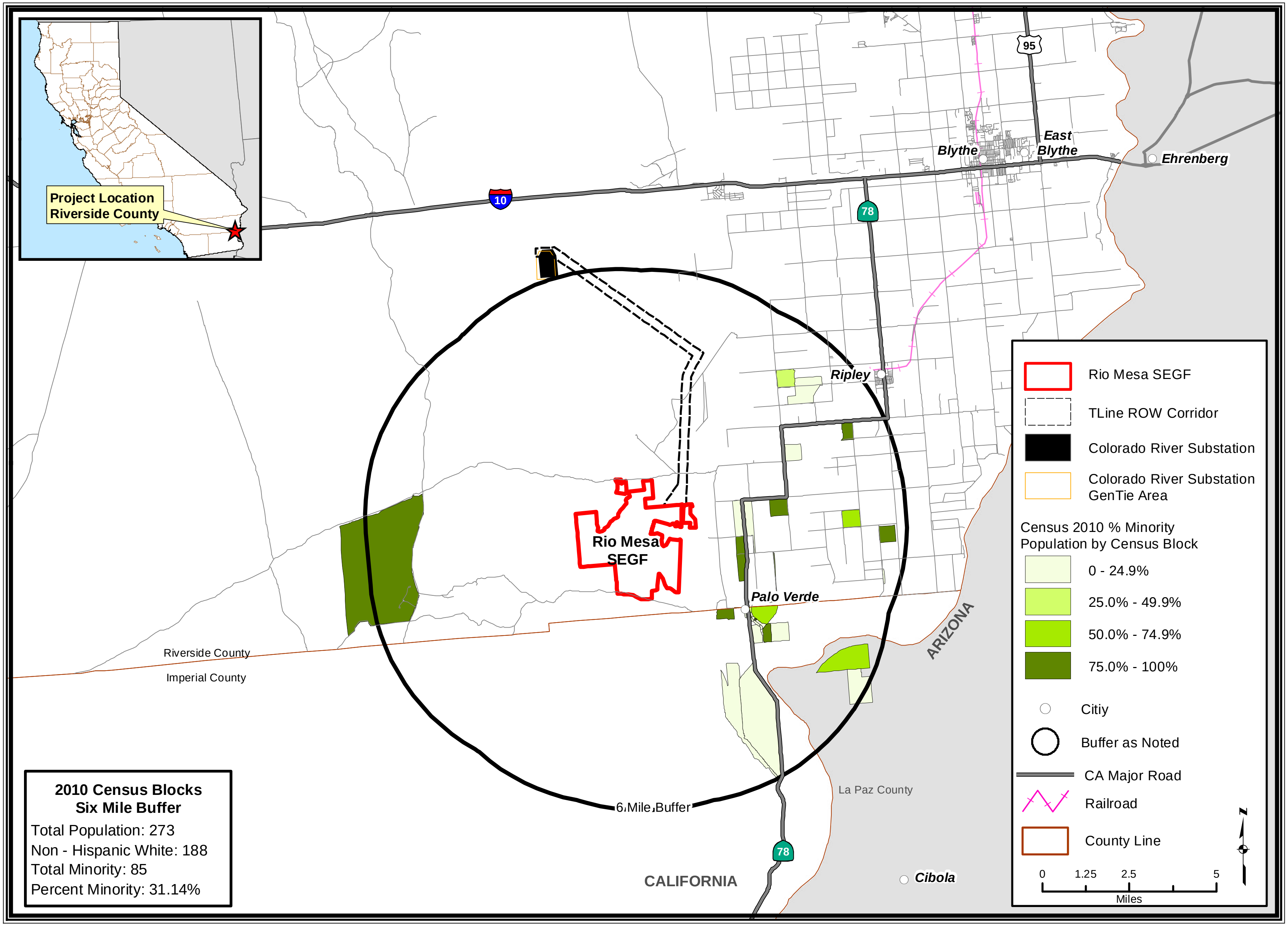
Project Name	Location	Ownership	Status	Project Description
				Transmission Line
Silverado Power I, II, III	West of SR-177, North of I-10	Silverado Power	On hold	3 solar PV projects with a 400 MW total capacity.
Rice Solar Energy Project	Rice Valley, Eastern Riverside County	Rice Solar Energy	Approved, construction date unknown at this time	150 MW solar power tower project with liquid salt storage. Project located on 1,410 acres; includes a power tower approximately 650 feet tall and 10- mile long interconnection with the WAPA Parker-Blythe transmission line
Blythe Airport Solar I Project	Blythe Airport	Riverside County	Approved	100 MW solar PV project located on 640 acres of Blythe airport land
Desert Quartzite	South of I-10, 8 miles southwest of Blythe	First Solar	POD in to BLM	600 MW solar PV project located on 7,724 acres, adjacent to DPV transmission line and SCE Colorado Substation
Desert Sunlight Project	6 miles north of Desert Center	First Solar	Approved	550 MW PV project on 4,144 acres of BLM land, requiring a 12-mile transmission line to the planned Red Bluff Substation
SCE Red Bluff Substation	South of I-10 at Desert Center	SCE	Approved	A proposed new 500/220 kV substation, 2 new parallel 500 kV transmission lines of about 2,500 to 3,500 feet each
Desert Center 50	Desert Center	US Solar Holdings	Under review	A planned 49.5 MW fixed flat panel photovoltaic solar power plant
Sol Orchard	Desert Center	Sol Orchard	Approved	A planned 1.5 MW fixed flat panel PV solar power plant north of I-10, east of SR-177, west of Desert Center Airport
Blythe Mesa Solar I	Blythe	Renewable Resources Group	Under review	A planned 485 MW solar PV project on private land in Blythe
Blythe Solar Power Generation Station 1	Blythe	Southwestern Solar Power	Approved	A planned 4.76 MW solar PV facility, including 69 PV panels that stand 50 feet tall and 72 feet wide
Eagle Mountain Landfill Project	Eagle Mountain , North of Desert Center	Mine Reclamation Corporation and Kaiser Eagle Mountain	Court of Appeals	Project proposed to be developed on a 4,000 acre portion of the Kaiser Eagle Mountain Mine in Riverside County
Wiley's Well Communication Tower	East of Wiley's Well Road just south of I-10	Riverside County	Final EIR	Expansion of Riverside County's fire and law enforcement agencies approximately 20 communication sites to provide voice and data transmission
Eagle Mountain Wind Project Met	South of Eagle Mountain,	LH Renewable	Wind testing pending	Met towers for wind testing

Project Name	Location	Ownership	Status	Project Description
Towers	north of Joshua Tree National Park			
Gestamp Asetym Solar	Northwest of Blythe	Gestamp Asetym Solar	EPA review	37 MW solar power plant
Blythe Energy Project Transmission Line	From the Blythe Energy Project to Devers Sub	Blythe Energy	Under Construction	67.4 miles of new 230 kV transmission line between Buck Sub and Julian Hinds Sub
Green Energy Express Transmission Line Project	Eagle Mountain Sub to So. California	Green Energy Express	Approved	70 mile double circuit 500 kV transmission line from Eagle Mt. Sub to So. California
EnXco	North of Wiley's Well Rd, east of Genesis Solar Project	EnXco	POD in to BLM	300 MW solar PV project
Desert Lily Soleil Project	6 miles north of Desert Center	EnXco	POD in to BLM	100 MW PV plant on 1,216 acres of BLM land
Big Maria Vista Solar Project	North of I-10, 12 miles nw Blythe	Bullfrog Green Energy	POD in to BLM	500 MW PV project on 2,684 acres
Chuckwalla Solar I	1 mile north of Desert Center	Chuckwalla Solar I	POD in to BLM	200 MW solar PV project on 4,083 acres
Mule Mountain Solar Project	South of I-10, 4 miles west of Blythe	Bullfrog Green Energy	POD in to BLM	500 MW solar PV project located on 2,684 acres
Quartzsite Solar Energy	10 miles north of Quartzsite	Solar Reserve	Draft EIS released	100MW, 653 foot tall power tower located on 1,500 acres of BLM land
Desert Harvest	6 miles north of Desert Center	EnXco	DEIS published	100MW PV project located on 930 acres
Ocotillo Sol	9 miles southwest of El Centro	SDG&E	NOI published	18 MW PV project on 115 acres
Mount Signal Solar Farm #1	Calexico	82LV 8ME	EA pending	600 MW solar PV project located on 1,440 acres
Centinela Solar Energy Project	Imperial County	Centinela Solar	ROW approved	230 kV line and 275 MW solar generating facility on 2,067 acres
Imperial Solar Energy Center South	Westside Main Canal, southwest of El Centro	CSOLAR Development	ROW granted	200 MW solar facility located on 19 acres of BLM land
Imperial Solar Energy Center West	El Centro	CSOLAR Development	ROW granted	250 MW solar facility. ROW granted for above ground 230 kV transmission line located on 65 acres of BLM land. PV Plant on approximately 1,130 acres of private land in Imperial County.
Tule Wind Energy Project	60 miles east of San Diego,	Iberdrola Renewables	ROW approved	186 MW wind project located on 12,239 acres of public land.

Project Name	Location	Ownership	Status	Project Description
	near Boulevard			
Ocotillo Wind Energy Facility	5 miles west of Ocatillo	Ocotillo Express	ROW approved	115 MW wind facility located on 12,436 acres of BLM land
Yuma Crude Oil Refinery	100 miles SW of Phoenix and 48 miles E of Yuma	Arizona Clean Fuels Yuma	Under review	Oil refinery on 1,400 acres
Starwood Solar 1	75 miles west of Phoenix	Lockheed Martin	Under Construction	290 MW concentrated solar power plant
Agua Caliente PV	Between Yuma and Phoenix	First Solar	Under Construction	290 MW solar PV plant on 2,400 acres
La Paz Solar Tower	La Paz County, AZ	EnviroMission	Pre-construction	200 MW power station on 11.000 acres
Stateline Solar Project	Eastern San Bernardino County	Desert Stateline LLC	Notice of intent filed	300 MW solar PV project on 2,000 acres of public land
Albiasa Solar Plant	Kingman, AZ	Albiasa Solar	Under review	200 MW solar facility located on 1,800 acres
Solana Power Plant	Gila Bend, AZ	APS	Under Construction	250 MW solar power plant located on 1,900 acres
Ogilby Solar	Chocolate Mountain	Pacific Solar Investments	Revised POD 8/26/11	1,500 MW Solar Thermal Trough
Mule Montain III	Chuckwalla Valley	EnXco	Pending	200 MW Solar PV
La Posa Solar Thermal	Stone Cabin, AZ	Pacific Solar Investments	Pending	2,000 MW Solar
Nexlight Quartzsite	Quartzsite, AZ	Nextlight Renewable Power	Pending	50 MW CSP Trough
Quartzsite Solar	Quartzsite, AZ	Quartzsite Solar Energy	Pending	600 MW CSP Trough
Wildcat Quartzsite	Quartzsite, AZ	Wildcat Quartzsite Solar	Pending	800 MW CSP Tower
Oro Valley Wind	Black Mountain, CA	Oro Valley Power	Pending	180 MW Wind Project
IMPERIAL WIND	BLACK MOUNTAIN, CA	IMPERIAL WIND	AUTHORIZED	48-65 MW
LH Renewables Riverside County Type II	Eagle Mountain, CA	LH Renewables	Pending	Unknown
Milpitas Wash	Chuckwalla Valley	John Deere Renewables	Authorized	Unknown
Graham Pass Wind Project	Riverside County	Graham Pass Inc.	Pending	175 MW Wind Project
Palo Verde Mesa Solar Project	N/W of Blythe	Renewable Resources Group	NOP Filed	486 MW Solar PV

SOCIOECONOMICS - FIGURE 1

Rio Mesa Solar Electric Generating Facility - Census 2010 Minority Population by Census Block - Six Mile Buffer



SOCIOECONOMICS

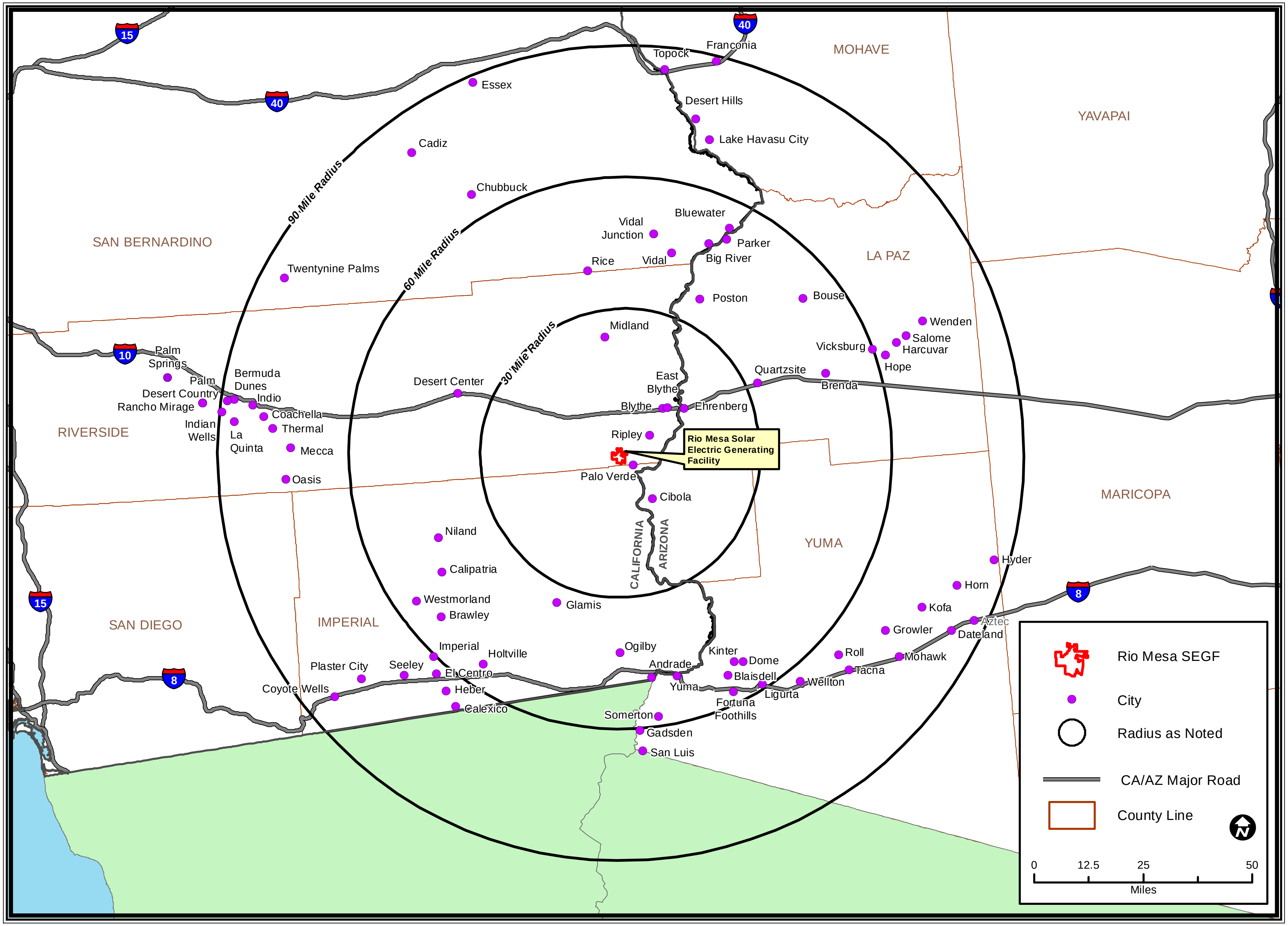
CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: URS - Multinet & Census 2010, PL94-171

SOCIOECONOMICS - FIGURE 2

Rio Mesa Solar Electric Generating Facility

California and Arizona Cities, Towns and Census Designated Places within 2 Hours Commute



SOCIOECONOMICS

CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: URS - ESRI

WATER SUPPLY

Christopher Dennis, CHG and Abdel-Karim Abulaban, P.E.

SUMMARY OF CONCLUSIONS

The California Energy Commission staff (staff) believes the project would comply with all applicable federal, state, and local laws, ordinances, regulations, and standards (LORS) with the adoption of the recommended conditions of certification. Staff also believes that construction and operation of the Rio Mesa Solar Electric Generating Facility (Rio Mesa SEGF) would not result in unmitigable project-specific direct, indirect, or cumulative significant impacts to surface or groundwater resources with the adoption of the recommended conditions of certification.

Based on staff's assessment of the proposed Rio Mesa SEGF, staff concludes the following:

- <u>Well Interference</u>. Based on staff's preliminary analysis of potential groundwater drawdown by the proposed project, groundwater wells on property adjacent to the proposed project could be significantly impacted by the project pumping. Staff's analysis is based on a simple numerical model and does not take into account groundwater level stabilizing effects of recharge from drains, irrigation, and mountain front precipitation. A more refined analysis using the MODFLOW computer program, which can take into consideration the effects of these conditions, could be completed by the applicant. Even with these model estimates, quantification of well interference impacts may not be possible until actual long-term groundwater production occurs. To ensure that well interference impacts are monitored and mitigated to a level of less than significant, staff recommends Conditions of Certification **WATER SUPPLY-4** and **-5**. Condition of Certification **WATER SUPPLY-4** would require a pre-construction baseline established for groundwater elevation and ongoing monitoring and reporting of groundwater elevation and pumping volumes to identify changes in baseline aquifer conditions. Condition of Certification **WATER SUPPLY-5** would require mitigation for significant impacts to adjacent property wells.
- <u>Groundwater Quality</u>. Groundwater quality would not be significantly impacted by the proposed project pumping. Concentrations of total dissolved solids (TDS), chloride, fluoride, sulfate, arsenic, and iron in the groundwater beneath the proposed project site currently exceed California Maximum Contaminant Levels (MCLs) for protection of public health or taste and odor thresholds. Drinking and sanitation water for plant operation employees would have to be treated and filtered prior to use. Water quality would be routinely monitored to ensure compliance with state and local LORS. Staff also concludes that the Rio Mesa SEGF complies with the state's water policy to feasibly use the least amount of the lowest-quality water available. Staff recommends Condition of Certification **WATER SUPPLY-3** which would ensure that the proposed project drinking and sanitation water supply complies with local and state drinking water LORS.
- <u>Well Abandonment</u>. There are several monitoring wells and possibly production wells at the proposed project property that could provide a conduit for contaminants

to enter the regional aquifer. To protect the regional aquifer water quality, staff recommends Condition of Certification **WATER SUPPLY-7**, which would require proper abandonment of all of these wells.

- Woodlands and Wetlands. Lands to the east of the proposed project common area contain sensitive woodlands in the washes and sensitive mesquite and seep weed habitat in the wetlands. Based on staff's preliminary analysis of potential groundwater drawdown by the proposed project, the sensitive habitat could be significantly impacted by the project pumping. Staff's analysis is based on a simple numerical model and does not take into account water level stabilizing effects of recharge from drains, irrigation, and mountain front precipitation. A more refined analysis using the MODFLOW computer program, which can take into consideration the effects of these conditions, could be completed by the applicant. Even with these model estimates, quantification of drawdown may not be possible until actual long-term groundwater production occurs. Condition of Certification **WATER SUPPLY-4** would require installation of groundwater monitoring wells between the proposed project pumping wells and the sensitive vegetation. The comparison between baseline and ongoing conditions would allow quantification of potential impacts due to project groundwater pumping and mitigation of significant impacts, as described under **Biological Resources** and recommended in Condition of Certification **BIO-8**.
- Seeps and Springs. There are no identified seeps or springs in the alluvial/fluvial formation in the project vicinity that could be affected by the proposed project groundwater pumping. The nearest seep or spring is Clapp Spring in the Palo Verde Mountains.
- Colorado River. The project would use groundwater that is in hydraulic connection with the Colorado River and may capture groundwater that would otherwise contribute to the volume of water flow in the Colorado River. Due to some issues with the computer model submitted by the applicant that raise questions about the reliability of the model, staff could not evaluate and quantify the potential effect that the project groundwater pumping would have on the volume of flow in the Colorado River. Staff, therefore, conservatively assumes that any withdrawal of groundwater by the proposed project would directly affect the volume of flow in the river and require mitigation. The proposed method of mitigation must be submitted to staff for review and analysis prior to publication for the Final Staff Analysis (FSA). The submittal must demonstrate how the project owner will conserve Colorado River water in a volume equivalent to the volume of groundwater pumped by the project and discuss in detail how the elements required by proposed Condition of Certification **WATER SUPPLY-6** would be satisfied.
- Groundwater Basin Balance. The volume of groundwater pumped over the life of the proposed project would be 0.08 percent of the volume of groundwater in the Palo Verde Mesa Groundwater Basin (PVMGB), which is not significant. Underflow from the Chuckwalla Valley Groundwater Basin (CVGB) is minimal and the Colorado River recharges the Palo Verde Valley Groundwater Basin (PVVGB) when water levels in that groundwater basin decline. In addition, any groundwater pumped by

the proposed project would be mitigated under staff recommended Condition of Certification **WATER SUPPLY-6**.

- Subsidence. There is no documented ground subsidence near the proposed project site. In addition, the volume of groundwater that would be extracted for construction and over the 25-year power plant lifespan is relatively small given the volume of the alluvial aquifer from which the water would be extracted and the moderating effect of percolation of irrigation and canal water in the Palo Verde Valley and underflow from the Colorado River. Staff believes the potential for subsidence to occur as a result of the proposed project pumping would be less than significant
- Cumulative Impacts. The proposed project could significantly impact other groundwater wells, the PVMGB and PVVGB balance, or the volume of flow in the Colorado River, cumulatively, when combined together with existing and reasonably foreseeable major projects. However, staff recommends Condition of Certification **WATER SUPPLY-6**, which would require all groundwater pumped by the project to be mitigated and would, thereby, avoid these potential significant impacts.

INTRODUCTION

The California Environmental Quality Act (CEQA) requires that the significant environmental effects of a proposed project be identified and that such impacts be eliminated or mitigated to the extent feasible (Pub. Resources Code, § 21002). CEQA defines a “significant effect” on the environment as a “substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including … water” (Cal. Code Regs., tit. 14, § 15382).

This section analyzes potential significant impacts to water supply resources that could originate from the construction and operation of the Rio Mesa SEGF. Where the potential of a significant impact is identified, staff has proposed mitigation to reduce the significance of the impact and, as appropriate, has recommended conditions of certification. Similarly, staff has included conditions of certification to ensure that the project complies with all laws that are or would be, absent the Energy Commission’s exclusive jurisdiction, applicable to the project.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local LORS would apply to the Rio Mesa SEGF and similar facilities, and help ensure the best and appropriate use and management of both soil and water resources by protecting human health and the environment.

Water Supply Table 1
Laws, Ordinances, Regulations, and Standards

Applicable LORS	Description
Federal	
Clean Water Act (33 USC Section 1257 et seq.)	The primary objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the Nation's surface waters. Pollutants regulated under the CWA include "priority" pollutants, including various toxic pollutants; "conventional" pollutants, such as biochemical oxygen demand, total suspended solids, oil and grease, and pH; and "non-conventional" pollutants, including any pollutant not identified as either conventional or priority. California established its regulations to comply with the CWA under the Porter-Cologne Water Quality Control Act of 1967.
Colorado River, Law of the River	The Colorado River is managed and operated under numerous compacts, federal laws, court decisions and decrees, contracts, and regulatory guidelines collectively known as the "Law of the River." This collection of documents apportions the water and regulates the use and management of the Colorado River among the seven basin states and Mexico. According to the "Law of the River," wells that draw water from the Colorado River by underground pumping need an entitlement for the diversion of water from the Colorado River. Consumptive use can occur through direct diversions of surface water, as well as through withdrawal of water from the river by underground pumping.
The U.S. Bureau of Reclamation, Colorado River – Proposed Accounting Surface Rule, 73 Federal Register 40, 916 (July 16, 2008) (subsequently withdrawn)	The U.S. Bureau of Reclamation (USBR) proposed the accounting surface rule to eliminate the unlawful use of Colorado River on July 16, 2008 in the Federal Register (73 Federal Regulation 40,916). Under this rule, users within the lower Colorado River Basin can divert tributary flow before it reaches the Colorado River. However, once flow reaches the river, entitlements are required for diversions. The river aquifer is hydraulically connected to the Colorado River and it has been proposed that the "accounting surface" is defined as groundwater levels that would occur should the Colorado River be the only source of groundwater in the aquifer (USGS, 1987; USGS, 2000a). Water levels higher than the accounting surface indicate recharge from tributary water sources. Wells drawing water from the river aquifer (or water below the accounting surface) draw water from the Colorado River and, under the rule, would need to be accounted in the consumptive use of the river. In cases where water is drawn from the river aquifer, an entitlement is required from the USBR.
State	
Warren-Alquist Act, Section 25008	States that it is the policy of the state to promote "all feasible means" of water conservation and "all feasible uses" of alternative water supply sources.
The 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. Section 13000 also states that the state must be prepared to exercise its full power and jurisdiction to protect the quality of the waters of the state from degradation.
California Constitution, Article 10, Section 2	This section requires that the water resources of the state be put to beneficial use to the fullest extent possible and states that the waste, unreasonable use, or unreasonable method of use of water is prohibited.

Applicable LORS	Description
California Water Code Sections 461, 13550, and 13551	Discourages use of potable water for non-potable uses, including industrial applications, unless alternatives would cause a loss or diminution of any existing water right, an adverse environmental impact, or be economically or otherwise infeasible.
California Water Code Section 13751	Requires a well completion report to be filed with the state for well construction, alternation, or destruction.
California Water Code Sections 4999 through 5009	This section requires additional management of groundwater resources in the Counties of Riverside, San Bernardino, Los Angeles, and Ventura due to the limited and in many places overdrawn supply of groundwater. Under this provision, every person extracting ground water at the rate of 25 acre-feet per year (AF/y) or more in these counties is required to file a Notice of Extraction and Diversion of Water with the SWRCB.
California Safe Drinking Water Act and Riverside County Code Title 13, Chapter 13.20, Water Wells	The California Safe Drinking Water Act requires public water systems to obtain a Domestic Water Supply Permit. Public water systems are defined as systems for the provision of water for human consumption through pipes or other constructed conveyances that have 15 or more service connections or regularly serve at least 25 individuals daily at least 60 days out the year. California Department of Public Health (CDPH) administers the Domestic Water Supply Permit program, and has delegated issuance of Domestic Water Supply Permits for smaller public water systems in Riverside County to the county. Under the Riverside County Code Title 13, Chapter 13.20, Water Wells, the Riverside County Department of Environmental Health monitors and enforces all applicable laws and orders for public water systems with less than 200 service connections. Periodic monitoring of water quality from potable water wells would be required. The proposed project would likely be considered a non-transient, non-community water system.
Local	
Riverside County Code, Title 13, Chapter 13.20 – Well Logs	This section requires that a report of well excavation for all wells dug or bored for which a permit has been issued be submitted to the Riverside County Department of Environmental Health within 60 days after completion of drilling. California Department of Water Resources (DWR) Form 188 shall satisfy this requirement as stipulated under California Water Code Section 13571.
Riverside County Ordinance Code, Title 13, Chapter 13.20 – Water Quality Standards	This section requires that beneficially used well water is tested for radiological, bacteriological, and chemical contaminants as required by Riverside County Department of Environmental Health. Laboratory testing must be performed by a State of California-certified laboratory. The results of the testing are to be provided to the County Department of Environmental Health within 90 days of pump installation.
Riverside County Code, Title 13, Chapter 13.20 – Well Abandonment	This section provides that all abandoned wells shall be destroyed in such a way that they would not produce water or act as a channel for the interchange of water, and would not present a hazard to the safety and well-being of people or animals. Destruction of any well shall follow requirements stipulated in DWR Bulletin No. 74-81, provided that at a minimum the top 50 feet shall be sealed with concrete, or other approved sealing material.

Applicable LORS	Description
Riverside County Code, Title 13, Chapter 13.20 – Declaration of Proposed Reuse	Requires that any well that has not been used for a period of one (1) year shall be properly destroyed unless the owner has filled a “Notice of Intent” with the health officer declaring the well out of service and declaring his intention to use the well again.
State Policies and Guidance	
Integrated Energy Policy Report (Public Resources Code, Div. 15, Section 25300 et seq.)	In the 2003 Integrated Energy Policy Report (IEPR), consistent with SWRCB Policy 75-58 and the Warren-Alquist Act, the Energy Commission adopted a policy stating they will approve the use of fresh 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.”
State Water Resources Control Board Res. 75-58	The principal policy of the SWRCB that addresses the specific siting of energy facilities is the Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling (adopted by the Board on June 19, 1976, by Resolution 75-58). This policy states that fresh inland waters should only be used for power plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound. In a letter dated January 20, 2010, the SWRCB clarified that this policy applies in most cases to surface water, not groundwater.
State Water Resources Control Board Res. No. 88-63	States that all groundwater and surface water of the state are considered suitable for municipal or domestic water supply with the exception of those waters that meet specified conditions.
State Water Resources Control Board Res. 2005-0006	Adopts the concept of sustainability as a core value for State Water Board programs and directs its incorporation in all future policies, guidelines, and regulatory actions.

SETTING

The Rio Mesa SEGF proposed project location is in the Sonora Desert at the confluence of Colorado River fluvial deposits and alluvial fan deposits emanating from the Mule and Palo Verde Mountains (BS, 2011a). Water resources in this area are limited. Water is used extensively for agriculture, urban, industrial, and recreational purposes. Due to the limited supply and extensive use of water in this area, there is a need for an elevated degree of water use conservation and management.

PALO VERDE MESA

The project would be constructed and operated in the Palo Verde region of eastern Riverside and Imperial Counties in a part of the greater Colorado River Valley. Palo Verde is divided into two sections, the current flood plain, referred to as the Palo Verde Valley, and the upland terraces that flank the valley, called Palo Verde Mesa. The proposed project is located on the Palo Verde Mesa, adjacent to the mesa-valley boundary.

Palo Verde Mesa has an arid climate characterized by mild winters and hot summers. Precipitation in the region falls far short of the water requirement for typical (non-desert) crops and landscaping vegetation. The climate, characterized by high temperatures, low humidity, and frequent winds, places the region in the highest evapotranspiration zone in California (ETo Zone 18)[1]. ETo for Zone 18 is 71.6 inches (DWR, 1999). Precipitation is typically concentrated about equally during summer and winter storms. These storms provide source water for hard rock seeps and springs in the Palo Verde Mountains (USGS, 1973). Summer storms cause high intensity, short-duration rainfall with rapid runoff. Winter storms bring gentle rains with little or no runoff. As a result, there are no perennial streams on the Palo Verde Mesa. Also, there are no seeps or springs in the Mule Mountains or in that alluvial basin between the Colorado River and the Palo Verde and Mule Mountains (USGS, 2012). The nearest seep or spring is Clapp Spring in the Palo Verde Mountains (USGS, 2012).

Native vegetation in the region primarily consists of three plant community types: creosote bush scrub associated with undeveloped desert areas; riparian plant communities associated with alluvial washes and channel banks of the Colorado River and its various canals and drains; and agricultural areas in active cultivation. Approximately 0.65 acres of potentially jurisdictional wetlands are within the project boundary along the central eastern part of the project (BS, 2012v). Additional wetlands are located adjacent to the project on the east near Hodges canal.

Hydrogeology

Groundwater in the area of the proposed project is contained within the Colorado River Hydrologic Region, which covers about 12,800,000 acres of southeastern California (DWR, 2003). The Colorado River Hydrologic Region is subdivided into 64 groundwater basins and subbasins (DWR, 2003). Water supply for the proposed project would come from the PVMGB, one of the 64 groundwater basin and subbasins in the region.

The PVMGB is approximately 226,000 acres in size, as defined by the California Department of Water Resources (DWR), and is not an adjudicated groundwater basin (DWR, 2003). The PVMGB is defined by the Big and Little Maria Mountains to the north, McCoy and Mule Mountains to the west, the Palo Verde Valley to the east, and the Palo Verde Mountains to the south (DWR, 2003). There are no known faults in the fluvial/alluvial fill in the vicinity of the proposed project that could impede groundwater flow (S&WE, 1976).

Groundwater from the PVMGB is the primary natural water supply for the Palo Verde Mesa area, providing water for domestic, industrial, and agricultural users. Surface water from the Colorado River is the primary source of water for agriculture in the area and is provided by the Palo Verde Irrigation District (PVID). Groundwater outflow is through evapotranspiration, agriculture runoff drains, and under flow to the Colorado River, whose flow is adjudicated (USBR, 2012). Historically, because of agricultural development, groundwater consumption exceeded groundwater recharge, and adversely affected river flows and agreements surrounding water volume in the river. Resulting declines in groundwater levels and storage have caused water use in this

[1] ETo represents the average annual water requirement for grass, which is the reference crop for the ETo system.

area to be regulated now by a complex set of laws and rules known as the ‘Law of the River’ (USBR, 2012).

The youngest major units in the Palo Verde region, the Older Alluvium and Younger Alluvium, were deposited by the Colorado River and are the primary water-bearing units of the aquifer system at the proposed project site (S&WE, 1976). The Older and Younger Alluvium were deposited as a series of flood plain deposits. The Older Alluvium is composed of ancestral flood-plain deposits and results from all but the most recent cycle of erosion and deposition by the Colorado River. The Older Alluvium comprises all of the groundwater system deposits of the Palo Verde Mesa and extends beneath the Palo Verde Valley, underlying the Younger Alluvium. The Older Alluvium is much thicker than the Younger Alluvium, reaching thickness of 600 feet beneath the central portion of the valley and the mesa and pinching out along the bordering bedrock mountains. The Older Alluvium is composed of sand, silt, and clay with minor amounts of gravel. The U.S. Geological Survey (USGS) also described the composition and productivity of the Older Alluvium in the mesa. The Older Alluvium includes a narrow zone of highly productive gravel lenses, which occur within a mile from the mesa-valley boundary.

The most-recent erosional episode carved the lowest terrace of the present-day Palo Verde Mesa, as well as a trench in the central portion of these older flood-plain deposits. The Younger Alluvium fills this trench with about 100 feet of sediments and comprises the present-day flood plain deposits of the Palo Verde Valley. The Younger Alluvium is predominately sand and gravel with minor amounts of silt and clay. The alluvial/fluvial aquifer at proposed project site is underlain by a regional interbedded sand, silt, and clay unit and the Pliocene Bouse formation (S&WE, 1976).

The Bouse formation includes a marine to brackish-water estuarine sequence deposited in an arm of the proto-Gulf of California (USGS, 1973; USGS, 2000b). This formation has alternatively been interpreted as, or may include, lacustrine sediments deposited in a closed, brackish basin (S&WE, 1976). The Bouse Formation is widely reported in the Colorado Valley and tributary basins in southeastern California and descriptions of this formation come from occurrences outside of Chuckwalla Valley. The unconsolidated to semi-consolidated sediments are reported to yield several hundred gallons per minute (gpm) to wells perforated in coarse-grained units (USGS, 2000b). Beneath the proposed project site, the Bouse formation acts as a clay aquitard and is encountered at approximately 305 to 435 feet below ground surface (bgs) (BS, 2011a). It is reported to be composed of a basal limestone (marl) overlain by interbedded clay, silt, sand, and tufa. The top of the Bouse Formation is relatively flat lying with a reported dip of approximately two degrees south of Cibola (USGS, 1973).

Unconformably underlying the Bouse formation is a fanglomerate composed chiefly of angular to subrounded and poorly sorted partially to fully cemented pebbles with a sandy matrix (USGS, 1973). The fanglomerate gives form and provides the matrix for a confined aquifer (S&WE, 1976; BS, 2011a). The fanglomerate is likely Miocene-age, but may be, in part, Pliocene-age (USGS, 1973). The Fanglomerate represents composite alluvial fans built from the mountains towards the valley and the debris of the fanglomerate likely represent a stage in the wearing down of the mountains following the pronounced structural activity that produced the basin and range topography in the area (USGS, 1973). Bedding surfaces generally dip from the mountains towards the basin. The fanglomerate reportedly dips between 2 and 17 degrees near the mountains due to structural warping (USGS, 1973). The amount of tilting indicates a general decrease in structural movements since its deposition (USGS, 1973).

Beneath the fanglomerate is metamorphic and igneous intrusive rocks forming bedrock of pre-Tertiary age (USGS, 1973). The bedrock topography in the study area has not been determined but appears to lie at depths exceeding 1,000 feet bgs in Parker Valley approximately three miles to the northeast and appears to be an insignificant source of water (USGS, 1973).

Historic Groundwater Levels and Flow

At the proposed project site, groundwater first occurs unconfined in the surficial alluvial/fluvial aquifer at a depth of approximately 125 to 145 feet bgs (BS, 2011a). There are groundwater monitoring wells and possibly other non-functioning wells at the proposed project site, which were installed or used during the siting evaluation of the proposed Sun Desert Nuclear Power Plant (S&WE, 1976). Data from this siting evaluation assisted the applicant to estimate that the horizontal hydraulic gradient of the aquifer beneath the proposed project site is approximately 0.0003 feet per foot (ft/ft) towards the southwest (S&WE, 1976; BS, 2011a). In addition, groundwater level differences between shallow and deeper wells indicate the existence of a vertical downward gradient (BS, 2011a).

As presented in **Water Supply Table 2** below, the groundwater elevation appears relatively stable in the proposed project site vicinity. The well with the greatest change in groundwater elevation (008S021E34R001S) is located in a mesa wash and might be screened in a perched water zone as indicated by the shallow depth to groundwater. The relatively stable groundwater levels have been measured over a decades-long period of time and suggest that groundwater withdrawal from the underlying aquifer has not significantly changed the water balance within the PVMGB due to the stabilizing effects of recharge from drains, irrigation, and mountain front precipitation.

Water Supply Table 2
Historical Groundwater Elevation Data

Groundwater Elevation in the Proposed Project Site Vicinity								
Well ID	Well Location	Period of Groundwater Monitoring (yrs)	Number of Groundwater Elevation Measurements	Depth Below Ground Surface (ft)		Measured Groundwater Elevation (amsl)		
				Min. (ft)	Max. (ft)	Min. (ft)	Max. (ft)	Range (ft)
008S021E34R001S	Mesa	2000 - 2010	4	39.38	49.01	291.09	300.72	9.63
008S021E28R003S	Mesa	1976 - 2011	8	141	142.67	222.53	224.2	1.67
008S021E25N001S	Valley	2006	7	9.20	10.30	223.5	224.6	1.1
008S021E28R002S	Mesa	1976 - 2010	5	140.27	141.00	224.5	225.23	0.73
008S021E28P001S	Mesa	2000 - 2010	4	161.33	163.48	212.22	214.37	2.15
008S021E24H001S	Valley	1980 - 1994	5	10.85	11.26	225.78	226.19	0.41
008S021E24C001S	Valley	1980 - 2006	21	6.58	11.77	226.83	232.02	5.19

Data Source: BS, 2011a; USGS, 2012.

U.S. Bureau of Reclamation, Proposed Colorado River Accounting Surface Rule (subsequently withdrawn)[2]

The Consolidated Decree of the United States Supreme Court in Arizona vs. California, 547 U.S. 150 recognized that consumptive use of water from the Colorado River can occur by groundwater withdrawal. Under this decree, users within the lower Colorado River Basin (which includes the proposed project) can divert tributary flow before it reaches the Colorado River. However, once flow reaches the river, entitlements are required for diversions. The river aquifer is hydraulically connected to the Colorado River and it has been proposed that the “accounting surface” is defined as groundwater levels that would occur should the Colorado River be the only source of groundwater in the aquifer (USGS, 1987; USGS, 2000a). Water levels higher than the accounting surface indicate recharge from tributary water sources.

According the accounting surface definitions, wells pumping groundwater from the river aquifer (or water below the accounting surface) draw water from the Colorado River and, as such, need to be accounted in the consumptive use of the river. In cases where groundwater is pumped from the river aquifer, an entitlement is required from the U.S. Bureau of Reclamation (USBR). The USBR proposed the accounting surface rule to eliminate the unlawful use of Colorado River on July 16, 2008 in the Federal Register (73 Federal Regulation 40,916). As of the date of this analysis, a rule has not been adopted and the USBR has no accepted method for determining whether there is unauthorized consumptive use of the river. At the proposed project site, current groundwater levels are approximately within two feet above the proposed USBR Colorado River accounting surface (BS, 2011a; USBR, 2008).

[2] 73 Federal Register 40, 916 (July 16, 2008).

PROPOSED PROJECT

The Rio Mesa SEGF project would be a 500-megawatt (MW) solar electric generating system constructed in two phases (BS, 2012v). During each phase, separate power plants would be constructed that consist of a power block with a generating capacity of 250-MW and of approximately 85,000 heliostats (BS, 2012v). The mirrors would be double mounted on poles concentrically aligned to focus solar energy on a solar receiver steam generator (SRSG) located at the top of a 750-foot tall concrete tower in the power block (BS, 2011a). Please see the **Project Description** section of this PSA for further details.

Each power block, located at the approximate center of each power plant, would consist of a SRSG at the top of a concrete tower, Rankine-cycle non-reheat stream turbine generator, an air-cooled condenser, an auxiliary Wet Surface Area Cooler (WSAC) system, evaporation basins, and other auxiliary equipment (BS, 2011a). Each power plant would also have natural gas fired boilers to provide heated water for plant startup, nighttime heat to systems, and power augmentation during partial load conditions (BS, 2011a).

Use of an air-cooled condenser for condensation of steam would minimize water use as compared to the use of a wet-cooling tower. Water consumption would, therefore, primarily be for boiler make up water, supply water for the WSAC system, and washing the heliostat mirrors (BS, 2011a). The WSAC would be a partial wet cooling system used to cool auxiliary systems such as turbine and generator lube oil, boiler feed pump seal oil, chemical feed systems, and the boiler circulation pump seal oil. The closed-loop WSAC would use water to spray over cooling tubes when the ambient dry bulb temperature is above 85°F (BS, 2011a). When the ambient dry bulb temperature is less than 85°F, only the air-cooled condenser would be used.

Construction of the Rio Mesa SEGF would require approximately 35 months and involve an average workforce of about 840 persons and peak workforce of 2,200 persons (BS, 2012v). Operation of the Rio Mesa SEGF would employ up to 100 employees and operate 7 days a week, 8 to 16 hours per day, with the exception of one annual shutdown for plant maintenance and any unforeseeable shutdowns (BS, 2011a). Rio Mesa SEGF is designed for a 25-year lifecycle with a projected equivalent availability factor[3] of 92 to 98 percent (BS, 2011a).

PROPOSED PROJECT WATER SUPPLY

Groundwater would be pumped to supply all proposed project water uses at a maximum rate of 405 acre-feet per year (AF/y) during project construction and 173 AF/y during commercial operation (BS, 2012v). This groundwater supply would come from two new production groundwater wells installed prior to project construction (BS, 2011a). One well would be used as a groundwater production well and the other as a backup water supply (BS, 2011a). The groundwater would be pumped from the unconfined

[3] Equivalent availability factor is a weighted average of the percent of full energy production capacity achievable.

alluvial/fluvial aquifer (BS, 2011a), and treated at the common area before distribution to each of the power blocks through underground pipelines (BS, 2011a).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section provides an evaluation of the expected direct, indirect, and cumulative impacts to water resources that would be caused by construction, operation, and maintenance of the project. Staff's analysis of potential impacts consists of a description of the potential impact, an analysis of the relevant facts, and application of the threshold criteria for significance to the facts. Where staff has identified potential impacts, staff provides a summary of the applicant's proposed mitigation and a discussion of the adequacy of the proposed mitigation. If necessary, staff presents additional or alternative mitigation measures and refers to specific conditions of certification related to a potential impact and the required mitigation. Mitigation is designed to reduce the effects of potential significant project impacts to a level that is less than significant.

METHOD FOR DETERMINING SIGNIFICANCE

Impacts leading to depletion or degradation of water resources are among those staff believes could be the most potentially significant water supply issues associated with the proposed project. To evaluate if significant CEQA impacts to water resources would occur, the following criteria were used:

- Would the project 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 that would not support existing land uses or planned uses for which permits have been granted)?
- Would the project substantially degrade water quality?
- Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)
- Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?

DIRECT/INDIRECT IMPACTS AND MITIGATION

In the following sections, staff has analyzed the proposed water supply to determine if it would cause substantial depletion or degradation of local or regional water resources. Staff has also analyzed potential impacts to the Colorado River by the proposed groundwater use.

Project Water Supply

The applicant proposes to install two new groundwater wells and pump groundwater from one of these wells for all construction and power plant operation water supply needs. To access groundwater at the project site, the project applicant has entered into an agreement with an option to exercise a lease for 6,640 acres from the Metropolitan Water District of Southern California (MWD) (BS, 2011a). Terms in the lease allow BrightSource Energy Inc. to pump groundwater at a rate of up to 600 AF/y (BS, 2011a). A summary of the proposed Rio Mesa SEGF water requirements is presented below in **Water Supply Table 3**.

Water Supply Table 3
Proposed Annual Water Supply Source and Use

	Water Demand	Water Supply Source	Estimated Maximum Annual Water Supply Requirement (acre-feet per year)
Construction	Soil Compaction, Dust Suppression, Hydrostatic Testing, and Other Construction Needs	On-site Groundwater Well (to be installed before any other project construction activity occurs)	400
	Drinking Water[1]		5
	Total Construction Water Demand		**405**
Operation	Cooling Water Makeup, Mirror Wash Water, Maintenance and Landscaping, and Fire Protection[2, 3]	Newly Installed On-site Groundwater Well	169 (84.5 per power plant)
	Drinking and Sanitation		4.3
	Total Operational Water Demand		**173.3**

Source: BS, 2012v.
1. Drinking water requirements were not identified in the AFC and, therefore, are conservatively estimated to be 2 gpd per person under peak workforce conditions.
2. Landscape water requirements were not identified in the AFC and, therefore, are assumed to be included in the total operational water demand.
3. Makeup water flow rates conservatively based on a 24 hour, 365 day per year operating schedule (BS, 2012v)

As illustrated in the above table, the applicant’s proposed maximum construction water demand would be equivalent to 405 AF/y, and 173 AF/y for operation of the power plants. To ensure that the proposed project would not exceed these maximums, staff recommends Condition of Certification **WATER SUPPLY-1** to ensure that the proposed water use is consistent with the volume of water use analyzed below.

The new wells would be installed at the project site prior to project construction (BS, 2011a). To ensure the project groundwater wells are constructed before project grading begins and in a manner consistent with state and local guidelines, staff recommends Condition of Certification **WATER SUPPLY-2** (BS, 2011a). The condition of certification would require the wells be designed and installed in accordance with California Well Standards (DWR, 1978) and County of Riverside regulations, and approved by the Energy Commission compliance project manager (CPM).

Domestic water supply would also come from the onsite groundwater wells (BS, 2011a). Based on available data, the existing groundwater quality at the project site contains relatively high concentrations of salts, arsenic, and iron (BS, 2011a). Without water treatment, concentrations of TDS, chloride, fluoride, sulfate, arsenic, and iron exceed the California MCLs for public water systems.

One hundred full-time employees would be onsite at all times to operate the project (BS, 2011a; BS, 2012v). This number of full-time employees would cause the project domestic water system to be classified as a non-community, non-transient domestic water system and would require compliance with federal and state water quality standards applicable to non-community, non-transient domestic water systems. Based on the described water quality and regulatory considerations, staff recommends condition of certification **WATER SUPPLY-3** to ensure conformance with applicable water quality standards for the project domestic water system. Implementation of this condition would reduce potential domestic water quality impacts to a level of less than significant.

Modeling of Proposed Groundwater Pumping

The applicant presented results of a computer model to show potential impacts the proposed groundwater pumping would have on groundwater resources and the Colorado River (BS, 2011a). The model used by the applicant was based on a model developed by the USGS (USGS 2008) to evaluate potential impacts to the Colorado River from groundwater pumping in the Parker-Palo Verde-Cibola river aquifer areas (USGS, 2008). The USGS model was developed using the finite-difference numerical groundwater model, MODFLOW. The model was also used and refined during Energy Commission licensing of the Blythe Solar Power Project (BSPP) to evaluate potential impacts from groundwater pumping (CEC, 2010). The basis for use of the BSPP refined model was that:

- The model included the BSPP site and was of sufficient detail and complexity to adequately evaluate BSPP proposed pumping impacts; and
- The model had undergone significant peer review prior to being published, including review by the USGS and USBR (CEC, 2010).

The BSPP model retained the single layer, two-dimensional aspect of the USGS model, but then refined the model grid spacing in the BSPP area and calibrated the USGS model to existing groundwater elevations.

The aquifer parameters established for the USGS model included saturated thickness, transmissivity, storativity, and river conductance. The BSPP refined the USGS model aquifer parameters using site-specific data from an aquifer test conducted during onsite investigations (AECOM, 2010). In the BSPP model, the area of the impact zone from project pumping was determined based on results from sensitivity model runs. The entire BSPP model domain was divided into two zones. Zone 1 represented the well impact area and contained both site specific and existing hydraulic parameters for model simulations. Zone 2 represented the remainder of the model area, but contained only hydraulic parameters used in the USGS model because there was no additional available data (AECOM, 2010). A summary of the aquifer parameters used in both models is presented below in **Water Supply Table 4**.

Water Supply Table 4
Summary of MODFLOW Model Aquifer Parameters

Model Characteristics	USGS 2008 Model (USGS, 2008)	BSPP Refinement of USGS 2008 Model (AECOM, 2010)
Model Code	Modflow 2000	Modflow 2000
Model Type	Two Dimensional, Superposition	Two Dimensional, Head-Based
Number of Model Layers	One	One
Model Grid Type	Uniform, Block-Centered, Finite-Difference	Variable-Spaced, Block-Centered, Finite-Difference
Number of Model Grid Rows	296	183
Number of Model Grid Columns	388	184
Minimum Grid Spacing (ft)	1,320	20
Maximum Grid Spacing (ft)	1,320	2,000
Modeled Formations	Older & Younger Alluvium	Older & Younger Alluvium
Ground Surface Elevation (ft amsl)	10	Interpolated from the USGS Digital Elevation Model
Saturated Thickness (ft)	500	500
Transmissivity (ft^2/day)	Conservative Low 6,300 Average 26,000	Conservative Low 6,300 Average 26,000
Storage Coefficient	0.2	0.2
Hydraulic Conductivity (ft/day)	A function of transmissivity	Calibrated to a range of 1 to 1,000
River Conductance (ft^2/day)	2.3×10^5	1.15×10^5

PVMGB Water Budget

The Blythe Solar Power Project (BSPP) and proposed Rio Mesa SEGF developed groundwater basin water balances as part of their computer modeling of the groundwater related impacts associated with groundwater use by these projects. The basin balances were developed to include the PVMGB and PVVGB so that potential impacts to the Colorado River and the river's influence on groundwater levels in the PVMGB could be evaluated. These basin balances are presented below in **Water Supply Table 5**.

Water Supply Table 5
Estimated PVMGB and PVVGB Groundwater Budget

Budget Components (AF/y)	PVMGB + PVVGB Water Balance (BSPP)[1]	PVMGB + PVVGB Water Balance (Applicant)
Recharge (Inflow)		
Recharge from Precipitation (mountain front)	5,000	5,300
Recharge from Precipitation (valley floor)	0	0
Underflow from Chuckwalla Valley Groundwater Basin	1,000	1,000
Underflow from the Parker Valley Groundwater Basin	3,500	1,200
Discharge from Colorado River	225,850	230,550
Irrigation Canal Leakage	120,000	125,000
Irrigation Return Flow (Palo Verde Valley)	67,000	57,000
Irrigation Return Flow (Palo Verde Mesa)	3,500	3,800
Publicly Owned Treatment Works (POTW) Return	750	750
Bedrock	0	0
Total Inflow	**426,600**	**424,600**
Discharge (Outflow)		
Underflow from Palo Verde Valley and Cibola Valley Groundwater Basins	0	0
Groundwater Extraction	11,100	9,100
Discharge to Colorado River	50,000	50,000
Transpiration (native vegetation)	8,500	8,500
Discharge to PVID Drains	357,000	357,000
Total Outflow	**426,600**	**424,600**
Budget Balance (Inflow - Outflow)	**0**	**0**

1. Source is Table 2 of AECOM, 2010.

The first column in the table shows the basin balance developed for the licensed BSPP (AECOM, 2010). The second column is the balance developed by the applicant for the proposed project. The basin water balances differ slightly, but are overall consistent with one another. For example, the Rio Mesa SEGF model used a slightly higher mountain front recharge to account for recharge from the mountains in the south, which are closer to the project site and therefore would be more significant for the Rio Mesa SEGF project but not for the BSPP project since they are much farther away from the project site. The rationale for the BSPP water balance has been fully discussed in a Numerical Groundwater Flow Model report prepared by AECOM for the BSPP (AECOM, 2010).

Applicant Refined MODFLOW Model

The BSPP MODFLOW model was further refined by the applicant to specifically evaluate potential impacts the proposed project would have on groundwater resources and the Colorado River (BS, 2011a). The applicant's refined model is a head based model that includes the PVMGB and additional site-specific aquifer characteristics (BS, 2011a).

Staff met with the applicant four times over a three-month period (CEC, 2012) to discuss the refinements of the model and changes to input parameters that would be necessary for staff analysis of project pumping impacts. One thing staff was concerned about is that when staff tried to run the model using the Groundwater Modeling System (GMS) platform, error messages were generated due to the initial heads being below the bedrock elevations along the model boundaries. The applicant ran the model using the Groundwater Vistas platform, which did not generate those errors, even though staff verified with the applicant that initial heads, as well as final heads for the steady state model, were below bedrock elevations. Staff worked with the applicant to try to find a solution to fix the model so that final heads are above bedrock elevations. In addition, staff worked with the applicant to clarify inconsistencies between the applicant's Groundwater Impact Assessment Report (GIAR) and the applicant's refined version of the BSPP groundwater model, and to clarify or modify elements of the model.

In reviewing the BSPP model, staff found significant BSPP model construction parameters were changed by the applicant (CEC, 2012), and were only discovered when staff compared the BSPP model parameters to the applicant's model parameters. This comparison revealed that a significant source of generated model errors resulted from the applicant expanding the model by adding bedrock elevations along the edges of the model domain. While this addition more accurately represented actual conditions of the groundwater basins, it exceeded the capability of the groundwater modeling program, MODFLOW 2000 (USGS, 2000b), and resulted in the errors generated when Energy Commission staff tried to run the model, which raises questions about the reliability of the model and whether it can be used to accurately assess potential impacts.

The added bedrock elevations represent the core of bedrock mountains that quickly drop in elevation from above the valley floor, to the valley floor, and then to the base of the alluvial aquifer. Along this rapid change in bedrock elevation, the groundwater gradient in the alluvial/fluvial aquifer should change rapidly. Also, along this rapid change in bedrock elevation, the alluvial/fluvial aquifer thickness thins. However, in the model equations, the groundwater inflow along the boundaries is dictated by the constant value contributed by mountain front recharge. To do that with the large gradient due to the steep bedrock elevations, the flow cross sectional areas along the boundaries have to be very small. At the same time, the gradient inside the boundaries has to be much milder than along the boundaries because saturated thicknesses are much larger. It seems like there are some model limitations that do not allow for such a rapid change of gradient and thus the only heads that could avoid the model instability had to be below the bedrock elevations. This problem was not encountered with the BSPP model because the BSPP model did not use the high bedrock elevations along the boundaries, and therefore even though the heads there were comparable with the heads obtained by the applicant, no errors were generated that had to do with heads being below bedrock elevations.

Staff is concerned that those errors could affect model calibration and how the model resolves basin drawdown and recharge. Thus, staff believes that the errors generated during model runs make the results of the transient model runs unreliable for the purposes of groundwater pumping impact analysis.

Groundwater Drawdown

Because the computer model provided by the applicant was unreliable for the purposes of groundwater pumping impact analysis, staff evaluated potential groundwater drawdown using the USGS computer program WTAQ (USGS, 1999). WTAQ is a simple superposition numerical model that computes drawdown at a pumping well and at a specified number of observation wells based on user specified aquifer and well parameters. A summary of the aquifer and well parameters used in the model is presented below in **Water Supply Table 6**.

Water Supply Table 6
Summary of WTAQ Model Parameters

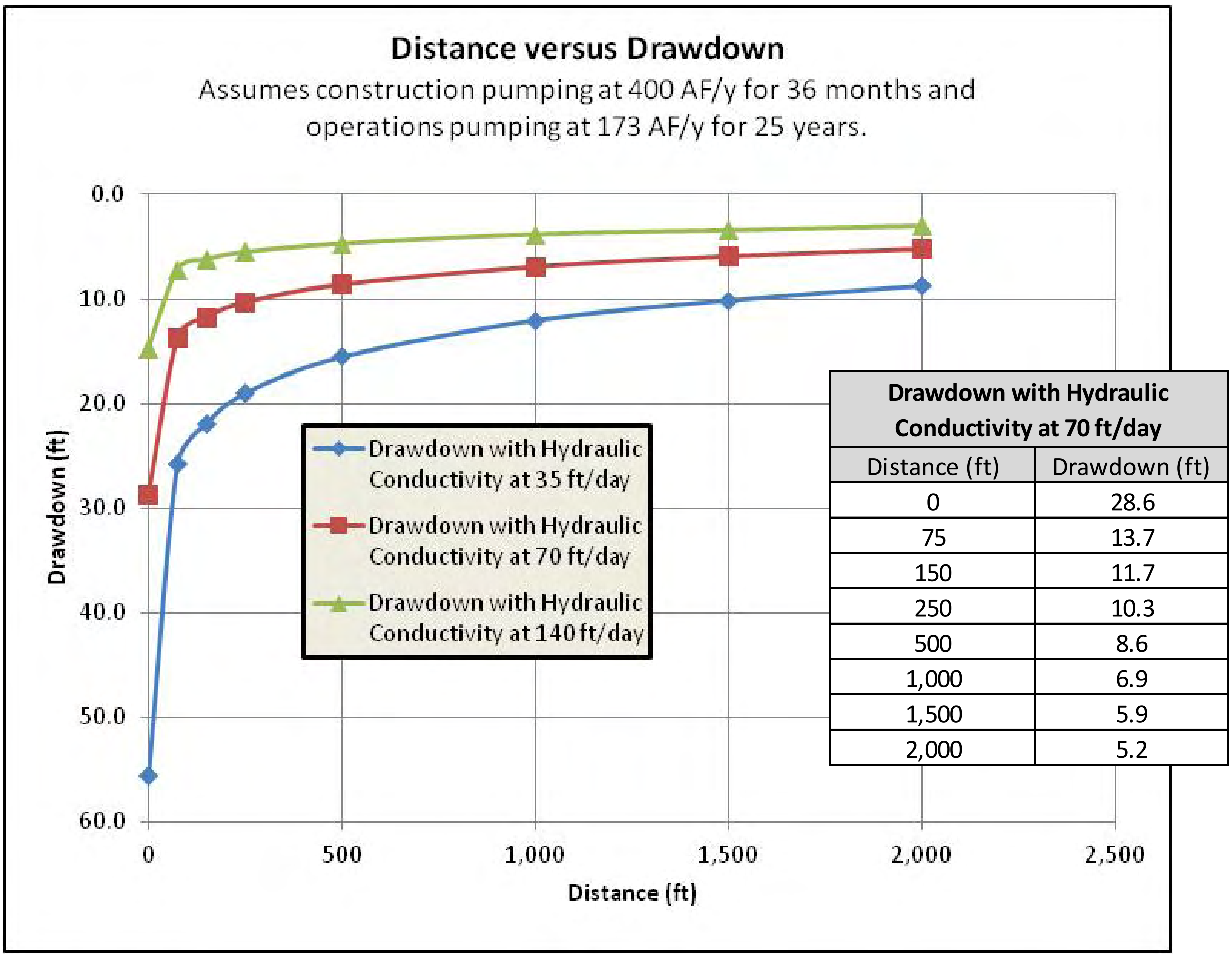
WTAQ Model Parameters				
Aquifer	**Unit**	**K_h at 35 ft/day**	**K_h at 70 ft/day**	**K_h at 140 ft/day**
Aquifer Type	---	Water Table	Water Table	Water Table
Saturated Thickness	ft	500	500	500
Horizontal Hydraulic Conductivity (K_h)	ft/day	35	70	140
Vertical Hydraulic Conductivity (K_v)	ft/day	3.5	7	14
Calculated Transmissivity	ft^2/day	17,500	35,000	70,000
Specific Storage	unitless	0.001	0.001	0.001
Specific Yield	unitless	0.004	0.004	0.004
Calculated Storativity	unitless	0.5	0.5	0.5
Pumping Well				
Well Type	---	Partially Penetrating	Partially Penetrating	Partially Penetrating
Screen Interval in Aquifer	ft	10 to 400	10 to 400	10 to 400
Pumping Rate (construction)	gpd	356,861	356,861	356,861
Pumping Rate (operations)	gpd	154,342	154,342	154,342
Total Pumping Time (construction)	yrs	3	3	3
Total Pumping Time (operations)	yrs	25	25	25
Observation Wells				
Well Type	---	Partially Penetrating	Partially Penetrating	Partially Penetrating
Screen Interval in Aquifer	ft	10 to 400	10 to 400	10 to 400
Distances	ft	75 to 2,000	75 to 2,000	75 to 2,000

Note: 1. K_h is horizontal hydraulic conductivity.

The model was run simulating a 36 month construction period with pumping at the proposed project at a rate of 405 AF/y. Twenty-five years of pumping at the rate of 173 AF/y was added to the construction pumping to simulate groundwater withdrawal at the end of project operation. Observation wells were placed at 75, 150, 250, 500, 1,000, 1,500, and 2,000 feet away from the pumping to evaluate groundwater levels at these locations after 28 years of project pumping. The aquifer parameters used in the model were consistent with those used in the USGS 2008 and BSPP MODFLOW models.

To better understand the potential impact to groundwater related drawdown, the drawdown from the proposed project pumping was modeled using an estimated representative horizontal hydraulic conductivity of 70 feet per day (ft/day), as well as two extreme values to assess the sensitivity of the model output to errors in the estimation of the hydraulic conductivity parameter. The two extreme values represented one-half and twice the average value, which are commonly used for performing sensitivity analyses. The representative value was derived from an onsite aquifer test conducted for the proposed Desert Sun Nuclear project, which indicated that the horizontal hydraulic conductivity ranges from approximately 61 to 127 ft/day in the project area. The BSPP model indicated horizontal conductivity values of 10 to 100 ft/day at the proposed project site. A summary of the model drawdown impacts is presented below in **Water Supply Figure 1**.

Water Supply Figure 1
Summary of WTAQ Model Drawdown Impact



Drawdown with Hydraulic Conductivity at 70 ft/day	
Distance (ft)	Drawdown (ft)
0	28.6
75	13.7
150	11.7
250	10.3
500	8.6
1,000	6.9
1,500	5.9
2,000	5.2

The drawdown impact at the proposed project pumping well, under estimated representative conditions, could be as high as 29 feet; however, this impact would quickly decrease with distance from the pumping well. At 1,000 feet, the drawdown impact is no more than 7 feet under any of the modeled hydraulic conductivity scenarios.

The WTAQ model is limited in that it is a simple superposition model that does not take into account more complex elements of the environment in which the groundwater pumping occurs. For example, the WTAQ model does not take into account mountain front recharge or the effect of the Colorado River and irrigation drains and canals on the drawdown cone of depression, which could reduce or eliminate any potential drawdown impacts. As such, the WTAQ model drawdown impact is a rough and conservative estimate as it ignores the impact of the Colorado River and recharge from the mountain front and the irrigation return water. A more refined estimate of drawdown impacts could be completed using the MODFLOW model developed by the applicant if the model reliability were resolved.

Groundwater Well Interference

Groundwater well interference occurs when the pumping cone of depression of one well intersects the pumping cone of depression of another well. This interference can result in the loss of well efficiency and well yield, and can result in the need for lowering pump intakes, damaged equipment, or even dry wells.

Staff used the USGS NWIS Mapper website to identify wells in the proposed project area that could be affected by project pumping (USGS, 2012). The NWIS website shows wells at the proposed project site and wells to the east on adjacent properties in the Palo Verde Valley. The closest offsite wells appear to be about 1,000 feet away from the proposed project pumping well. Based on the WTAQ modeling with the horizontal hydraulic conductivity equal to 70 ft/day, wells within 1,000 feet of the proposed project pumping well could experience a drawdown impact of 7 feet and 5 feet for wells 2,000 feet away. While this could be a significant impact depending on the configuration of the impacted well, drawdown impact from the proposed project pumping would be moderated by percolation of irrigation and canal water in the Palo Verde Valley and by underflow from the Colorado River.

Staff's WTAQ modeling presented above is a simplified estimate of how drawdown from project groundwater pumping at the site would behave after 28 years of project pumping. A more refined analysis using the MODFLOW computer program could be completed by the applicant if the reliability issues could be resolved. This would allow for an analysis, that takes into consideration site conditions such as recharge from drains, irrigation, and mountain front precipitation. Even with these model estimates, however, accurate quantification of well interference impacts may not be possible until actual long-term groundwater production occurs due to variations between assumed model parameters and actual site conditions. To ensure that well interference impacts are mitigated to a level of less than significant, staff recommends Conditions of Certification **WATER SUPPLY-4** and **-5**.

Condition of Certification **WATER SUPPLY-4** would require a pre-construction baseline to be established for groundwater elevation. Ongoing monitoring and reporting groundwater elevation and pumping volumes would also be required by this condition, so that changes in baseline conditions can be identified. Significant impacts to these wells, as identified by changes in baseline conditions, would be mitigated in accordance with Condition of Certification **WATER SUPPLY-5**.

Water Flow in the Colorado River

The proposed project would pump up to 5,506 AF of groundwater over the three-year construction period and 25-year life of the project. There is concern that since groundwater is in hydraulic connection with the Colorado River, project pumping may capture groundwater that would otherwise contribute to the volume of water flow in the river. The Colorado River is currently over-appropriated and any reduction in river flow would result in a significant impact. The applicant evaluated potential changes in river flow due to project pumping using the revised model discussed above. The applicant concluded that the project pumping would not result in significant changes to flow in the river.

Staff believes that due to the unreliability of the applicant's groundwater model, an accurate assessment of river impacts has not been provided. Given the known hydrologic connection between the groundwater system and the river documented and discussed above, staff conservatively assumes that any and all withdrawal of groundwater by the proposed project would directly and significantly impact the volume of water flow in the river. This assessment is supported by the application of the accounting surface rule because the water table at the project site is at or slightly above the accounting surface elevation. To mitigate this significant impact, staff requires the proposed method of mitigation to be submitted to staff for review and analysis prior to publication for the FSA. This submittal must demonstrate how the project owner will conserve Colorado River water in a volume equivalent to the volume of groundwater pumped by the project and discuss in detail how the elements required by proposed Condition of Certification **WATER SUPPLY-6** would be satisfied.

The proposed water conservation must address the Colorado River take and define the conservation method, quantify the amounts of conservation, and analyze how the conservation projects mitigate the impact of the proposed project. Appropriate water conservation projects could include payment for irrigation improvements in the PVID service area, purchase of water rights within the Colorado River Basin to be held in reserve in perpetuity, tamarisk eradication, purchase of water from the City of Needles Water Bank, or other proposed mitigation methods acceptable to the CPM. Irrigation improvements in the PVID service area would conserve river water by reducing the volume of river water needed for crop irrigation. Purchasing of water rights within the Colorado River Basin could include water rights purchased upstream of the proposed project above the Parker Dam. Such water rights would have to be held in perpetuity and would directly benefit the volume of water flow in the river. Another option is tamarisk eradication along the banks of the Colorado River. A water conservation program such as this would remove this non-native, invasive species of vegetation that are reported to consume large quantities of river water through evapotranspiration. The applicant could also purchase an equivalent volume of water from the City of Needles Water Bank, which has been established to offset take from the Colorado River. A combination of these methods of conservation would be considered by staff.

Condition of Certification **WATER SUPPLY-6** would require a detailed description of the water conservation project to be submitted in a Water Conservation Plan that would include the following elements:

- Identification of the water conservation activities and source of water conservation;
- Demonstration of the legal right to the water and the ability to conduct the water conservation program;
- Discussion of all governmental approval needed to implement the water conservation program, including a copy of all government correspondence;
- A demonstration of how much Colorado River water would be conserved;
- An estimated schedule for completion of the water conservation activities;
- Performance measures to evaluate the amount of water conserved; and
- A Monitoring and Reporting Plan that describes the steps necessary and reporting frequency to demonstrate that the activities would achieve the required water conservation.

Staff believes that, if model unreliability can be resolved, it is possible the amount of water required for water conservation in accordance with Condition of Certification **WATER SUPPLY-6** could be reduced or eliminated.

In addition, the terms of the lease between the applicant and MWD state that if there is a determination by the USBR, or any other agency with jurisdiction over the project water, determines use is a diversion or use of Colorado River water, then the project owner would be required to retroactively purchase and replace the amount of groundwater pumped with an equal amount of MWD's non-Colorado River water supplies (BS, 2011a; BS, 2011b). MWD would then decrease their diversion of Colorado River water by the same amount at the Parker Dam, which is upgradient of the proposed Rio Mesa SEGF site. This exchange water would be derived from non-Colorado River sources within MWD's authority and existing operating system, such as the State Water Project. MWD currently derives more than half of its water supply from State Water Project deliveries. No new water sources would be developed under the agreement.

Groundwater Basin Balance

The 5,506 AF of groundwater that would be pumped over the life of the proposed project is small (less than 0.08 percent) compared to the estimated 6,840,000 AF of water in storage in the Palo Verde Mesa aquifer (DWR, 2003). The potential impact of the proposed project pumping to the PVMGB balance would be insignificant. In addition, staff recommended Condition of Certification **WATER SUPPLY-6**, which provides mitigation for all pumped project groundwater and, thereby, would avoid any potential impacts to the PVMGB basin balance.

Seeps and Springs

There are no known seeps or springs near the proposed project site. The closest identified seep or spring to the proposed project site is Clapp Spring in the Palo Verde Mountains, approximately six miles from the proposed project groundwater wells (DWR, 1978). This spring derives its water from precipitation further upgradient in the Palo Verde Mountains and beyond the potential reach of the cone of depression that would result from the project's proposed groundwater pumping. No significant impact to the seeps or springs is expected.

Biological Resources

As discussed in the **Biological Resources** section, lands to the east of the proposed common area contain sensitive woodlands in the washes and sensitive mesquite and seep weed habitat in the wetlands. The woodlands are located in the washes that originate in the Palo Verde and Mule Mountains and are as close as approximately 375 feet from the proposed project water supply wells. The wetlands are located near the contact of the mesa and valley, approximately 760 feet from the proposed project water supply wells. The degree of connectivity between the aquifer where project groundwater would be pumped and the source of water supporting the woodland and wetland vegetation is not well understood. The presence of woodland vegetation in the mesa washes could suggest there is a relatively shallow water table within the plant rooting depth, and groundwater evaluation from one well support this inference as discussed above. For further discussion of site conditions supporting these vegetation types see the **Biological Resources** section.

As presented in **Water Supply Table 2**, available groundwater elevation data show the depth from the ground surface to groundwater in the area of the mesa wash woodlands has ranged from about 140 to 163 feet over the past 35 years (1976 to 2011) and has ranged from 7 to 12 feet over the past 26 years (1980 to 2006) in the valley. Due to the relatively close proximity of these vegetation types to the proposed production wells, staff is concerned that pumping could cause drawdown that would impact these sensitive vegetation communities.

Using the WTAQ results discussed above, staff analyzed whether the proposed pumping would result in drawdown in the area of groundwater dependent sensitive woodlands and wetlands vegetation. Staff conservatively estimated drawdowns in the range of approximately 10 feet at the woodlands 375 feet from the project pumping well and 8 feet in the wetlands 760 feet from the pumping well after 28 years of project pumping. Based on analysis in the **Biological Resources** section, this could result in a significant impact to plant vigor and viability. Staff understands that the calculations and assumptions used to evaluate potential groundwater level impacts in the WTAQ model do not take into consideration site conditions such as recharge from drains, irrigation, and mountain front precipitation. These conditions could have a stabilizing effect on groundwater elevation and drawdown could be less than that estimated herein. The computer model developed by the applicant could be used to develop a more refined analysis, which would consider these affects. If the issues causing the model to be unreliable were resolved, then additional estimates may be useful in understanding potential impacts. Even with these model estimates, however, accurate quantification of drawdown may not be possible until actual long-term groundwater production occurs.

In the **Biological Resources** section, staff has recommended Condition of Certification **BIO-8** which requires the applicant to monitor plant stress and mortality to determine if significant impacts are occurring and identifies measures the applicant must take to mitigate significant impacts. Consistent with **BIO-8,** Condition of Certification **WATER SUPPLY-4** would require a pre-construction baseline be established for groundwater elevations in the areas of sensitive vegetation and development of a monitoring network of wells that can be used to evaluate whether drawdown from project pumping is occurring in the areas of sensitive vegetation.

Subsidence

Regional ground subsidence is typically caused by petroleum or groundwater withdrawal that increases the matrix stress of the soil profile. This increase in the matrix stress in deeper formation soils can result in the collapse of the soil matrix.

There has been extensive groundwater pumping in the PVMGB and there is no documented subsidence in the region. In addition, there is no site-specific documentation of ground subsidence near the proposed project site (ECI, 2000). The maximum total volume of 5,506 AF of groundwater that would be extracted over the three-year construction period and 25-year power plant lifespan is relatively small and would be moderated by percolation of irrigation and canal water in the Palo Verde Valley and underflow from the Colorado River. Groundwater levels in the proposed project area have remained relatively stable indicating there has been no significant change in groundwater storage that would increases stresses on the soil matrix. In addition, the power blocks, with their heavy structural loads (dead loads), are located over 8,000 feet away from the proposed project water supply wells where potential drawdown would be minimal. Staff, therefore, believes the potential for subsidence to occur as a result of the proposed project pumping would be less than significant. Additional analysis of subsidence potential not related to groundwater pumping is provided in the **Geologic and Paleontologic Resources** section.

Groundwater Quality

The Colorado River Basin Plan (Basin Plan) establishes water quality objectives using narrative and numerical standards to protect beneficial uses of ground water in the basin (RWQCB, 2006). Beneficial water uses are of two types – consumptive and non-consumptive. Consumptive uses are those normally associated with people’s activities, primarily municipal, industrial, and irrigation uses that consume water and cause corresponding reduction of water supply and possibly water quality. Non-consumptive uses include swimming, boating, waterskiing, fishing, and other uses that do not significantly deplete water supplies.

Historical beneficial uses of water within the Colorado River Basin have largely been associated with irrigated agriculture and mining (RWQCB, 2006). Industrial use of water has become increasingly important in the region, particularly in the agricultural areas. Present beneficial uses of water in the Colorado River Basin are mostly agricultural, with the major irrigated acreage being located in the Coachella, Imperial and Palo Verde Valleys (RWQCB, 2006). The second in quantity of usage is the use of water for municipal and industrial purposes (RWQCB, 2006). The third major category of beneficial use, recreational use of surface waters, represents another important segment of the region's economy (RWQCB, 2006).

All surface and ground waters are considered to be suitable, or potentially suitable, for municipal or domestic water supply with the exception of:

- Surface and ground waters where the TDS exceed 3,000 milligrams per liter (mg/L), and it is not reasonably expected by the Regional Board to supply a public water system, or
- There is contamination, either by natural process or by human activity, that cannot be treated for domestic use using either Management Practices or best economically achievable treatment practices, or
- The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day (gpd) (RWQCB, 2006).

Water quality objectives are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area (RWQCB, 2006). Establishing numerical objectives for groundwater involves complex considerations and it is acknowledged that the quality of groundwater varies significantly throughout the PVMGB and varies with depth. It is the Basin Plan goal to maintain the existing quality of non-degraded groundwater basins and to minimize the quantities of contaminants reaching any groundwater basin (RWQCB, 2006).

Staff used these thresholds as a basis for evaluating potential impacts to groundwater quality from the proposed project pumping. Based on available water quality data at the proposed project site, groundwater would not meet drinking water quality primary or secondary standards for public supply without treatment given the elevated levels of TDS, chloride, fluoride, and sulfate and possibly elevated levels of arsenic and iron (BS, 2011a). A summary of groundwater quality data is presented below in **Water Supply Table 7**.

Soil and Water Table 7
Summary of Groundwater Quality Data
(all values reported in mg/L unless otherwise indicated)

Analyte	Well #28R003S			Well #28Q002S	Primary and Secondary MCLs
	1976[1]	1/26/11	5/11/11	1/26/11	
Arsenic	NA	0.00919	**0.0129**	ND<0.000589	0.01
Bicarbonates as HCO_3	140	74	95	124	No MCL
Calcium	56	18.3	36.2	89.8	No MCL
Chloride	**604**	**740**	**730**	**470**	250
Fluoride	**3.8**	**4.2**	**4.2**	0.41	2.0
Iron	0.08	**0.321**	**0.250**	0.0618	0.2
Magnesium	5	2.27	3.70	19.1	No MCL
Nitrate as N	2	ND<0.017	0.0045	0.070J	10
Potassium	11	5.02	6.81	5.28	No MCL
Selenium	NA	ND<0.000554	0.00461	0.00173	0.05
Sodium	580	511	615	363	No MCL
Sulfate	**450**	**390**	**420**	**410**	250
Total Alkalinity as $CaCO_3$	160	74	95	124	No MCL
Total Dissolved Solids	**1,815**	**1,850**	**1,840**	**1,570**	500
pH (units)	7.7	8.60	8.12	7.27	No MCL

Source: BS,2012a.
J - Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit and the reported concentration is an estimate.
NA - Not Analyzed
1. From S&WE, 1976. Represents average concentrations for five samples collected during aquifer testing.

In addition, the PVID Outfall Drain, downgradient of the proposed project site, contains Clean Water Act section 303(d) reportable concentrations of dichloro-diphenyl-trichloroethane (DDT) and pathogens (RWQCB, 2012; BS, 2011a).

The agriculture drains capture irrigation water on individual properties and remove it to PVID drains. The PVID drains remove the excess irrigation water and capture groundwater to prevent rising groundwater from interfering with or preventing cultivation (RWQCB, 2012). Most drains discharge into the PVID Outfall Drain, which discharges into a historic channel of the Colorado River (RWQCB, 2012). Because the excess irrigation water and groundwater is discharged to the Colorado River, the aquifer water does not appear to be affected by these pollutants and groundwater quality would not be affected by the proposed project groundwater pumping.

There are no contaminant plumes or plumes of low water quality that would be intercepted by the proposed project pumping. Therefore, there would be no aquifer groundwater quality impacts expected related to the proposed project pumping.

Concentrations of TDS, chloride, fluoride, sulfate, arsenic, and iron in the groundwater at the proposed project would be treated and filtered by onsite equipment for power plant equipment needs and for drinking and sanitation needs.[4] Staff recommends

[4] Potential water quality impacts related to industrial and sanitary wastewater are discussed in the **Soil and Surface Water** section.

Condition of Certification **WATER SUPPLY-3** to ensure that the proposed project drinking and sanitation water complies with local and state drinking water LORS.

There is a potential that significant groundwater quality impacts could occur by one or more of the monitoring wells and possibly production wells at the proposed project property providing a conduit for contaminants to enter the regional aquifer. To protect the regional aquifer water quality, staff recommends Condition of Certification **WATER SUPPLY-7**, which would require proper abandonment of all of these wells. Abandonment of these wells in accordance with state well standards is consistent with state law and Riverside County Code, Title 13, Chapter 13.20 and would ensure that groundwater quality is protected for the current and future beneficial uses.

There is also a potential that significant groundwater quality impacts could occur during construction if contaminated or hazardous materials used during construction were to be released and migrate to the groundwater table. Potential impacts related to an unauthorized release of hazardous materials would be mitigated through implementation of a Hazardous Material Business Plan (HMBP) during construction and plant operation (see **Hazardous Materials Management**). Potential impacts to groundwater quality are expected to be maintained to a level of less than significant.

Cumulative impacts and Mitigation

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 reasonably foreseeable future projects (California Code of Regulations, Title 14, section 15130).). A summary of existing and reasonably foreseeable projects in the PVMGB, PVVGB, and CVGB and within the Colorado River accounting surface is presented in **Water Supply Table 8**, together with their potential groundwater use.

The proposed project in combination with other projects could cause: (a) interference with the efficiency and yield of wells on other properties; (b) reductions in the water level in the Colorado River; and (c) reductions in the PVMGB and PVVGB groundwater level. However, each of these potential impacts would be mitigated to a level of less than significant with the implementation of staff recommended conditions of certification.

There are approximately 23 existing and reasonably foreseeable projects within 30 miles of the proposed project, all of which are within the proposed Colorado River accounting surface (**Water Supply Table 8**). Each of these projects would use groundwater as their water supply source. The geographic extent considered for cumulative impacts on groundwater resources is the PVMGB. The extent of the PVMGB is described above.

Water Supply Table 8
Existing and Reasonably Foreseeable Projects

Project Name	Project Proponent	Status	Project Description	Distance from Rio Mesa SEGF (miles)	Estimated Groundwater Use (AF/y)[1]
Big Maria Vista Solar Project	Bullfrog Green Energy	POD in to BLM	500 MW PV project on 2,684 acres	25	25
Blythe Airport Solar I Project	Riverside County	Approved	100 MW solar PV project located on 640 acres of Blythe airport land	20	5
Blythe Energy Project	Blythe Energy, LLC	Existing	520 MW combined-cycle natural gas-fired electric-generating facility. Project is connected to the Buick Substation owned by WAPA	12	3,000
Blythe Energy Project II	Blythe Energy	Approved	520 MW combined-cycle power plant located entirely within the Blythe Energy Project site boundary, located on 30 acres of a 76 acre site	24	3,605
Blythe Energy Project Transmission Line	Blythe Energy , LLC	Existing	Transmission line modifications including upgrades to Buck Substation, approximately 67.4 miles of new 230 kV transmission line between Buck Substation and Julian Hinds Substation, upgrades to the Julian Hinds Substation, installation of 6.7 miles of new 230 kV transmission line between Buck Substation and SCE's DPV 500 kV transmission line	24	minimal
Blythe Energy Project Transmission Line	Blythe Energy	Under Construction	67.4 miles of new 230 kV transmission line between Buck Sub and Julian Hinds Sub	30	minimal
Blythe Mesa Solar I	Renewable Resources Group	Under review	A planned 485 MW solar PV project on private land in Blythe	30	24.3
Blythe PV Project	First Solar	Existing	21 MW solar photovoltaic project located on 200 acres	30	1.05
Blythe Solar Power Generation Station 1	Southwestern Solar Power	Approved	A planned 4.76 MW solar PV facility, including 69 PV panels that stand 50 feet tall and 72 feet wide	30	0.24
Blythe Solar Power Project	Solar Millennium	Under review	1,000 MW solar PV facility on 7,345 acres	25	266
Colorado River Substation Expansion	SCE	Approved 7/2011	500/230kV substation, constructed in an area approximately 1000 ft by 1900 ft	10	minimal
Desert Quartzite	First Solar	POD in to BLM	600 MW solar PV project located on 7,724 acres, adjacent to DPV transmission line and SCE Colorado Substation	8	30
Desert Southwest Transmission Line	Imperial Irrigation District	Approved	118 mile 500 kV transmission line from a new substation/switching station near the Blythe Energy Project to the existing Devers Substation located approximately 10 miles north of Palm Springs	30	minimal

Project Name	Project Proponent	Status	Project Description	Distance from Rio Mesa SEGF (miles)	Estimated Groundwater Use (AF/y)[1]
Devers-Palo Verde No. 1 Transmission Line	SCE	Existing	Existing 500 kV transmission line parallel to I-10 from Arizona to the SCE Devers Substation, near Palm Springs. DPV1 will loop into the approved Midpoint Substation, which will be located 10 miles southwest of Blythe	15	minimal
Devers-Palo Verde No. 2 Transmission Line Project	SCE	CPUC petition to modify request to construct CA-only portion approved by CPUC 11/2009	New 500 kV transmission line parallel to the existing Devers-Palo Verde Transmission Line from Midway Substation, approximately 10 miles southeast of Blythe, to the SCE Devers Substation, near Palm Springs. The ROW for the 500 kV transmission line would be adjacent to existing DPV ROW	30	minimal
Four Commercial Projects	Various	Approved	Four commercial projects have been approved by the Blythe Planning Department, including the Agate Road Boar & RV Storage, Riverway Ranch Specific Plan, Subway Restaurant and Motel, and Agate Senior Housing Development. Dates of construction are unknown at this time	20	not available
Intake Shell	Shell	Under Construction	Reconstruction of a Shell facility located at Intake & Hobson Way	20	minimal
Interstate 10	Caltrans	Existing	Interstate 10 is a major east-west route for trucks delivering goods to and from California. It is a four-lane divided highway in the project region	10	minimal
McCoy Soleil Project	EnXco	Plan of Development to Palm Springs BLM	300 MW solar power tower project located on 1,959 acres. Requires a 14 mile transmission line to proposed SCE Colorado Substation south of I-10	24	15
Mule Mountain Solar Project	Bullfrog Green Energy	POD in to BLM	500 MW solar PV project located on 2,684 acres	15	25
NextEra (FPL) McCoy	McCoy Solar	NOI to prepare an EIS 8/29/11	Up to 750 MW solar PV project on 7,700 acres of BLM land, 470 acres of private land, with a 16 mile gen-tie	22	37.5
Three Residential Developments	Various	Under Construction	3 residential development projects are under construction: River Estates at Hidden Beaches, The Chanslor Place, Mesa Bluffs. 125 single family homes are currently being built	20	not available
Twelve Residential Developments	Various	Approved or Under Construction	12 residential development projects approved by the Blythe Planning Department: Vista Palo Verde, Van Weelden, Sonora	20	not available

Project Name	Project Proponent	Status	Project Description	Distance from Rio Mesa SEGF (miles)	Estimated Groundwater Use (AF/y)[1]
			South, Ranchette Estates, Irvine Assets, Chanslor Village, St. Joseph's Investments, Edgewater Lane, The Chanslor Place Phase IV, Cottonwood Meadows, Palo Verde Oasis. A total of 1,005 single family residences are proposed.		
				Total	7,034

1. Photovoltaic water usage estimated using a conversion factor of 0.05 AF/y per MW.

Groundwater Basin Balance and Colorado River Flow

Groundwater resources in the region were used to support a variety of agricultural ventures in the 1980s. The groundwater levels in the PVMGB have generally remained stable over recent history. The relatively stable groundwater levels that have been measured over the decades-long period of time suggest that groundwater withdrawal from the underlying aquifer has not significantly changed the water balance within the PVMGB. This is probably in large part due to recharge of groundwater from the Colorado River (AECOM, 2010).

The majority of the agricultural ventures that were present in the 1980s to 1990s were abandoned in the 1990s, returning groundwater resources to a balanced inflow and outflow. The proposed project, when combined with the other existing and reasonably foreseeable projects, could significantly impact the PVMGB and PVVGB balance.

It is anticipated that extraction of groundwater from the PVMGB and PVVGB over the 25-year life of the proposed project would be approximately 5,506 AF. Cumulative groundwater use over this time period by existing and reasonably foreseeable projects is estimated to be 181,356 AF (including the proposed project). The storage capacity of the PVMGB and PVVGB is approximately 11,800,000 AF (DWR, 2003). The cumulative volume groundwater extraction is estimated to be 1.5 percent of the total groundwater in storage in the PVMGB and PVVGB. These projects, however, will likely induce subsurface inflow from the Colorado River. As previously stated, the Colorado River is fully appropriated and any groundwater production in the PVMGB or PVVGB may increase subsurface flow from the Colorado River. The subsurface inflow from the Colorado River could be significant and would be a significant impact. However, staff recommended Condition of Certification **WATER SUPPLY-6** would require all groundwater pumped by the proposed project to be mitigated, and thereby, avoid any potential cumulative impacts to the Colorado River by the proposed project.

Groundwater Quality

There is a potential that significant cumulative groundwater quality impacts could occur during construction and operation if contaminated or hazardous materials were released and migrated to groundwater. Implementation of the proposed HMBP would reduce potential unauthorized release to a level of less than significant (see **Hazardous Materials Management**).

Environmental Justice

Staff has reviewed **Socioeconomics Figure 1**, which shows the environmental justice population (see the **Socioeconomics** and **Executive Summary** sections of this PSA for further discussion of environmental justice) is not greater than fifty percent within a six-mile buffer of the proposed Rio Mesa SEGF and therefore there would not be a disproportionate **Water Supply** impact resulting from construction and operation of the proposed project to an environmental justice population.

COMPLIANCE WITH FEDERAL, STATE, AND LOCAL LORS

Staff has reviewed the LORS and policies presented in **Water Supply Table 1** and believes the proposed project would comply with these LORS provided the recommended conditions of certification are adopted. Selected LORS are discussed below.

COLORADO RIVER, LAW OF THE RIVER

The Colorado River is managed and operated under numerous compacts, federal laws, court decisions and decrees, contracts, and regulatory guidelines collectively known as the "Law of the River." This collection of documents apportions the water and regulates the use and management of the Colorado River among the seven basin states and Mexico. According to the “Law of the River,” wells that draw water from the Colorado River by underground pumping need an entitlement for the diversion of water from the Colorado River. Consumptive use can occur through direct diversions of surface water, as well as through withdrawal of water from the river by underground pumping.

As discussed above, if the Accounting Surface Rule were in effect, the project pumping would likely be found to be consumptive use of the Colorado River. The applicant has entered into an option agreement with the MWD to lease 6,640 acres from MWD and obtain access to groundwater at the proposed project site at the rate of 600 AF/y (BS, 2011a). The terms of this lease state that if a determination by the USBR, or any other agency with jurisdiction over the water use, finds the proposed project groundwater pumping a diversion or use of Colorado River water, then the project owner would be required to retroactively purchase and replace the amount of groundwater pumped with an equal amount of MWD’s non-Colorado River water supply (BS, 2011a; BS, 2011b). MWD would then decrease their diversion of Colorado River water by the same amount at the Parker Dam, which is upgradient of the proposed Rio Mesa SEGF site. This exchange water would be derived from non-Colorado river sources within MWD’s authority and existing operating system, such as the state water project. MWD currently derives more than half of its water supply from state water project deliveries. No new water sources would be developed under the agreement.

The Energy Commission does not have in-lieu permit authority where the Law of the River applies and it is unclear what other government entity would have jurisdiction over the proposed project water use other than USBR. Staff is also unaware of any pending determination or if and when a determination would be made.

WATER USE LORS AND STATE POLICY AND GUIDANCE

The Energy Commission has five 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) resolutions (in particular Resolutions 75-58 and 88-63), and a letter from the Board to the CEC interpreting Resolutions 75-58 and 88-63 (collectively referred to as the state's water policies).

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 requires 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 (Cal. Const., art. X, § 2). Even earlier in the twentieth 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 affirming that it is the policy of the state to promote "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 IEPR, 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). In the IEPR, 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, 2003). 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, 2003). The IEPR also notes California's exploding population, estimated to reach more than 47 million by 2020, is a population that will continue to use "increasing quantities of fresh water at rates that cannot be sustained" (IEPR, 2003).

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 SWRCB determined that water with 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 power plant cooling to that *minimally essential*" for the welfare of the state (*Ibid*; emphasis added). In 1988, the SWRCB 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).

When evaluating solar projects, staff was unsure exactly how to integrate these decisions for water with TDS between 1,000 and 3,000 mg/L. In November 2009, staff requested direct help from the SWRCB for a contemporary interpretation of those Resolutions (Letter from Executive Director Melissa Jones to SWRCB Executive Director Dorothy Rice, Nov. 23, 2009). The SWRCB responded with a letter.

Letter from the State Water Resources Control Board

The SWRCB's response first established that, generally, Commission staff should consider "multiple factors" in its decisions regarding water supplies for power plants. (Letter from SWRCB Executive Director Dorothy Rice to Executive Director Melissa Jones, Jan. 20, 2010 "SWRCB Letter"). In other words, staff should consider the impacts on the relevant basin, impacts on other basins, the quantity of use proposed, the quality of the water proposed for use, the project's requirements as understood by staff, whether there are any other competing uses for the water supply, and other relevant factors when analyzing a proposed project's water use. The letter also confirmed that both SWRCB Resolutions are binding on all state agencies (Wat. Code § 13146).

In addressing water of TDS of 1,000 to 3,000 mg/L, the SWRCB stated that such water should be generally considered fresh when it involves surface water, and generally not when it involves groundwater (SWRCB Letter). The SWRCB concluded that groundwater should only be used for renewable energy power plants "upon a demonstration that the use of other water supplies or *other methods of cooling* would be 'environmentally undesirable or economically unsound" (SWRCB Letter; emphasis added). While the SWRCB did not define "economically unsound," it explained that the Water Code compels use of recycled water for industrial uses if recycled water is available, and its cost is equal to or less expensive than using fresh water (SWRCB Letter; Wat. Code § 13550). The staff also notes that dry-cooling has been amply demonstrated to be feasible and, thus, a potential method of cooling that could avoid the use of groundwater in accordance with the SWRCB's letter.

The applicant for the project proposes a dry-cooled facility that would use 173 AFY of groundwater from onsite wells. There is no recycled water economically available in the region. Pumped water would be used for various purposes, including domestic use by workers, dust suppression, mirror washing, and evaporative cooling for WSAC systems. The majority of water use will be for mirror washing. Water is the only feasible means of cleaning the mirrors, which must be clean to maintain efficiency of output of the proposed solar power plant. Overall use of the water is efficient for this technology, requiring 34.6 AF/y per 100 MW of capacity, or 0.12 AF/y per net gigawatt hour generated.

Quality of the groundwater varies significantly throughout the PVMGB, and varies with depth. In general, groundwater below the project site would not meet water quality standards for public supply without treatment, because of elevated levels of TDS and high concentrations of chloride, fluoride, sulfate, arsenic, and iron.

Staff concludes that the proposed project would comply with the state's water policy to feasibly use the least amount of the lowest-quality water available.

NON-TRANSIENT, NON-COMMUNITY WATER SYSTEMS

The California Safe Drinking Water Act and Riverside County Code Title 13, Chapter 13.20, Water Wells require monitoring for potable water wells, defined as non-transient, non-community water systems (serving 25 people or more for more than six months). The proposed project would employ approximately 100 fulltime employees during operations. Regulated wells must be sampled for bacteriological quality once a month and the results submitted to the County of Riverside for review and comment. The wells must also be monitored for inorganic chemicals once and organic chemicals quarterly during the year designated with the year designation based on historical monitoring frequency and laboratory capacity. Condition of Certification **WATER SUPPLY-3** would ensure the applicant complies with this requirement.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has not received any public or agency comments regarding soil and water resources.

CONCLUSIONS

The Energy Commission staff believes the project would comply with all applicable federal, state, and local LORS with the adoption of the recommended conditions of certification. Staff also believes that construction and operation of the Rio Mesa SEGF may not result in unmitigable project-specific direct, indirect, or cumulative significant impacts to surface or groundwater resources with the adoption of the recommended conditions of certification.

Based on staff's assessment of the proposed Rio Mesa SEGF, staff concludes the following:

- Well Interference. Based on staff's preliminary analysis of potential groundwater drawdown by the proposed project, groundwater wells on property adjacent to the proposed project could be significantly impacted by the project pumping. Staff's analysis is based on a simple numerical model and does not take into account groundwater level stabilizing effects of recharge from drains, irrigation, and mountain front precipitation. A more refined analysis using the MODFLOW computer program which can take into consideration the effects of these conditions could be completed by the applicant. Even with these model estimates, quantification of well interference impacts may not be possible until actual long-term groundwater production occurs. To ensure that well interference impacts are monitored and mitigated to a level of less than significant, staff recommends Conditions of Certification **WATER SUPPLY-4** and **-5**. Condition of Certification **WATER SUPPLY-4** would require a pre-construction baseline established for groundwater elevation and ongoing monitoring and reporting of groundwater elevation and pumping volumes to identify changes in baseline aquifer conditions. Condition of Certification **WATER SUPPLY-5** would require mitigation for significant impacts to adjacent property wells.
- Groundwater Quality. Groundwater quality would not be significantly impacted by the proposed project pumping. Concentrations of TDS, chloride, fluoride, sulfate, arsenic, and iron in the groundwater beneath the proposed project site currently exceed California MCLs for protection of public health or taste and odor thresholds. Drinking and sanitation water for plant operation employees would have to be treated and filtered prior to use. Water quality would be routinely monitored to ensure compliance with state and local LORS. Staff also concludes that the Rio Mesa SEGF complies with the state's water policy to feasibly use the least amount of the lowest-quality water available. Staff recommends Condition of Certification **WATER SUPPLY-3** which would ensure that the proposed project drinking and sanitation water supply complies with local and state drinking water LORS.
- Well Abandonment. There are several monitoring wells and possibly production wells at the proposed project property that could provide a conduit for contaminants to enter the regional aquifer. To protect the regional aquifer water quality, staff recommends Condition of Certification **WATER SUPPLY-7**, which would require proper abandonment of all of these wells.
- Woodlands and Wetlands. Lands to the east of the proposed project common area contain sensitive woodlands in the washes and sensitive mesquite and seep weed habitat in the wetlands. Based on staff's preliminary analysis of potential groundwater drawdown by the proposed project, the sensitive habitat could be significantly impacted by the project pumping. Staff's analysis is based on a simple numerical model and does not take into account water level stabilizing effects of recharge from drains, irrigation, and mountain front precipitation. A more refined analysis using the MODFLOW computer program which can take into consideration the effects of these conditions could be completed by the applicant. Even with these model estimates, quantification of drawdown may not be possible until actual long-term groundwater production occurs. Condition of Certification **WATER SUPPLY-4** would require installation of groundwater monitoring wells between the proposed project pumping wells and the sensitive vegetation. The comparison between

baseline and ongoing conditions would allow quantification of potential impacts due to project groundwater pumping and mitigation of significant impacts, as described under **Biological Resources** and recommended in Condition of Certification **BIO-8**.

- Seeps and Springs. There are no identified seeps or springs in the alluvial/fluvial formation in the project vicinity that could be affected by the proposed project groundwater pumping. The nearest seep or spring is Clapp Spring in the Palo Verde Mountains.
- Colorado River. The project would use groundwater that is in hydraulic connection with the Colorado River and may capture groundwater that would otherwise contribute to the volume of water flow in the Colorado River. Due to some issues with the computer model submitted by the applicant that raise questions about the reliability of the model, staff could not evaluate and quantify the potential effect that the project groundwater pumping would have on the volume of flow in the Colorado River. Staff, therefore, conservatively assumes that any withdrawal of groundwater by the proposed project would directly affect the volume of flow in the river and require mitigation. The proposed method of mitigation must be submitted to staff for review and analysis prior to publication for the FSA. The applicant must demonstrate how the project owner will conserve Colorado River water in a volume equivalent to the volume of groundwater pumped by the project and discuss in detail how the elements required by proposed Condition of Certification **WATER SUPPLY-6** would be satisfied.
- Groundwater Basin Balance. The volume of groundwater pumped over the life of the proposed project would be 0.08 percent of the volume of groundwater in the PVMGB, which is not significant. Underflow from the CVGB is minimal and the Colorado River recharges the PVVGB when water levels in that groundwater basin decline. In addition, any groundwater pumped by the proposed project would be mitigated under staff recommended Condition of Certification **WATER SUPPLY-6**.
- Subsidence. There is no documented ground subsidence near the proposed project site. In addition, the volume of groundwater that would be extracted for construction and over the 25-year power plant lifespan is relatively small given the volume of the alluvial aquifer from which the water would be extracted and the moderating effect of percolation of irrigation and canal water in the Palo Verde Valley and underflow from the Colorado River. Staff believes the potential for subsidence to occur as a result of the proposed project pumping would be less than significant.
- Cumulative Impacts. The proposed project could significantly impact other groundwater wells, the PVMGB and PVVGB balance, or the volume of flow in the Colorado River, cumulatively, when combined together with existing and reasonably foreseeable major projects. However, staff recommends Condition of Certification **WATER SUPPLY-6**, which would require all groundwater pumped by the project to be mitigated and would, thereby, avoid these potential significant impacts.

ADDITIONAL INFORMATION STAFF REQUIRES FROM THE APPLICANT IN ORDER TO COMPLETE THE FSA

The applicant is required to submit a detailed description of how the applicant would mitigate Colorado River take and define the water conservation method, quantify the conservation amounts, and analyze how the conservation projects mitigate the impacts of the proposed project.

PROPOSED CONDITIONS OF CERTIFICATION

CONSTRUCTION AND OPERATIONS WATER USE

WATER SUPPLY-1: Groundwater use for all construction activity shall not exceed 405 acre-feet per year (AF/y). Groundwater use for operation of both power plants and drinking and sanitation water shall not exceed 173 AF/y. The quantity of the groundwater used annually for project construction and operation shall be reported annually to the compliance project manager (CPM) to ensure compliance with this condition.

Prior to the use of groundwater 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 (gpd) 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 and shall be calibrated and maintained in accordance with the manufacturers recommended methods and schedule.

The project owner shall report all groundwater produced to the State Water Resource Control Board (SWRCB) pursuant to the requirement of Water Code Section 4999 et. seq.

Verification: At least sixty (60) days prior to the start of construction of the proposed project, the project owner shall submit to the 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 report of the amount of water used for construction purposes. The summary shall include the monthly range and monthly average of daily water usage in gpd. After the start of commercial operation, project owner shall prepare an annual summary report, which will include maximum daily and monthly usage in gpd and the total monthly and annual usage in acre-feet. Following the first year of commercial operation, the annual summary report will summarize the annual usage in tabular form. For calculating the total water use, the term “year” will correspond to the date established for the Annual Compliance Report (ACR).

The project owner shall file an annual Notice of Extraction and Diversion of Water with the SWRCB in accordance with Water Code Section 4999 et. seq. The project owner shall include a copy of the filing in the ACR.

INSTALLATION OF NEW PROJECT GROUNDWATER WELLS

WATER SUPPLY-2: The project owner shall construct and operate one onsite production groundwater well and one backup well. The project owner shall ensure that these wells are completed in accordance with all applicable state and local groundwater well requirements. The project owner shall do all of the following before beginning any project fencing or grading activity:

a. Well Installation Packet. Submit a groundwater well installation packet to the County of Riverside for review and comment and the CPM for review and approval. This packet shall contain documentation, plans, and fees normally required for a County well installation permit.

b. Well Completion Report. In accordance with California's Water Code section 13754, the project owner shall ensure that the well driller submits to the California Department of Water Resources a Well Completion Report for each well installed. A copy of the Well Completion Report shall also be submitted to the CPM.

The project shall not construct a groundwater well until the CPM provides approval to construct or operate a groundwater well.

Verification: The project owner shall submit all of the following:

1. A groundwater well installation packet shall be submitted to the County of Riverside for review and comment and the CPM for review and approval at least ninety (90) days before groundwater pumping begins.

2. A Well Completion Report for each groundwater well shall be submitted no later than thirty (30) days after installation of the groundwater well.

NON-TRANSIENT, NON-COMMUNITY WATER SYSTEM

WATER SUPPLY-3: The project is subject to the requirements of California Code of Regulations title 22, Sections 64400.80 through 64445 for a non-transient, non-community water system (serving 25 people or more for more than six months). The project owner shall do all of the following:

a. Non-Transient, Non-Community Water System Permit. The project owner shall obtain a permit, from the County of Riverside, to operate a non-transient, non-community water system prior to commencement of commercial operations. A copy of the approved permit shall be submitted to the CPM.

b. Monitoring and Reporting Plan. The project owner shall submit to the CPM a copy of the monitoring and reporting plan for the production well used as the drinking water supply well.

c. California Certified Water Treatment Plant Operator. The project owner shall designate a California Certified Water Treatment Plant Operator in accordance with California Code of Regulation, title 22, Section 63765 and shall fulfill the technical, managerial, and financial requirements prescribed by California Code of Regulation, title 22, Sections 64400.80 through 64445.

d. Annual Reporting. In the annual compliance report (ACR), the project owner shall provide an annual update of the monitoring requirements, submittals to County of Riverside, and a copy of the Riverside County's annual renewed permit.

Verification: The project owner shall submit the following to the CPM:

1. A copy of the approved permit to operate a non-transient, non-community water system at least sixty (60) days prior to commencement of commercial operations.

2. A copy of the approved Monitoring and Reporting Plan submitted to the County of Riverside at least sixty (60) days prior to commencement of commercial operations.

3. A copy of the designated California Certified Water Treatment Plant Operator certificate and all the technical, managerial, and financial requirements data prescribed by California Code of Regulation, Sections 64400.80 through 64445 at least sixty (60) days prior to commencement of commercial operations. Any changes in this information shall be submitted to the CPM within sixty (60) days after the change.

4. In the ACR, provide updates of the monitoring requirements, submittals to the County of Riverside, and a copy of Riverside County's annual renewed permit.

GROUNDWATER MONITORING, REPORTING, AND MITIGATION

WATER SUPPLY-4 : Prior to the start of any groundwater pumping, the project owner shall submit the following for CPM review and approval:

a. A Groundwater Well Reconnaissance Report. This report shall identify all groundwater wells within a five-mile radius of the project production wells. The methodology used and results of this well reconnaissance shall be described in detail in a written report.

b. A Groundwater Monitoring and Reporting Plan. This plan shall describe the methodology and the network of wells to be used to monitor groundwater elevation and quality. This network of wells shall require installation of at least two new groundwater monitoring wells between the project production wells and sensitive woodland vegetation and two monitoring wells between the project production wells and sensitive mesquite vegetation. These wells shall be monitored to evaluate potential groundwater impacts in accordance with **BIO-8**. At least three wells shall be used to monitor groundwater quality for evaporation pond leak detection monitoring. New monitoring wells dedicated to evaporation pond leak detection may be required.

c. A Baseline Groundwater Monitoring Report. The report shall establish baseline groundwater elevation and quality conditions within a five-mile radius of the project production wells.

A meeting(s) with the CPM is required prior to the submittal of each item above to ensure that the correct information is included in the submittal. This required information will be documented by the CPM. If the project owner fails to provide the required information, this condition of certification is not satisfied.

Beginning six months after groundwater pumping commences, and semi-annually thereafter for the next five years, the project owner shall submit the following to the CPM for review and approval:

d. A Groundwater Monitoring Report. This report shall document current groundwater elevation and quality conditions. These current conditions shall, in detail, be quantitatively compared to the baseline conditions. All significant impacts shall be documented and mitigated in accordance with Conditions of Certification **WATER SUPPLY-5** and **-6** and **BIO-8**.

Every five years, the project owner shall evaluate the data and provide a detailed written analysis of whether the monitoring, reporting, and mitigation program frequency should be revised or eliminated.

Verification: The project owner shall submit all of the following. Failure to follow this schedule may result in project construction delays.

1. A Groundwater Well Reconnaissance Report shall be submitted at least six (6) months before groundwater pumping begins.

2. A Groundwater Monitoring and Reporting Plan shall be submitted at least ninety (90) days before groundwater pumping begins.

3. A Baseline Groundwater Monitoring Report shall be submitted at least thirty (30) days before groundwater pumping begins.

4. A Groundwater Monitoring Report shall be submitted every six (6) months beginning six (6) months after groundwater pumping begins.

GROUNDWATER IMPACT MITIGATION

WATER SUPPLY-5: The type and extent of mitigation shall be determined by the amount of water level decline induced by the project pumping, the type of impact, and site-specific well construction and water use characteristics. If an impact is determined to be caused by drawdown from more than one source, the level of mitigation provided shall be proportional to the amount of drawdown induced by the project relative to other sources.

In order to be eligible, a well owner must provide documentation of the well location and construction, including pump intake depth, and evidence that the well was constructed and in use before project pumping was initiated. The mitigation of impacts shall be determined as follows:

a. Increased Electrical Usage. If project pumping has lowered a well's water levels and increased pumping lifts, increased energy costs shall be calculated. Payment or reimbursement for the increased costs shall be provided at the option of the affected well owner. In the absence of specific electrical use data supplied by the well owner, the following formula shall be used to calculate the additional electrical usage:

<u>Increased Cost for Energy</u>	=	(change in lift/total hydraulic head) x (total energy consumption times costs/unit of energy)
Where:		
change in lift (ft)	=	calculated change in water level in the well
total hydraulic head (ft)	=	(elevation head) + (discharge pressure head)
elevation head (ft)	=	(wellhead discharge pressure gauge elevation) – (water level elevation in well during pumping)
discharge pressure head (ft)	=	(pressure in pounds per square inch at wellhead discharge gauge) x (2.31 to convert psi to feet of water)

The project owner shall submit to the CPM for review and approval the documentation showing which well owners must be compensated for increased energy costs and that the proposed amount is sufficient compensation to comply with the provisions of this condition.

i. Any reimbursements (either lump sum or annual) to impacted well owners shall be only to those well owners whose wells were in service within six months of the Commission Decision.

ii. The project owner shall notify all owners of the impacted wells within one month of the CPM approval of the compensation analysis for increased energy costs.

iii. The project owner shall provide compensation either on a one-time lump-sum basis or on an annual basis, as described below.

Annual Compensation. Compensation provided on an annual basis shall be calculated prospectively for each year by estimating energy costs that will be incurred to provide the additional lift required as a result of the project. With the permission of the impacted well owner, the project owner shall provide energy meters for each well or well field affected by the project. The impacted well owner to receive compensation must provide documentation of energy consumption in the form of meter readings or other verification of fuel consumption. For each year after the first year of operation, the project owner shall include an adjustment for any deviations between projected and actual energy costs for the previous calendar year.

One-Time Lump-Sum Compensation. Compensation provided on a one-time lump-sum basis shall be based on a well-interference analysis, assuming the maximum project-pumping rate of 173 AF/y. Compensation associated with increased pumping lift for the life of the project shall be estimated as a lump sum payment as follows:

i. The current cost of energy to the affected party considering time of use or tiers of energy cost applicable to the party's billing of electricity from the utility providing electric service, or a reasonable equivalent if the party independently generates their electricity;

ii. An annual inflation factor for energy cost of 3 percent; and

iii. A net present value determination assuming a term of 25 years and a discount rate of 9 percent;

b. Well Screen Exposure. If groundwater monitoring data indicate project pumping has lowered water levels below the top of the well screen, and the well yield is shown to no longer meet pre-project demand, compensation shall be provided to diagnose and treat well screen encrustation. Reimbursement shall be provided at an amount equal to the customary local cost of performing the necessary diagnosis and maintenance for well screen encrustation. Should well yield reductions be reoccurring, the project owner shall provide payment or reimbursement for either periodic maintenance throughout the life of the project or replacement of the well.

c. Well Yield. If project pumping has lowered water levels to significantly impact well yield so that the well can no longer meet its intended purpose, causes the well to go dry, or causes casing collapse, payment or reimbursement of an amount equal to the cost of deepening or replacing the well shall be provided to mitigate these effects. Payment or reimbursement shall be at an amount equal to the customary local cost of deepening the existing well or constructing a new well of comparable design and yield (only deeper). The demand for water, which determines the required well yield, shall be determined on a per well basis using well owner interviews and field verification of property conditions and water requirements compiled as part of the pre-project well reconnaissance. Well yield shall be considered significantly impacted if it is incapable of meeting 150 percent of the well owner's maximum daily demand, dry-season demand, and annual demand – assuming the pre-project well yield documented by the initial well reconnaissance met or exceeded these yield levels. The contribution of project pumping to observed decreases in observed well yield shall be determined by interpretation of the groundwater monitoring data collected and shall take into consideration the effect of other nearby pumping wells, basin-wide trends, and the condition of the well prior to the commencement of project pumping.

d. The project owner shall notify any owners of the impacted wells within one month of the CPM approval of the compensation analysis.

e. Pump Lowering. In the event that groundwater is lowered as a result of project pumping to an extent where pumps are exposed but well screens remain submerged, the pumps shall be lowered to maintain production in the well. The project shall reimburse the impacted well owner for the costs associated with lowering pumps in proportion to the project's contribution to the lowering of the groundwater table that resulted in the impact.

f. Deepening of Wells. If the groundwater is lowered enough as a result of project pumping that well screens and/or pump intakes are exposed, and pump lowering is not an option, such affected wells shall be deepened or replacement wells constructed. The project shall reimburse the impacted well owner for all costs associated with deepening existing wells or constructing replacement wells in proportion to the project's contribution to the lowering of the water table that resulted in the impact.

Verification: The project owner shall do all of the following:

1. At least sixty (60) days prior to project construction, the project owner shall submit to the CPM, for review and approval, a comprehensive plan (Groundwater Level Monitoring and Reporting Plan) presenting all the data and information required in Item A above. The project owner shall submit to the CPM all calculations and assumptions made in development of the plan.

2. During project construction, the project owner shall submit to the CPM quarterly reports presenting all the data and information required in Item B above. The project owner shall submit to the CPM all calculations and assumptions made in development of the report data and interpretations.

3. No later than sixty (60) days after commencing project operation, the project owner shall provide to the CPM, for review and approval, documentation showing that any mitigation to private well owners during project construction was satisfied, based on the requirements of the property owner as determined by the CPM.

4. During project operation, the project owner shall submit to the CPM, applicable quarterly, semi-annual, and annual reports presenting all the data and information required in Item C above. The project owner shall submit to the CPM all calculations and assumptions made in development of report data and interpretations, calculations, and assumptions used in development of any reports.

5. The project owner shall provide mitigation as described in Item D above, if the CPM's inspection of the monitoring information confirms project-induced changes to water levels and water level trends relative to measured pre-project water levels, and well yield has been lowered by project pumping. The type and extent of mitigation shall be determined by the amount of water level decline and site-specific

well construction and water use characteristics. The mitigation of impacts shall be determined as set forth in Item D above.

6. No later than 30 days after CPM approval of the well drawdown analysis, the project owner shall submit to the CPM all documentation and calculations describing necessary compensation for energy costs associated with additional lift requirements.

7. The project owner shall submit to the CPM all calculations, along with any letters signed by the well owners indicating agreement with the calculations, and the name and phone numbers of those well owners that do not agree with the calculations.

8. If mitigation includes monetary compensation, the project owner shall provide documentation to the CPM that compensation payments have been made by March 31 of each year of project operation or, if a lump-sum payment is made, payment shall be made by March 31 of the following year. Within 30 days after compensation is paid, the project owner shall submit to the CPM a compliance report describing compensation for increased energy costs necessary to comply with the provisions of this condition.

COLORADO RIVER IMPACT MITIGATION

WATER SUPPLY-6: The project owner shall undertake one or more of the activities identified below to mitigate project impacts to flows in the Colorado River. These activities shall result in replacement of up to 5,506 acre-feet (AF) (up to 405 AF/y during construction and 173 AF/y during 25 years of operation) in the Colorado River Basin over the life of the project. The activities shall include water conservation projects such as payment for irrigation improvements in Palo Verde Irrigation District, purchase of water rights within the Colorado River Basin that will be held in reserve, tamarisk eradication, purchase of water from the City of Needles Water Bank, or other proposed mitigation activities acceptable to the CPM. The activities proposed for mitigation shall be described in detail in a Water Supply Plan that shall be provided to the CPM for review and approval. The Water Conservation Plan shall include the following at a minimum:

a. Identification of the activities and water source that will replace up to 5,506 AF of diverted water from the Colorado River over the life of the project;

b. Demonstration of the project owner’s legal right to the water or ability to conduct the activity and all written agreements demonstrating that right;

c. Discussion of whether any governmental approval of the identified activities will be needed and compliance with CEQA;

d. Copies of all correspondence with any local, state, or federal government entities that discuss conditions for approval of the activities and water source that will replace up to 5,506 AF of diverted from the Colorado River.

e. Demonstration of how much Colorado River water each of the chosen activities replaces;

f. An estimated schedule for completion of the activities;

g. Performance measures that would be used to evaluate the amount of water replaced by the activities; and

h. A Monitoring and Reporting Plan describing in detail the steps necessary and proposed frequency of reporting to show the activities are achieving the intended benefits and replacing the Colorado River diversions.

Verification: The project owner shall submit a Water Conservation Plan to the CPM for review and approval thirty (30) days before the start of extraction of groundwater for construction.

ABANDONMENT OF EXISTING GROUNDWATER MONITORING AND PRODUCTION WELLS

WATER SUPPLY-7: Prior to the start of commercial operation the project owner shall protect groundwater resources by abandoning all groundwater wells existing on the proposed project property. Abandonment procedures shall be developed consistent with those described in the California Department of Water Resources Bulletins 74-81 & 74-90. The owner shall submit a well abandonment packet and applicable fees to the County of Riverside, for review and comment. The owner shall also submit to the CPM the well abandonment packet containing the County of Riverside's comments and proof of County fee payment. The project shall not abandon a well until the CPM provides approval.

In accordance with California's Water Code section 13754, the project owner shall ensure that the well driller submits to the California Department of Water Resources a Well Completion Report for each well abandoned. Once wells have been abandoned in accordance with the approved plan the project owner shall file well completion reports for each abandoned well with Riverside County, California Department of Water Resources, and the CPM.

Prior to commencement of commercial operation, the project owner shall provide a report to the CPM that documents the actual location, conditions, methods and materials used to complete abandonment of each well and confirmation that all wells within the project property have been abandoned consistent with the requirements of this condition.

Verification: No later than thirty (30) days before well abandonment the project owner shall submit copies of the well packets with review and comment from Riverside County to the CPM for review and approval.

No later than thirty (30) days prior to commencement of commercial operation, the project owner shall provide a report to the CPM that a copy of the Well Completion Report for each well abandoned and documents that show the actual location, conditions, methods, and materials used to complete abandonment of each well and a statement that all wells within the project property have been abandoned.

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ACRONYMS USED

amsl	above mean sea level	IEPR	Integrated Energy Policy Report
AF	acre-feet	kV	kilovolts
AF/y	acre-feet per year	LORS	Laws, Ordinances, Regulations, and Standards
bgs	below ground surface	mg/L	milligrams per liter
BSPP	Blythe Solar Power Project	MCL	Maximum Contaminant Level
CDPH	California Department of Public Health	MW	megawatt
CEC	California Energy Commission	MWD	Metropolitan Water District
CEQA	California Environmental Quality Act	PSA	Preliminary Staff Assessment
CLA	Construction Logistics Area	PV	Photovoltaic
CPM	Compliance Project Manager	PVID	Palo Verde Irrigation District
CWA	Clean Water Act	PVMGB	Palo Verde Mesa Groundwater Basin
DWR	California Department of Water Resources	PVVGB	Palo Verde Valley Groundwater Basin
ETo	Evapotranspiration Zone	RWQCB	Regional Water Quality Control Board
FSA	Final Staff Assessment	SEGF	Solar Electric Generating Facility
ft	feet	SRSG	Solar Receiver Steam Generator
ft^2	Feet squared	SWRCB	State Water Resources Control Board
ft/ft	feet per foot	TDS	Total Dissolved Solids
gals	gallons	USBR	U.S. Bureau of Reclamation
gpd	gallons per day	USGS	U.S. Geological Society
gpm	gallons per minute	WSAC	Wet Surface Area Cooler System
HMBP	Hazardous Materials Business Plan	yrs	years

SOIL AND SURFACE WATER

Abdel-Karim Abulaban, P.E.

SUMMARY OF CONCLUSIONS

The California Energy Commission (Energy Commission) staff has analyzed the environmental impacts from the proposed project and believes that construction and operation of the Rio Mesa Solar Electric Generating Facility (Rio Mesa SEGF) would not result in unmitigable project-specific direct, indirect, or cumulative significant impacts to soil or water resources with submittal of a draft Drainage, Erosion, and Sediment Control Plan (DESCP) and the adoption of the associated recommended conditions of certification. Staff also believes the project would comply with all applicable federal, state, and local laws, ordinances, regulations, and standards (LORS) with the adoption of the associated recommended conditions of certification. Based on staff's preliminary assessment of the Rio Mesa SEGF, staff concludes the following:

- Hydrology: The project would not significantly alter natural drainage courses, and therefore post-project flows leaving the project site will not be different compared to pre-project conditions. The power blocks, substation, heliostat assembly buildings and administrative areas would be protected using diversion channels, bypass channels, or swales to direct run-on flow from up-slope areas and runoff flow through and around each plant, which would be designed to maintain peak flow rates similar to pre-project rates.
- Storm Water and Soil Erosion: The applicant has submitted the Ivanpah Solar Energy Generation Project (ISEGF) Drainage Erosion and Sediment Control Plan (DESCP) as an example of the plan that would be prepared for the Rio Mesa SEGF. The applicant has not provided staff with site-specific plans detailing the best management practices that would be used on the project site to manage storm water erosion and sedimentation impacts. In the ISEGF DESCP the applicant demonstrates that it can identify the appropriate design and management practices that would be appropriate for completion of a plan for Rio Mesa SEGF. Therefore, prior to completion of the Final Staff Assessment (FSA) the applicant needs to submit a copy of the draft DESCP for the Rio Mesa SEGF for staff review and analysis.
- Sanitary Wastewater: The proposed method of sanitary wastewater disposal by a septic system and leach field would have no significant impacts provided the requirements of recommended Condition of Certification **Soil & Surface Water-6** are met.
- Industrial Wastewater: The potential impacts related to the proposed use of evaporation ponds to dispose of the industrial wastewater could be mitigated through effective application of state and local LORS. However, staff could not complete the analysis of this waste disposal method or identify the appropriate mitigation methods because the applicant has not provided all the necessary information to staff and the Colorado River Basin Regional Water Quality Control Board (CRB RWQCB) to complete the in-lieu permit requirements. The applicant must submit the final design and plans to staff and the CRB RWQCB for completion of permit requirements prior to completion of the FSA.

- Surface Water: The project would use groundwater for project operation. The groundwater is hydraulically connected to the Colorado River. Potential impacts to the Colorado River are analyzed in the **Water Supply** section of this Preliminary Staff Assessment (PSA). Any impact from the use of the project on the Colorado River would be offset in accordance with staff's proposed Condition of Certification **WATER SUPPLY-5**.

INTRODUCTION

The California Environmental Quality Act (CEQA) requires that the significant environmental effects of a proposed project be identified and that such impacts be eliminated or mitigated to the extent feasible (Pub. Resources Code, § 21002). CEQA defines a "significant effect" on the environment as a "substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including … water" (Cal. Code Regs., tit. 14, § 15382).

This section analyzes potential impacts to soil and surface water resources from the construction and operation of the Rio Mesa SEGF. Where the potential for a significant impact is identified, staff has proposed mitigation to reduce the significance of the impact and, as appropriate, has recommended conditions of certification. Similarly, staff has recommended conditions of certification to ensure that the project complies with all laws that are or would be, absent the Energy Commission's exclusive jurisdiction, applicable to the project.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local environmental LORS would apply to the Rio Mesa SEGF and similar facilities, and help ensure the best and appropriate use and management of both soil and surface water resources by protecting human health and the environment.

Soil & Water Table 1
Laws, Ordinances, Regulations, and Standards

Applicable LORS	Description
Federal	
Clean Water Act (33 USC Section 1257 et seq.)	The Clean Water Act (CWA) (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 CWA under the Porter-Cologne Water Quality Control Act of 1967. The CWA also establishes protection of navigable waters. Activities that result in the dredging or filling of jurisdictional waters of the United States require authorization under a Section 404 permit issued by the Army Corps of Engineers (USACE). The USACE may grant authorization under either an individual permit or a nationwide permit to address operations that may affect the ephemeral washes. Section 404 permits are also subject to CWA Section 401 water quality certification through the Regional Water Quality Control Board (RWQCB). Section 401 certification through the RWQCB is required if there are

Applicable LORS	Description
	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. The RWQCB can require impacts to these waters to be quantified and mitigated.
State	
California Water Code Section 13240, 13241, 13242, 13243, & Water Quality Control Plan for the Colorado River Basin 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 provides comprehensive water quality planning. The following chapters are applicable to determining appropriate control measures and cleanup levels to protect beneficial uses and to meet the water quality objectives: Chapter 2, Present and Potential Beneficial Uses; Chapter 3, Water Quality Objectives, and the sections of Chapter 4, Implementation, entitled "Requirements for Site Investigation and Remediation," "Cleanup Levels," "Risk Assessment," "Stormwater Problems and Control Measures," Erosion and Sedimentation," "Solid and Liquid Waste Disposal to Land," and "Groundwater Protection and Management."
California Water Code Section 13260	Requires filing, with the appropriate RWQCB, 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.
California Code of Regulations, Title 23, Division 3, Chapter 30	This chapter requires the submission of analytical test results and other monitoring information electronically over the internet to the SWRCB's Geotracker database.
State Water Resources Control Board General Permit CAS000002.	The SWRCB regulates storm water discharges associated with construction projects affecting areas greater than or equal to 1 acre to protect state waters. Under General Permit CAS000002, the SWRCB has issued a National Pollutant Discharge Elimination System (NPDES) General Permit for storm water discharges associated with construction activity. Projects can qualify under this permit if specific criteria are met and an acceptable Storm Water Pollution Prevention Plan (SWPPP) is prepared and implemented after notifying the SWRCB with a Notice of Intent.
State Water Resources Control Board 2003-003-DWQ	This general permit applies to the discharge of water to land that has a low threat to water quality. Categories of low threat discharges include piping hydrostatic test water.
California Code of Regulations, Title 23, Division 3, Chapter 15	Title 23, Division 3, Chapter 15 applies to waste discharges to land and requires Regional Water Quality Control Boards issue Waste Discharge Requirements specifying conditions for protection of water quality as applicable.
California Plumbing Code (California Code of Regulations Title 24, Part 5)	Requirements for the design and construction of septic tanks and leach fields.
Local	
Riverside County ordinances related to building, grading, and storm water and erosion control	Describes ordinances for grading; soil erosion control; and stormwater compliance for construction activities.

Applicable LORS	Description
Riverside County Flood Hazard Zone Ordinance Code 458.13	Requires a development permit prior to any construction or other development within any area of special flood hazards and requires that flood capacity of any altered watercourse be maintained.
County of Riverside Ordinance Code Title 8, Chapter 8.124	Requirements for the design and construction of septic tank and leach field systems
State Policies and Guidance	
State Water Resources Control Board Res. No. 68-16	The “Antidegradation Policy” mandates that: 1) existing high quality waters of the state are maintained until it is demonstrated that any change in quality will be consistent with maximum benefit to the people of the state, will not unreasonable affect present and anticipated beneficial uses, and will not result in waste quality less than adopted policies; and 2) requires that any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters, must meet Waste Discharge Requirements (WDR) which will result in the best practicable treatment or control of the discharge necessary to assure that: a) a pollution or nuisance will not occur and b) the highest water quality consistent with maximum benefit to the people of the state will be maintained.
State Water Resources Control Board Res. 2008-0030	Requires sustainable water resources management such as low impact development (LID) and climate change considerations, in all future policies, guidelines, and regulatory actions. Directs Regional Water Boards to “aggressively promote measures such as recycled water, conservation and LID Best Management Practices where appropriate and work with dischargers to ensure proposed compliance documents include appropriate, sustainable water management strategies.”

SETTING

The Rio Mesa SEGF proposed project location is in the Sonora Desert at the confluence of Colorado River fluvial deposits and alluvial fan deposits emanating from the Mule and Palo Verde Mountains (BS 2011a). Water resources in this area are limited and vegetation is sparse. Due to these limitations, there is a need for a high degree of water use management and protection against accelerated soil erosion.

PALO VERDE MESA

The project would be constructed and operated in the Palo Verde region of eastern Riverside county, a part of the greater Colorado River Valley. Palo Verde is divided into two sections; the current flood plain, referred to as the Palo Verde Valley, and the upland terraces that flank the valley, called Palo Verde Mesa. The proposed project is located on the Palo Verde Mesa, adjacent to the mesa-valley boundary.

Palo Verde Mesa has an arid climate characterized by mild winters and hot summers. Precipitation in the region falls far short of the water requirement for typical (non-desert) crops and landscaping vegetation. The climate, characterized by high temperatures, low humidity, and frequent winds, places the region in the highest evapotranspiration zone in California (ETo Zone 18)[1]. Specifically, ETo for Zone 18 is 71.6 inches (DWR 1999). Precipitation is typically distributed about equally during summer and winter storms. These storms provide source water for hard rock seeps and springs in the Palo Verde Mountains (USGS, 1973). Summer storms cause high intensity, short-duration rainfall with rapid runoff. Winter storms bring gentle rains with little or no runoff. There are no perennial streams on the Palo Verde Mesa.

The project is proposed for development in the Palo Verde Valley Groundwater Basin (PVMGB). The PVMGB is approximately 226,000 acres in size as defined by the California Department of Water Resources (DWR) (DWR, 2003) and is in an area that is part of the Colorado River adjudication. The groundwater basin is defined by the Big and Little Maria Mountains to the north, McCoy and Mule Mountains to the west, the Palo Verde Mesa to the east, and the Palo Verde Mountains to the south (DWR, 2003). There are no known faults in the fluvial/alluvial fill in the vicinity of the proposed project that could impede groundwater flow (Stone & Webster Engineering Corp., 1976).

Groundwater from the PVMGB is the primary natural water supply for the valley region. Groundwater outflow is through evapotranspiration, agriculture runoff drains, and under flow to the Colorado River. Historically, because of agricultural development, groundwater consumption exceeded groundwater recharge and adversely affected Colorado River flows and agreements surrounding water volume flow in the river. Groundwater levels and storage declined, and now water use is regulated by a complex set of laws and rules known as 'Law of the River' (USBR, 2012). Depth to groundwater at the project site is now approximately 125 to 145 feet below ground surface (bgs) (BS 2011a).

Surface and Groundwater Beneficial Uses

The primary responsibility for the protection of water quality in California rests with the State Water Resources Control Board (SWRCB) and nine Regional Water Quality Control Boards. The proposed project site falls under the jurisdiction of the Colorado River Basin Regional Water Quality Control Board (CRB RWQCB). Residents, visitors and nature rely on the region's water resources to provide beneficial uses, defined as "uses of water necessary for the survival or well-being of people, plants and wildlife." The Water Quality Control Plan for the Colorado River Region (Basin Plan) designates beneficial uses for water bodies within the region, and establishes water quality objectives and implementation plans to protect those beneficial uses.

The Basin Plan for the RWQCB establishes water quality objectives, including narrative and numerical standards that protect the beneficial uses of surface and ground waters in the region. The Basin Plan describes implementation plans and other control measures designed to ensure compliance with statewide plans and policies and provides comprehensive water quality planning.

Beneficial water uses are of two types – consumptive and non-consumptive. Consumptive uses are those normally associated with people's activities, primarily municipal, industrial and irrigation uses that consume water and cause corresponding

[1] ETo represents the average annual water requirement for grass, which is the reference crop for the ETo system.

reduction and/or depletion of water supply. Non-consumptive uses include swimming, boating, waterskiing, fishing, and other uses that do not significantly deplete water supplies.

1. Past or Historical Beneficial Uses
   a. Historical beneficial uses of water within the Colorado River Basin Region have largely been associated with irrigated agriculture and mining. Industrial use of water has become increasingly important in the Region, particularly in the agricultural areas.

2. Present Beneficial Uses
   a. Agricultural use continues to be the predominant beneficial use of water in the Colorado River Basin Region, with the major irrigated acreage being located in the Coachella, Imperial and Palo Verde Valleys. The second in quantity of usage is the use of water for municipal and industrial purposes. The third major category of beneficial use, recreational use of surface waters, represents another important segment of the region's economy.

3. Sources of Drinking Water Policy
   a. All surface and ground waters are considered to be suitable, or potentially suitable, for municipal or domestic water supply with the exception of:
      i. Surface and ground waters where: the TDS exceed 3,000 mg/L, and it is not reasonably expected by the RWQCBs to supply a public water system;
      ii. There is contamination, either by natural process or by human activity, that cannot be treated for domestic use using either management practices or best economically achievable treatment practices; or
      iii. The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day.

Existing uses of waters from springs in the Colorado River Basin include the Box Spring, Crystal Spring, Old Woman Spring, Cove Spring, Mitchell Caverns Spring, Bonanza Spring, Agua Caliente Spring, Kleinfelter Spring, Von Trigger Spring, Malpais Spring, and Sunflower Spring. Based on a review of available information including the USGS National Water Information System (NWIS) database, USGS quadrangle maps and data provided by the U.S. Bureau of Land Management (BLM), none of these springs are within the area that would be influenced by the project.

Water quality objectives are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area.

1) **General Surface Water Objectives** (RWQCB)
   a. Aesthetic Qualities - All waters shall be free from substances attributable to wastewater of domestic or industrial origin or other discharges which adversely affect beneficial uses not limited to: settling to form objectionable deposits; floating as debris, scum, grease, oil, wax, or other matter that may cause nuisances; and producing objectionable color, odor, taste, or turbidity.

b. Tainting Substances – Waters shall be free of unnatural materials which individually or in combination produce undesirable flavors in the edible portions of aquatic organisms.

c. Toxicity – All waters shall be maintained free of toxic substances in concentrations which are toxic to, or which produce detrimental physiological responses in human, plant, animal, or indigenous aquatic life. Compliance with this objective will be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies, 96-hour bioassay or bioassays of appropriate duration or other appropriate methods as specified by the RWQCB. Effluent limits based upon bioassays of effluent will be prescribed where appropriate, additional numerical receiving water objectives for specific toxicants will be established as sufficient data becomes available, and source control of toxic substances will be encouraged. The survival of aquatic life in surface waters subjected to a waste discharge or other controllable water quality factors, shall not be less than that for the same water body in areas unaffected by the waste discharge, or other control water which is consistent with the requirements for “experimental water” as described in Standards Methods for the Examination of Water and Wastewater.

d. Temperature – temperature shall not be altered.

e. pH – shall range from 6.0 to 9.0

f. Dissolved Oxygen – shall not be reduced below the following minimum levels at any time: warm – 5.0 mg/L, cold – 8.0 mg/L, and warm and cold – 8.0 mg/L

g. Total Dissolved Solids – discharges of wastes or wastewater shall not increase the total dissolved solids content of receiving waters, unless it can be demonstrated to the satisfaction of the Regional Board that such an increase in total dissolved solids does not adversely affect beneficial uses.

h. Bacteria – The geometric mean of the indicated bacterial densities should not exceed one or the other of the following: E. coli – 630 colonies (col) per 100 ml and enterococci – 165 col per 100 ml. Nor shall any sample exceed one other following maximum allowable: E.coli 2000 col per 100 ml and enterococci 500 col per 100 ml.

Any discharge, except from agricultural sources, shall not cause concentration of total dissolved solids in surface waters to exceed the following TDS limits in milligrams per liter (mg/l) limits:

Location	Annual Average	Maximum
Coachella Valley Drains	2,000	2,500
Palo Verde Valley Drains	2,000	2,500

2) **General Groundwater Objectives**: Establishment of numerical objectives for groundwater involves complex considerations and it is acknowledged that the quality of groundwater varies significantly throughout the PVMGB and varies with depth. It is the RWQCB’s goal to maintain the existing quality of non-degraded groundwater

basins and to minimize the quantities of contaminants reaching any groundwater basin.

a. Groundwater designated for domestic or municipal supply shall not contain taste or odor producing substances.

b. Groundwater designated for domestic or municipal supply shall not contain coliform organisms in excess of limits specified in the regulations.

c. Groundwater designated for domestic or municipal supply shall not contain concentrations of chemical constituents in excess of the limits specified in California Code of Regulations, Title 22 regulations.

d. Discharges of water softeners regeneration brines, other mineralized wastes, and toxic wastes to disposal facilities which ultimately discharge in areas where such waste can percolate to ground waters useable for domestic and municipal purposes, are prohibited.

Wastewater reclamation and reuse is encouraged, however, such use must meet applicable water quality standards.

Soil Features

The Project site is situated on alluvial fans that emanate from the Mule Mountains, as shown on **Soil and Surface Water Figure 1**. Alluvial fans form at the base of topographic features where there is a marked break in slope. Water-transported material (alluvium) carried by a mountain stream enters a broad flat valley and deposits sediment as its velocity decreases on entering the flatter valley. This creates fan-shaped deposits. Consequently, alluvial fans tend to be coarse-grained at their mouths and fine-grained at their edges, with sediment size gradation between the mouth and the extremities.

Detailed Natural Resources Conservation Service (NRCS) soil survey data is not available for the project site; therefore the applicant used U.S. General Soil Map information to estimate soils properties. The U.S. General Soil Map consists of general soil association units, created by generalizing more detailed soil survey maps. In situations such as the Rio Mesa SEGF proposed site where more detailed soil survey maps are not available, data on geology, topography, vegetation, and climate were assembled, together with satellite images. Soils of like areas are studied, and the probable classification and extent of the soils were determined. The U.S. General Soil Map shows that most of the Rio Mesa SEGF proposed site is within a much larger area labeled with Soil Unit S1041. A small portion of the project site, comprised of the western side and a small area in the southwestern corner, belongs to the Soil Unit S1140. These soil units are part of a particular grouping of several separate soil types that would likely be found together in a landscape. Subcomponents of the two Soil Units are presented in **Soil and Surface Water Table 2**.

Soil and Surface Water Table 2
U.S. General Soil Map: Sub-Components of Soil Units S1041 and S1140

Sub-Components	Composition percent	Hydrologic Group	Texture
Soil Unit S1041			
Rositas	19%	A	Fine Sand (0-2% slopes)
Carrizo	18%	A	Gravelly sand
Orita	15%	B	Gravelly sandy loam
Aco	28%	B	Sandy Loam/Gravelly Loamy Sand
Badland	7%	D	Weathered Bedrock
Carsitas	6%	A	Gravelly sand (0-9% slopes)
Chuckwalla	6%	B	Very gravelly silt loam
Soil Unit S1140			
Gunsight	27%	B	Very Gravelly Sandy Loam
Rillito	19%	B	Gravelly Loam
Chuckwalla	8%	B	Very gravelly silt loam
Carrizo	6%	A	Gravelly Loamy Sand
Beeline	5%	D	Gravelly Sandy Loam
Cipriano	5%	D	Very gravelly sandy clay
Denure	5%	B	Gravelly sandy loam
Gilman	5%	B	Loam
Mohall	5%	B	Clay loam
Momoli	5%	B	Gravelly sandy loam
Pinamt	5%	B	Extremely gravelly sandy loam
Tremant	5%	B	Gravelly sandy loam

(Source: BS 2011a, Appendix 5.11A)

Descriptions of the four Hydrologic Soil Groups, which classify a soil's infiltration characteristics, are listed in **Soil and Surface Water Table 3**.

Soil and Surface Water Table 3
Hydrologic Soil Groups

Hydrologic Soil Group	Description
A	Low runoff potential. Soils having high infiltration rates (greater than 0.30 inches per hour) even when thoroughly wetted and consisting chiefly of deep, well-drained sands or gravels.
B	Soils having moderate infiltration rates (0.15 – 0.30 inches per hour) when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well- to well-drained sandy loam soils with moderately fine to moderately coarse textures.
C	Soils having slow infiltration rates (0.05 – 0.15 inches per hour) when thoroughly wetted and consisting chiefly of silty-loam soils with a layer that impedes downward movement of water, or soils with moderately fine to fine texture.
D	High runoff potential. Soils having very slow infiltration rates (0 – 0.05 inches per hour) when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material.

The applicant also completed an onsite investigation to prepare a Preliminary Geotechnical Evaluation following subsurface exploration performed in June 2011. Results from laboratory testing showed that the shallow surface deposits consist of a porous, sandy surface layer overlying a hardpan layer (BS 2011a, Table 5.11-2). Soils in the region are primarily derived from alluvial, colluvial, and fluvial deposits and range from coarse to moderately fine in texture. On the Palo Verde Mesa, soils tend to be well to excessively drained, coarse grained, sands, gravels, and loam with relatively low erosion hazards (BS 2011a). In the Palo Verde Valley, soils tend to be finer in texture and are generally well drained fine-grained sands, silts, clays, and loam with relatively low erosion hazards. Surface water runoff from mountain precipitation discharges through incised and braided channels in the mesa. Excess surface flow drains to the Hodges Canal, which ultimately discharges water to the Colorado River (BS 2011a).

Native vegetation in the region primarily consists of three plant community types: creosote bush scrub associated with undeveloped desert areas; riparian plant communities associated with alluvial washes and channel banks of the Colorado River and its various canals and drains; and agricultural areas in active cultivation. Approximately 0.65 acres of potentially jurisdictional wetlands are within the project boundary along the central eastern part of the project (BS 2012v). Additional wetlands are located adjacent to the project on the east near Hodges canal.

PROPOSED PROJECT

The Rio Mesa SEGF project would be a 500MW solar electric generating system that would be constructed in two phases. Each phase would have a 250MW capacity and consist of approximately 85,000 heliostats, double mounted on poles concentrically aligned to focus solar energy on a solar receiver steam generator (SRSG) located at the top of a 750-foot tall concrete tower. Please see the **Project Description** section of this PSA for further details.

A power block would be located at the approximate center of each plant site, with a Rankine-cycle non-reheat steam turbine generator, an air-cooled condenser, an auxiliary Wet Surface Area Cooler (WetSAC) system, evaporation basins, and other auxiliary equipment (BS 2012v). Each power plant would also have natural gas fired boilers to provide heated water for plant startup, nighttime heat to systems, and power augmentation during partial load conditions.

This is an efficient system design that minimizes water use by using an air-cooled condenser for condensation of steam. Water consumption would be used primarily for boiler make up water, supply water for the WetSAC system, and washing the heliostat mirrors. The WetSAC would be a partial dry cooling system used to cool auxiliary systems such as turbine and generator lube oil, boiler feed pump seal oil, chemical feed systems, and the boiler circulation pump seal oil. The closed-loop WetSAC would use water to spray over the cooling tubes when the ambient temperature is above 85 degrees Fahrenheit (BS, 2011a). When the ambient temperature is less than 85 degrees Fahrenheit, the WetSAC would use air-cooled fin-fans.

Construction of the Rio Mesa SEGF would require approximately 35 months and involve an average and peak workforce size of 800 and 2,200 persons, respectively. Once operational, the Rio Mesa SEGF would employ up to 100 employees and operate 7 days a week and typically up to 16 hours per day. The Rio Mesa SEGF would be designed for a 25-year lifecycle, with a projected equivalent availability factor[2] of 92 to 98 percent (BS 2012v).

Soil Erosion and Stormwater Control

The project proposes to manage stormwater in accordance with site-specific grading plans, a construction Storm Water Pollution Prevention plan (SWPPP), a Drainage Erosion and Sediment Control Plan (DESCP), and in accordance with the Riverside County ordinances. These plans and ordinances would establish methods of when and how to control and manage storm water flow as it reaches, flows across, and then leaves the project site.

Development of the project would maintain original grades and natural drainage features across the majority of the project site without the need for added storm drainage control. The power blocks, substation, heliostat assembly buildings and administrative areas would require storm water management systems. These systems would include diversion channels, bypass channels, or swales to direct run-on flow from up-slope areas and runoff flow through and around each plant.

Surface Water Features

Numerous small desert washes (ephemeral drainages) from the Mule Mountains cross the proposed project site. The slope gradient diminishes from west to east. Surface waters that enter the proposed project site occur only during heavy rains and dissipate quickly into the well-drained, sandy surface soils.

Features of the drainages include single, large channels with well-defined bed and banks, as well as broad, but sometimes weakly expressed, assemblages of shallow braided ephemeral channels. Water runoff generally drains toward the east and southeast via sheet flow and these natural drainage channels, discharging into the Hodges Drain, which eventually drains into the Colorado River.

A total of 29 ephemeral washes were mapped in the project area by the applicant. Three of the ephemeral washes were determined to be “Waters of the U.S.” by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act (BS 2011a, TN 63638 02-9-12, Preliminary Jurisdictional Determination Acceptance), as shown on **Soil and Surface Water Figure 2**. For further discussion on the jurisdictional determination, please refer to the **Biological Resources** section of this PSA.

The Federal Emergency Management Agency (FEMA) prepares 100-year flood maps for flood insurance purposes and for floodplain management use by local agencies. However, the proposed project would be located in an area that has not been mapped by FEMA for 100-year floods. The applicant, therefore, relied on the California Department of Water Resources’ (DWR) estimated flood zones, referred to as Awareness 100-year Floodplains to determine if the project site is located in a 100-year

[2] Equivalent availability factor is a weighted average of the percent of full energy production capacity achievable.

flood zone (BS 2011a). This delineation of floodplains is done to help developers stay out of 100-year flood zones and avoid flood hazards. The applicant stated that some of the heliostats as well as the common service building would be located in the awareness 100-year floodplains.

The applicant completed a Preconstruction Hydrology Analysis that modeled onsite peak flows, runoff volumes, maximum velocities and maximum depths for 24-hour storm events with 100-year and 2-year recurrence intervals, or probability of occurrence in any one year of 1% and 50%, respectively. **Soil and Surface Water Table 4** presents the estimated peak flows leaving the site calculated from the major washes (as shown in **Soil and Surface Water Figure 1**). The majority of runoff flows through the southern portion of the site due to offsite flows originating from the west.

Soil and Surface Water Table 4
Estimated Preconstruction 24-hour Peak Discharges at Different Cross Sections

	Return period (Probability of occurrence[1])					
	100-year (1%)			**2-year** (50%)		
Wash	**Flow (cfs)**	**Max Depth (ft)**	**Max. Velocity (fps)**	**Flow (cfs)**	**Max Depth (ft)**	**Max. Velocity (fps)**
0	788	2.2	6.1	67	1.0	3.0
10A	160	1.7	4.8	23	0.8	3.1
4	105	1.7	4.6	16	1.3	3.0
10B	280	2.2	4.1	39	1.0	3.0
5	445	2.4	5.0	71	1.3	3.7
20	726	2.6	4.7	86	1.4	2.6
15	676	2.9	4.6	205	2.3	3.8
25A	1351	2.4	3.7	40	1.1	2.6
23	195	1.7	4.0	1	0.2	1.4
25B	1336	3.6	4.8	25	1.8	2.6
30	306	1.7	3.6	1	0.2	1.5
45	6154	3.9	4.6	788	2.4	3.4
35	615	2.4	4.3	79	1.1	4.6
40	4641	4.5	4.6	701	2.8	3.3

(Source: BS 2011v)
Note 1: The probability of the rain event occurring in any given year.
cfs: cubic feet per second.
fps: feet per second

Groundwater Resources

For a detailed discussion of the regional groundwater resources, refer to the **Water Supply** section of this PSA.

Water Supply and Use

Groundwater would supply all proposed project water uses at a maximum usage rate of 173 acre-feet per year. Two new production wells would be installed prior to project construction to supply water for both project construction and operation. The groundwater would be pumped from the Bouse formation and surficial alluvial aquifer. The pumped groundwater would be treated at the common area and distributed to each power block by underground pipelines (BS 2011a). For a detailed discussion and analysis of the water supply, refer to the **Water Supply** section of this PSA.

Wastewater Management

Hydrostatic Test Water

Approximately 600,000 gallons (1.84 AF) of water would be used for hydrostatic testing purposes to pressure test project piping and vessels (BS 2011a; Table 5.14-3). Depending on analysis of the water, the hydrostatic test water would either be trucked to a wastewater treatment facility or discharged to land in accordance with the State Water Resources Control Board (SWRCB) permit for low threat discharges to surface waters (SWRCB Order No. R7-2009-0300).

Sanitary Waste

During construction, sanitary waste would be contained in portable facilities and routinely disposed of at a local treatment facility. During plant operation, each power block and the common area would have sanitary facilities. Disposal of the sanitary waste generated at each of the facilities would be through separate septic and leach field systems, one for each power block and one for the common area (BS 2011a). Approximately 200 gallons per day (gpd) of wastewater would be generated by each plant and the common area (600 gpd total) (BS 2011v). This waste would be disposed of through the septic system. Sewage sludge would periodically be disposed of by a local sanitary waste service provider to maintain system operation (BS 2011a).

Process Wastewater

Wastewater from all of the plant equipment processes, including the boilers and WetSAC blowdown, would be collected, and recycled and reused to the maximum practical extent (BS 2011a). This wastewater would be treated by either a thermal distillation system with mechanical vapor compression or reverse osmosis (RO) with ion exchange at wastewater treatment (WWT) systems located at the power block. Distillate/permeate collected from the WWT plant would be recycled to the treated water storage tank for reuse within the plant. Concentrate from the WWT system that cannot be recycled and reused would be discharged to one of two evaporation ponds in the common area to evaporate. Sludge accumulating in the ponds would be removed from the project site by an outside contractor as necessary.

Liquids from containment areas, sample drains, and facility equipment drains would be collected by general plant drains. A WWT system consisting of either thermal distillation with mechanical vapor compression or a reverse osmosis system with ion exchange would be installed for each of the power plants, as well as the common area (BS 2011a). Water from these areas would be collected in a system of floor drains, hub drains, sumps, and piping and routed to the respective WWT system. Waste from the WWT systems would be discharged to evaporation ponds that would be constructed to service the project. Drains that potentially could contain oil or grease would first be routed through an oil/water separator. The separated oil and sludge would be either disposed at a hazardous waste disposal facility or recycled by a certified oil recycler (BS 2011a: Table 5.14-4).

Reject waste produced from the RO process in the raw water treatment system would be captured in the wastewater collection tank and treated in the WWT system. Demineralized water from the mixed-bed system would be used as the feed water for the power-cycle makeup treatment system. The mixed-bed unit would be a self-contained skid-mounted unit that would be regenerated off site. There would be no liquid waste from the power cycle makeup water treatment equipment (BS 2011a).

Boiler blowdown, discharged from each SRSG to maintain water chemistry within acceptable ranges, would either be routed to a SRSG flash tank or discharged to a wastewater collection tank for treatment. If routed to a flash tank, the flash steam would be recovered back into the steam cycle and the condensate further flashed to the atmosphere, cooled, and recovered in the treated water storage tank. Blowdown from the night-time preservation and the start-up and auxiliary boilers would either be collected in blowdown tanks and recovered in a treated water storage tank or discharged to a wastewater collection tank for treatment (BS 2011a).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section provides an evaluation of the expected direct, indirect, and cumulative impacts to soil and water resources that would be caused by construction, operation, and maintenance of the project. Staff's analysis of potential impacts consists of a description of the potential effect, an analysis of the relevant facts, and application of the threshold criteria for significance to the project. Staff has identified potential impacts and provides a summary of the applicant's proposed mitigation and a discussion of the adequacy of the proposed mitigation. If necessary, staff presents additional or alternative mitigation measures and refers to specific conditions of certification related to a potential impact and the required mitigation. Mitigation is designed to reduce the effects of potential significant project impacts to a level that is less than significant.

METHOD FOR DETERMINING SIGNIFICANCE

Impacts leading to soil erosion or depletion or degradation of water resources are among those that staff believes could be most potentially significant soil and water resource issues associated with the proposed project. The thresholds of significance for these issues are discussed below.

Soil Resources

Staff evaluated the potential impacts to soil resources, including the effects of construction and operation activities, that could result in erosion and downstream transportation of soils and the potential contamination of soils and groundwater. There are extensive regulatory programs in effect that prevent or minimize these types of impacts. These programs are effective and, absent unusual circumstances, an applicant's ability to identify and implement Best Management Practices (BMPs) to prevent erosion or contamination is sufficient to ensure that these impacts would be less than significant. In addition, soils would be protected by the development and implementation of grading plans, a construction Storm Water Pollution Prevention Plan (SWPPP), and a Drainage Erosion and Sediment Control Plan (DESCP).

Although these programs and BMPs are generally effective on most gas-fired power projects, the proposed project is of a substantially larger scale. Modeling and calculations can be used to estimate future scenarios and provide a basis for design parameters; however, these methods are based on assumptions and projections that can be imprecise. To account for the potential imprecision in the modeling and calculations, staff has proposed conditions of certification that would mitigate potential impacts. The LORS and policies presented in **Soil and Surface Water Table 1** were used to determine the threshold of significance for the proposed Rio Mesa SEGF project.

Water Quality

To evaluate if significant impacts to soil or water resources would occur, the following criteria were used. Where a potentially significant impact was identified, staff or the applicant proposed mitigation to ensure the impacts would be less than significant.

- Would the project violate any water quality standards or waste discharge requirements?
- Would the project 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 on- or off-site?
- Would the project 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 on- or off-site?
- Would the project create or contribute runoff water that would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?
- Would the project otherwise substantially degrade water quality?
- Would the project place housing 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?
- Would the project place within a 100-year flood hazard area structures which would impede or redirect flood flows?
- Would the project 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?
- Would the project be inundated by seiche, tsunami, or mudflow?
- Would the project result in substantial soil erosion or the loss of topsoil?
- Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)

- Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

DIRECT/INDIRECT IMPACTS AND MITIGATION

A discussion of the direct and indirect Rio Mesa SEGF construction and operations impacts and mitigation is presented below. For each potential impact evaluation, staff describes the potential effect and applies the threshold criteria for significance to the project. If mitigation is warranted, staff provides a summary of the applicant's proposed mitigation and a discussion of the adequacy of the proposed mitigation. In the absence of an applicant-proposed mitigation or if mitigation proposed by the applicant is inadequate, staff mitigation measures are recommended. Staff also provides specific conditions of certification related to a potential impact.

During construction, groundwater would be used for dust suppression, soil compaction, and hydrostatic pipeline and vessel testing. Potential impacts to soils related to increased erosion or release of hazardous materials could be possible during construction. Potential storm water impacts could result if increased runoff flow rates and volume discharge from the site increase flooding downstream. Water quality could be impacted by discharge of hazardous materials released during construction or by project-induced migration of poorer quality groundwater to higher quality groundwater. Project water demand could also affect the quantity of available groundwater.

Operation of the Rio Mesa SEGF could lead to potential impacts to soil, storm water runoff, water quality, and water supply. Soils may be potentially impacted through accelerated erosion or the release of hazardous materials used during the operation of the Rio Mesa SEGF. Storm water runoff from the proposed project could result in impacts if increased runoff flow rates and volumes discharged from the Rio Mesa SEGF increase erosion or downstream flooding. Water quality could be impacted by discharge of eroded sediments from the project or by the discharge of hazardous materials released during operation. Potential impacts to soil, storm water, water quantity, including the applicant's proposed mitigation measures and staff's proposed mitigation measures, are discussed below.

Soil Resources

Staff evaluated the potential impacts to soil resources including the effects of construction and operation activities that could result in erosion and downstream transportation of soils and the potential for contamination to soils and surface water. There are extensive regulatory programs in effect that are designed to prevent or minimize these types of impact. These programs are effective, and absent unusual circumstances, an applicant's identification and implementation of best management practices (BMPs) to prevent erosion or contamination are sufficient to ensure that these impacts would be less than significant. The LORS and policies presented in **Soil and Surface Water Table 1** were used to determine the significance of Rio Mesa SEGF impacts.

DIRECT IMPACTS

Soil Erosion Due to Water and Wind

Construction of the project is scheduled to last 35 months. Soil losses would be caused by construction and grading activities that would expose and disturb the soil and leave soil particles vulnerable to detachment by wind and water. Soil erosion results in the loss of topsoil and increases in sediment loading to nearby water resources. In the absence of proper BMPs, earthwork could cause significant fugitive dust and erosion.

The magnitude, extent, and duration of those impacts would depend on several factors, including weather patterns in the vicinity of the Rio Mesa SEGF site, the types of soil that could be affected, and the method, duration, and time of year of construction activities. Prolonged periods of precipitation, or high intensity and short duration runoff events coupled with earth disturbance activities could result in accelerated onsite erosion. In addition, high winds during grading and excavation activities could cause wind borne erosion leading to increased particulate emissions that adversely impact air quality. The implementation of appropriate erosion control measures would help conserve soil resources, maintain water quality, prevent accelerated soil loss, and protect air quality.

Construction and operation activities proposed by the applicant can adversely impact soil resources including increased soil erosion, soil compaction, loss of soil productivity, and disturbance of soils crucial for supporting vegetation and water dependant 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. The magnitude, extent, and duration of those impacts would depend on several factors, including the proximity of the Rio Mesa SEGF site to surface water, the soil types affected, and the method, duration, and time of year of construction activities. Prolonged periods of precipitation, or high intensity and short duration runoff events coupled with earth disturbance activities can result in on-site erosion. In addition, high winds during grading and excavation activities can result in wind-borne erosion leading to increased particulate emissions that adversely affect air quality.

The Rio Mesa SEGF would be constructed on soils consisting of the Aco-Rositas-Carrizo group and the Gunsight-Rillito-Chuckawalla group. These soils consist of gravel, sand, and loam and are well to excessively well drained soils that have a high rate of water transmission. The Gen-Tie line would be built on Aco-Rositas-Carrizo group and Rositas-Carsitas-Dune Land group soils (BS 2011a: Appendices 5.11A and 5.11B). Wind and water erosion is evident in these soils. Wind deflation areas are present at the Rio Mesa SEGF site. There is ample evidence pointing to the presence of storm water sheet flow. Major and minor washes dissect the Rio Mesa SEGF site. At other locations, old and new sand dunes are present. The storm water that does not evaporate, transpire, or percolate into the ground, discharges to the Hodges Canal and, ultimately, to the Colorado River. Because storm water from the proposed project site can discharge to the Colorado River, storm water flow at the proposed project site is a U.S. Army Corps of Engineers (USACE) jurisdictional feature subject to regulation under the federal Clean Water Act (USACE 2010). Further analysis and mitigation of these potential impacts is discussed in the **Biological Resources** section of this PSA.

Construction Impacts and Mitigation

Construction of the project is scheduled to take approximately 35 months to complete (BS 2011a). During construction, the project site would be subject to wind and water erosion. Using the Revised Universal Soil Loss Equation, version 2 (RUSLE2), the estimated existing volume of soil loss to water erosion is 0.26 tons/acre/year (BS 2011a). Project construction could accelerate the rate of erosion by water to 0.59 tons/acre/year (BS 2011a).

The applicant has proposed to implement BMPs to reduce the volume of soil erosion (BS 2011a). Implementing these BMPs is should reduce the volume of soil erosion to 0.05 tons/acre/year during construction in both the project site and laydown area. The applicant has not provided information on erosion rates for the installation of the linear facilities. However, the linear facilities would be installed in areas of similar soil characteristics and topography. Furthermore, the area that would be disturbed by the construction of the linear facilities constitutes a small portion of the total project site that would not contribute significantly to the total volumes of sediment erosion and would be expected to be managed effectively with the proper BMPs for sediment erosion.

To reduce potential impacts related to soil erosion, the original grades and natural drainage features would be maintained across the majority of the project site and, therefore, would require no added storm drainage control. The power blocks, substation, heliostat assembly buildings and administrative areas would require storm water management systems. These systems would include diversion channels, bypass channels, or swales to direct run-on flow from up-slope areas and runoff flow through and around each plant.

Vegetation would be cut to a height of approximately 12 to 18 inches to allow clearance for heliostat function and, at the same time, leave the soil surface and root structures somewhat intact. An approximate 8- to 12-foot-wide linear swath of vegetation along the entire outer edge of the area to be developed would be cleared and grubbed (but not graded except as required for safe passage of vehicles) to create an internal perimeter path for installation of the tortoise and security fencing. Ungraded access routes, or “drive zones,” would occur at intervals of approximately 100-150 feet center to center for each drive zone (BS 2011a). These same routes would be used for the occasional cutting of vegetation to reduce the risk of fire due to plant regrowth (BS 2011a). Where possible, soil surface and root structures would be left intact. Dirt roads would be graded diagonally through the heliostat rows (BS 2011a). At some washes, slopes may be close to vertical, and too steep for safe equipment passage. In those cases, cuts into the side of the existing embankments would be necessary. The applicant proposes to relocate surface rocks and boulders to allow proper installation of heliostats and facilities when they cannot be avoided.

Heavy to medium grading would be required for the power tower and power block areas, substation, and common area for the heliostat assembly and staging complex, administration/control/maintenance buildings, ground water wells, water treatment and storage systems (BS 2011a). According to the applicant, the deepest excavations would be restricted to foundations and sumps.

High winds during grading and excavation activities could result in wind borne erosion leading to increased particulate emissions that would adversely impact air quality. The implementation of appropriate erosion control measures would help conserve soil resources, protect downstream properties and resources, and protect air quality. Conditions of certification in the **Air Quality** section of this PSA require a construction mitigation plan to prevent significant impacts from fugitive dust and wind erosion during construction. Please refer to the **Air Quality** section for details of the construction mitigation plan. The requirement to use soil weighting and bonding agents following grading would conserve freshwater by reducing the need for water as a means to control fugitive dust.

Examples of temporary erosion control measures that could be included in the final DESCP/SWPPP include revegetation, the use of dust suppression methods, and the construction of sediment barriers. Potential temporary erosion control measures are described in greater detail below.

- Revegetation – Vegetation is the most efficient form of erosion control because it keeps the soil in place and maintains the landscape over the long term. Vegetation reduces erosion by absorbing raindrop impact energy and holding soil in place with fibrous roots. It also reduces runoff volume by decreasing erosive velocities and increasing infiltration into the soil. Due to the dry and sandy conditions of the soil at the project site, drought-tolerant species and establishment procedures that are suited to this environment would be required for revegetation.
- Dust Suppression – During construction of the project improvements and the related linear facilities, dust erosion control measures would be implemented to minimize the wind-blown erosion of soil from the site. Local well water will be sprayed on the soil in construction areas to control dust and during revegetation of the site after construction activities are completed. The speed of vehicles on unpaved roads may also be controlled to reduce wind erosion. Installation of construction entrance/exits and tire wash areas are other methods that may be utilized to control wind erosion and sediment tracking.
- Sediment Barriers – Sediment barriers, such as sand bags, silt fences, mulched vegetation, berms, and ditches, would be used to slow runoff and trap sediment. Sediment barriers are generally placed below disturbed areas or at the base of exposed slopes. Sediment barriers are most often placed around sensitive areas, such as wetlands or washes, to prevent contamination from sediment-laden water. Some barriers would be placed in locations where off-site drainage will occur to control sediments and prevent the transportation of soils off site. Any soil stockpiles would be stabilized and covered if left on site for long periods of time. This could include the placement of sediment barriers around the base of the stockpiles, a method that can be employed during trenching operations associated with installation of the transmission lines.

The applicant has not provided a site-specific DESCP/SWPPP for staff analysis. The applicant has indicated that it would prepare a DESCP, in accordance with the Energy Commission standard conditions of certification, which would include BMPs for wind and water erosion control during project construction. The implementation of appropriate erosion control measures would help conserve soil resources, maintain water quality, and prevent accelerated soil loss. The erosion and sedimentation control measures would include: applying water or soil binders to the roads in active construction and laydown areas; controlling speed on unpaved surfaces; installing stabilized entrances/exits; use of earthen berms, silt fences, or fiber rolls to control sedimentation; and preserving existing vegetation. During grading, soil would also be stabilized by maintaining sufficient water content to make it resistant to weathering and erosion by wind and water (BS 2011a). The applicant has also submitted the DESCP/SWPPP for the Ivanpah Solar Energy Generating Facility (ISEGF), which is another one of the applicant's projects, as an indication of the type of plan the applicant would prepare for the construction of the Rio Mesa SEGF. Since the ISEGF is located in a more complex area with steeper slopes and more erosive flows requiring more aggressive BMPs for storm water management, and it employs the same technology for power generation, staff believes that the BMPs identified in that DESCP/SWPPP would likely be adequate for the Rio Mesa SEGF.

Nevertheless, in order to understand how the applicant proposes to manage storm flows and potential erosion and sedimentation on the site, the applicant must submit at least a conceptual DESCP showing the types of drainage control structures and best management practices that would be implemented during construction of the Rio Mesa SEGF. Staff is requesting that the applicant submit a draft DESCP for review and analysis prior to completion of the FSA so staff can ensure adequate measures can be identified and implemented to address site specific conditions.

Staff believes that when the applicant submits a draft DESCP in accordance with the criteria identified in Condition of Certification **Soil & Surface Water-1** that would address site specific conditions, then compliance with the approved DESCP would eliminate or reduce to a less than significant level the impacts of soil erosion during construction. In addition, the project activities require that it be covered under the federal General Construction Permit (SWRCB Order No. 2009-0009-DWQ). To ensure compliance with this Order, staff proposes Condition of Certification **Soil & Surface Water-2**, which requires a construction SWPPP. Also, conditions of certification in the **Air Quality** section of this PSA require a construction mitigation plan to prevent significant impacts from fugitive dust and wind erosion during construction. With implementation of BMPs and associated monitoring activities included in the approved DESCP and SWPPP, impacts on soil would be expected to be less than significant during construction of the proposed Rio Mesa SEGF project.

<u>Sanitary Wastewater</u>

During construction, the project is expected to generate an estimated 300 gallons per day of sanitary wastewater. The applicant proposes to have this wastewater collected by a contracted sanitary service for off-site treatment or disposal. This would ensure sanitary wastewater would be disposed of by a licensed contractor that would have responsibility for disposal at a facility that would be permitted to accept these types of wastes. Staff believes there would be no significant impacts if the sanitary wastewater is disposed of in accordance with permit requirements in the jurisdiction of the facility permitted to accept these wastes.

Operation Impacts and Mitigation

The proposed project would have lower rates of water erosion during the operations phase of the project, approximately 0.066 tons/acre/year. The reduced rate of erosion during operations is achievable through use of BMPs and site design features. During the operations phase, berms would surround each solar field and minimize sediment migration off-site. The applicant also proposes regular applications of dust palliatives and water during operations that would reduce wind erosion to 1 ton/acre/year. Reduced wind erosion would also result in reduced mirror damage due to sediment abrasion (BS 2011a).

Given the low frequency of precipitation and storm water runoff, BMPs should limit potential soil loss from water erosion caused by on-site precipitation events. BMPs would be applied and erosion and sedimentation control measures repaired as soon as erosion is evident. Temporary erosion control measures would be implemented as needed to control erosion during both construction and operation. Temporary sediment control materials would be maintained on-site throughout the life of the project to respond as needed to handle unforeseen rain or emergencies.

The applicant has also stated that permanent wind erosion control measures that would be included in a DESCP/SWPPP would mitigate potential erosion and subsequent fugitive dust impacts resulting from prevailing winds during construction and operation of the Rio Mesa SEGF project. During operation, areas not covered by foundations, paving, or the solar array would be treated with soil stabilizers. The Rio Mesa SEGF project would be expected to minimize wind erosion in an effort to protect the mirrors and minimize maintenance and damage.

The applicant has also submitted the DESCP/SWPPP for the Ivanpah Solar Energy Generating Facility (ISEGF) as an indication of the type of plan the applicant would prepare for the operation of the Rio Mesa SEGF. The applicant has not submitted site-specific storm water and erosion control plans identifying the specific BMPs to manage storm water and erosion from the site. Instead, the applicant stated that DESCP and SWPPP plans similar to those of the Ivanpah SEGF and the BMPs therein would be used for the Rio Mesa SEGF. The Ivanpah SEGF is a more complex site that has many steeper slopes that produce more erosive flows than the Rio Mesa SEGF, and therefore, the BMPs employed there should be adequate for what the Rio Mesa SEGF would require. However, without site-specific plans designed specifically for the Rio Mesa SEGF site, staff cannot complete the analysis of storm water and sediment erosion impacts; staff can only use the proposed plan to get an idea about what to expect for the Rio Mesa SEGF.

In order to understand how the applicant proposes to manage storm flows and potential erosion and sedimentation on the site the applicant must submit at least a conceptual DESCP showing the types of drainage control structures and best management practices that would be implemented during operation of Rio Mesa SEGF. Staff is requesting that the applicant submit a draft DESCP for review and analysis prior to completion of the FSA so staff can ensure adequate measures can be identified and implemented to address site specific conditions.

Staff believes that when the applicant submits a draft DESCP that complies with the criteria identified in Condition of Certification **Soil & Surface Water-1** that would address site specific conditions then compliance with the approved DESCP would eliminate or reduce to a less than significant level the impacts of soil erosion during operation. In addition, the project activities might require that it be covered under the federal General Permit for Discharges of Storm Water Associated with Industrial Activities (Order No. 97-03-DWQ, NPDES No. CAS000001). To ensure compliance with this Order, staff proposes Condition of Certification **Soil & Surface Water-3**. Staff understands that since the Rio Mesa SEGF is a solar energy project, it might not be required to obtain an industrial SWPPP permit. However, a determination must be made by the CRB RWQCB indicating there are no special conditions requiring project compliance with the industrial federal permit.

The BMPs and recommended conditions of certification for erosion and sediment control above are generally effective on most projects. However, staff considers that the proposed project does constitute an unusual circumstance. The proposed project is of a very large scale compared to other projects constructed on active alluvial fans in the past, and it also involves a very large number of heliostats that add up to a significant total area subject to localized erosion.

Presence of the heliostats and their pylons would promote the concentration of flows in their vicinity, and also cause a decrease in the chance for infiltration, thereby increasing the effective runoff rates per unit area. Repeated concentrated flows around the heliostats and the pylons would cause localized erosion around the pylons. Staff acknowledges that the applicant has completed a thorough hydrologic modeling and analysis, but notes that modeling is imprecise and untested in this extreme desert environment. Should these assumptions and calculations be inaccurate, the consequences of flash flood damage or modified sedimentation and erosion rates may be significant.

Although modeling and calculations can be used in an attempt to estimate future scenarios and provide a basis for structural design parameters, these methods are based on assumptions and projections that can be imprecise and untested in this environment. Rain that falls on the mirrors while they are in storage position would eventually fall to the ground and flow on a pervious surface for some time, thus losing some volume to infiltration. This would result in reduced flows. Staff acknowledges that the applicant used a conservative assumption for the hydrologic and hydraulic calculations to analyze local scour depth; all mirror surface areas were treated as impervious areas. However, these assumptions and calculations may prove to be inaccurate, in which case the consequences of flash flood damage or modified sedimentation and erosion rates may be overwhelming. To reduce these potential impacts, staff proposes Condition of Certification **Soil & Surface Water-4** requiring an analysis of storm events and heliostat stability as part of a Pylon Insertion Depth and Heliostat Stability Report, as well as a Storm Water Damage Monitoring and Response Plan to reduce any potential impacts.

Storm Water and Drainage

The naturally developed drainage system at the Rio Mesa SEGF site would be used for all areas except at the power blocks and common area. These areas would be protected from storm water flows by berms and diversion channels. Water would be captured by the berms, and routed down past the protected area via the diversion channels and reintroduced as sheet flow on the downgradient side of the protected area (BS 2011a).

Precipitation that falls within the protected areas would be captured by a system of drains. These drains would route the storm water through an oil-water separator and reintroduce the storm water as sheet flow down gradient of the protected area.

The applicant proposes designing the diversion channels with a minimum ground surface slope of 0.5 percent to allow positive drainage that prevents formation of puddles. The applicant also proposes to reduce erosion by lining storm drainage channels with a non-erodible material, such as compacted rip-rap, geo-synthetic matting, or engineered vegetation. Channels would be designed to allow sheet flow to occur for all storm events less than or equal to a 100-year, 24-hour storm event. The applicant also proposes to control all surface runoff during and after construction in accordance with BMPs that would be identified in the DESCP that the applicant would prepare and submit to staff in accordance with standard conditions of certification.

The applicant completed a Post-construction Hydrology Analysis that modeled onsite peak flows, runoff volumes, maximum velocities and maximum depths for 24-hour storm events with 2-, 5-, 10-, 25-, and 100-year recurrence intervals, or probability of occurrence in any one year of 50%, 20%, 10%, 4%, and 1%, respectively, and compared discharge rates at the project outfall with pre-construction conditions. **Soil and Surface Water Table 5** presents a comparison between the pre- and post-construction discharges for the modeled storm events and the absolute and percent increase in discharges expected to be caused by the project.

Soil and Surface Water Table 5
Estimated Pre- and Post-construction 24-hour Peak Discharge at Project Outfall

Storm Event	Existing Condition Total Runoff Volume (acre-feet)	Post-Construction Total Runoff Volume (acre-feet)	Runoff Volume Increase (acre-feet)	Percent Runoff Volume Increase
100-year, 24-hour	4,767	4,831	64	1.35%
25-year, 24-hour	2,769	2,796	27	0.97%
10-year, 24-hour	1,732	1,740	8	0.47%
5-year, 24-hour	1,117	1,120	3	0.29%
2-year, 24-hour	457	457458	1	0.17%

(Source: BS 2011v)
cfs: cubic feet per second.
fps: feet per second

The applicant also presented a comparison between maximum discharge rates for pre- and post-construction conditions. **Soil and Surface Water Table 6** presents the estimated peak discharges estimated at several critical cross sections (as shown in **Soil**

and Surface Water Figure 3) for 24-hour storm events with 100- and 2-year recurrence interval.

Soil and Surface Water Table 6
Estimated Pre- and Post-construction 24-hour Peak Discharges at Different Cross Sections

	Return period (Probability of occurrence[1])							
	100-year (1%)				2-year (50%)			
Cross Section	Pre-const. Flow (cfs)	Post-const. flow (cfs)	Flow increase (cfs)	Percent Increase	Pre-const. Flow (cfs)	Post-const. flow (cfs)	Flow increase (cfs)	Percent Increase
CS1	672	675	3	0.4%	257	264	7	2.7%
CS2	0	11	11	--	0	0	0	0
CS3	1336	1369	34	2.5%	8	10	2	25%
CS4	0	7	7	--	0	0	0	0
CS5	299	344	45	15%	0	0	0	0
CS6	6143	6143	0	0	758	758	0	0
CS7	64	64	0	0	3	3	0	0
CS8	775	784	9	1.1%	5.6	5.8	0.2	3.5
CS14	775	784	1	0.1%	7	8	1	14.3

(Source: BS 2011v)
cfs: cubic feet per second.
fps: feet per second

As **Soil and Surface Water Table 5** shows, the increase in runoff volume due to the project is very small. That is due to the fact that the project would result in a very small increase of impervious area, and would not alter drainages except at limited locations where the common area structures would be located. The percent increase in discharge rates in **Soil and Surface Water Table 6** are also small. The only exceptions are at small cross sections where the pre-construction discharges are small and thus they are very sensitive to minor changes. However, these are limited locations where the discharges are insignificant and are not expected to have any significant impact off-site.

Discharges from the proposed project are, therefore, not expected to have a significant impact to sensitive surface waters.

Significant impacts to the existing drainage system and soil resources would be avoided by using the low impact development approach (LID). LID is a comprehensive land planning and engineering design approach with a goal of maintaining and enhancing the pre-development hydrologic regime of watersheds. Where grading is necessary, earthwork cuts and fills would be balanced to the greatest degree possible. According to the applicant, the earthwork within the power blocks and common area would be excavated and compacted in accordance with the recommendations provided in the geotechnical report. Also, the applicant proposes that the grade of the surface soil at each plant would be designed to provide the minimum requirements for access of installation equipment and materials during site construction and operations. By doing so, most of the natural drainage features would be maintained and any grading required would be designed to promote sheet flow where possible. The applicant would protect areas disturbed by grading and other ground disturbance against erosion by implementing appropriate BMPs that would be identified in the draft DESCP/SWPPP the applicant would prepare for the project.

In addition, the applicant proposes to place stone filters and check dams in appropriate areas throughout the project site to provide areas for sediment deposition and to promote the sheet flow of storm water. Where available, native materials (rock and gravel) would be used for the construction of the stone filter and check dams. Diversion berms would be used to redirect storm water around critical facilities, as required. Periodic maintenance would be conducted as required after major storm events and when the volume of material behind the check dams exceeds 50 percent of the original volume. Stone filters and check dams should not alter drainage patterns, but they are intended to minimize soil erosion and promote sheet flow.

Staff believes the estimate of pre- and post- project flows are reasonable and could be used for the basis of a drainage design that mitigate any potential impacts from on-site storm water flows and drainage. However, since applicant has not provided staff with a site-specific DESCP/SWPPP, staff cannot analyze the effectiveness of the proposed BMP’s for handling flows in the more important or representative areas of the site. Staff is requesting that the applicant submit a draft DESCP for review and analysis prior to completion of the FSA so staff can ensure adequate measures can be identified and implemented to address site specific drainage conditions.

Staff believes that when the applicant demonstrates a draft DESCP can be developed that would address site specific conditions, then compliance with an approved DESCP prepared in accordance with Condition of Certification **Soil & Surface Water-1** would eliminate or reduce to a less than significant level the impacts of soil erosion during operation. In addition, if applicable, the project activities might require that it be covered under the federal General Permit for Discharges of Storm Water Associated with Industrial Activities (Order No. 97-03-DWQ, NPDES No. CAS000001). Therefore staff would also recommend the applicant be required to comply with Condition of Certification **Soil & Surface Water-3.**

Flooding, Tsunami, and Seiche

The Rio Mesa SEGF site is too far inland from any major water bodies to be affected by tsunami or seiche, and the project site is not in a Federal Emergency Management Agency (FEMA) 100-year flood zone (FEMA, 2012). However, according to a Department of Water Resources based available map data, the major washes at the Rio Mesa SEGF site form a 100-year DWR awareness floodplain zone (DWR, 2012). Awareness floodplains identify the 100-year flood hazard areas using approximate assessment procedures. These floodplains are shown simply as flood prone areas without specific depths and other flood hazard data (DWR, 2012).

To evaluate specific flood hazards at the project site, the applicant performed modeling that estimates that the 100-year, 24-hour storm flows are confined to the large washes and in the wetlands area east of the Rio Mesa SEGF. Storm water would be allowed to flow through the project site using the naturally developed drainage system in all areas except at the power blocks and the common area. Storm water flow to these areas would be concentrated and diverted away from these areas and introduced downgradient as sheet flow (BS 2011a).

Construction of the project would result in a slight increase of impervious areas, which would result in a proportional increase in runoff volumes and peak flow rates. However, the added impervious area is estimated to be less than 300 acres, which is insignificant when compared with the project footprint of over 3,800 acres. Furthermore, most of the created impervious area would not be contiguous, meaning that flows from those areas would eventually drain to pervious areas and have a good chance for infiltration, and thus any increase in the volumes and peak discharges should be very small. Staff believes, therefore, that potential flooding impacts would be less than significant with the implementation of this DESCP and SWPPP storm water management plan.

Water Supply

Refer to the **Water Supply** section of this PSA for a detailed analysis of the potential effects on groundwater supplies and groundwater quality.

Wastewater Management

Improper handling or containment of construction wastewater could cause a broad dispersion of contaminants to soil or groundwater. Discharge of any non-hazardous construction-generated wastewater would require compliance with discharge regulations. Sources of construction wastewater would include equipment wash water and hydrostatic test water. Equipment wash water would be transported to an appropriate treatment facility. Hydrostatic test water would be discharged to land or trucked off-site to an appropriate treatment and disposal facility. Discharge of the hydrostatic test water to land would be done in accordance with the Colorado River Basin (CRB) RWQCB Order No. R7-2009-0300 as a discharge to land with a low threat to surface water. Sanitary wastewater generated during construction would be containerized in portable facilities with the waste removed by a licensed waste hauler. With the use of BMPs and compliance with LORS, staff concludes that there would be no significant impact from construction-generated wastewater. To ensure that the operation wastewater is managed appropriately and in accordance with applicable BMPs and LORS, staff proposes Condition of Certification **Soil & Surface Water-5.**

Process Wastewater

During plant operations, process wastewater would be generated from the reverse osmosis/demineralizer system, chemical feed area, and general plant drains. The reverse osmosis/demineralizer system water would be discharged to evaporation ponds. Wastewater from the chemical feed area and general plant drains would be processed through an oil/water separator with the water discharged to the evaporation ponds. Sizing of the evaporation ponds appears to be sufficient to accommodate the discharge to the ponds. The oil and sludge from the oil/water separator would be removed off-site to a recycling facility or landfill.

The applicant prepared a Report of Waste Discharge for the two evaporation ponds, which was submitted to both Energy Commission staff and CRB RWQCB staff for analysis as discussed above. The Report of Waste Discharge (BS 2011c) included design details and figures about discharge volumes and characteristics for two evaporation ponds when the project was going to have three solar fields. However, modified designs with final numbers for discharge volumes for the project after the elimination of the third solar field have not been submitted to the water board to start the process of developing the appropriate waste discharge requirements. Before staff can complete analysis and development of any monitoring and mitigation methods that would be included in a condition of certification, the applicant must submit to staff and CRB RWQCB, final plans showing details of the final design of the two evaporation ponds for conditions of the modified project after the elimination of the third solar field.

Sanitary Wastewater

Sanitary wastes generated during operation of the Rio Mesa SEGF would be collected by sinks, toilets, and other sanitary facilities. Because there are no sanitary sewer connections, the sanitary wastewater would be processed through a septic system and discharged to a leach field. Solids would be periodically removed by a professional service. The estimated average daily wastewater flow from the two power blocks and the common area to its corresponding leach field is expected to be 600 gallons (BS 2012v). This volume of wastewater is below the CRB RWQCB threshold requiring completion of a site specific engineering report demonstrating there will be no impacts to water quality. Staff recommends Condition of Certification **Soil & Surface Water-6** to ensure that the sanitary waste is managed in accordance with appropriate BMPs and Riverside County Code Title 3, Division 3, Chapter 8, Waste Management, Article 5, Liquid Waste Disposal and Title 6, Division 3, Chapter 3, and the Uniform Plumbing Code. These codes are designed to ensure that the construction and operation of septic systems would not result in impacts to public health and the environment.

CUMULATIVE IMPACTS AND MITIGATION

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 reasonably foreseeable future projects (California Code of Regulations, Title 14, section 15130).

Cumulative Impacts to Soil and Storm Water

Construction and operation of the Rio Mesa SEGF project would result in both temporary and permanent changes to the soil and storm water drainage patterns at the Rio Mesa SEGF project site. Without the use of BMPs that would be incorporated into a final DESCP and construction SWPPP, these changes could incrementally increase local soil erosion and storm water runoff. However, as discussed above, these potential impacts would be prevented or reduced to a level of less than significant through the implementation of BMPs, a final DESCP, and construction SWPPP, and compliance with all applicable erosion and storm water management LORS. This development has the potential to increase local soil erosion and storm water runoff. However, this development is also required to comply with all applicable erosion and storm water management LORS. Compliance with these LORS would ensure cumulative impacts would be prevented or reduced to a level of less than significant. Staff considered the potential for cumulative impacts due to construction and operation of the proposed Rio Mesa SEGF with other existing or foreseeable projects noted in **Table 1** of the **Executive Summary** and determined that when combined with the Rio Mesa SEGF would not create cumulative soil and surface water impacts in the project area. With the implementation of **Soil & Surface Water-1**, **-2**, and **-3**, staff believes the Rio Mesa SEGF project would not significantly contribute to the cumulative soil erosion and storm water impacts from other development within the vicinity of the proposed Rio Mesa SEGF project, as other development would also be required to comply with LORS that would ensure no significant impact would be caused by the development.

COMPLIANCE WITH FEDERAL, STATE, AND LOCAL LORS

CLEAN WATER ACT, ANTIDEGRADATION POLICY, PORTER-COLOGNE WATER QUALITY CONTROL ACT, AND SWRCB ORDERS 2009-0009-DWQ, 2003-003-DWQ, AND 97-03-DWQ

The Clean Water Act (CWA) (33 USC, section 1257 et seq.) requires states to set standards to protect water quality, which include regulations of storm water and wastewater discharge during construction and operation of a facility. California established its regulations to comply with the CWA under the Porter-Cologne Water Quality Control Act. The SWRCB regulates storm water discharges associated with construction of projects affecting areas greater than or equal to 1 acre. Under Order 2009-0009-DWQ, the SWRCB has issued a National Pollutant Discharge Elimination System (NPDES) General Permit for storm water discharges associated with construction activity, Order 2003-03-DWQ is for water discharges to land that has a low threat to water quality (includes water from hydrostatic testing of pipes), and Order 97-03-DWQ is for storm water discharges associated with industrial activity. Projects qualify under these permits if specific criteria are met and an acceptable Storm Water Pollution Prevention Plan (SWPPP) is prepared and implemented after notifying the SWRCB with a Notice of Intent.

The Rio Mesa SEGF would satisfy these requirements of the SWRCB and CRB RWQCB with the development of a DESCP in accordance with Condition of Certification **Soil & Surface Water-1**, the development of a construction SWPPP in accordance with Condition of Certification **Soil & Surface Water-2**, compliance with requirements for hydrostatic test water discharge in accordance with Condition of Certification **Soil & Surface Water-5**, and the development of an industrial SWPPP in accordance with Condition of Certification **Soil & Surface Water-3**. In addition, proposed Condition of Certification **Soil & Surface Water-4** would reduce potential impacts from damaging storm events.

CALIFORNIA CODE OF REGULATIONS TITLE 20, DIVISION 2, CHAPTER 3, ARTICLE 1

These data collection regulations known as Quarterly Fuel and Energy Reports (QFER) are to obtain necessary information in order for the California Energy Commission to develop policy reports and analyses related to energy. Power plant owners are required to periodically report specific operational data to the California Energy Commission, including water supply and water discharge information.

RIVERSIDE COUNTY GENERAL PLAN AND RENEWABLE ENERGY ORDINANCE

The Riverside County General Plan lists Water Resources goals and policies, which include that new industrial developments must reduce polluted runoff from entering surface waters by complying with the Clean Water Act, must reduce direct-source pollution into surface waters, and must implement appropriate mechanisms to reduce wastewater discharge.

Although compliance with **Soil & Surface Water-1**, **-2**, and **-3** would reduce polluted runoff from entering surface waters, staff believes that Rio Mesa SEGF does not specifically reduce direct-source discharge. As discussed in “Onsite Area Flooding” above, berms would be constructed to protect the power blocks and common area from flooding, which would be designed in a way that would ensure peak flows are not much larger than pre-construction peak flows. However as discussed in “Water Quality” above, staff does not identify any significant impacts to water quality as a result of the diversion channels and berms as they would affect only a small portion of the site and would not result in significant increase in peak flows.

SWRCB RES. 2008-0030 (LOW IMPACT DEVELOPMENT)

SWRCB and CRB RWQCB encourage a low-impact planning approach for new development projects. Low Impact Development (LID) is an alternative management approach to the traditional “end-of-pipe” centralized collection and treatment approach of simply collecting onsite runoff flows in order to control offsite discharge through a single discharge point. Although the post construction peak discharge rate is only slightly larger than the preconstruction rate, the post construction flows are typically sustained for a longer period of time which increases the volume of runoff during a given rain event. This can increase the amount of pollutants and the erosive energy of discharge.

LID focuses on an integrated system of decentralized, small-scale control measures spread throughout the site. By distributing storm water rather than concentrating it, the erosive forces of this runoff can be avoided. LID features often take advantage of soil infiltration, vegetation, and evaporation to mimic the natural hydrologic regime. Examples of measures include:

- Reducing imperviousness, conserving natural resources and ecosystems, maintaining natural drainage courses, reducing use of pipes, and minimizing clearing and grading.
- Providing runoff storage measures dispersed uniformly throughout a site’s landscape with the use of a variety of detention, retention, and runoff practices.
- Maintaining predevelopment time of concentration by strategically routing flows, increasing surface roughness, and disconnecting[3] impervious surfaces to maintain travel time and control the discharge.

[3] The impacts of disconnected impervious surfaces are considerably less severe than a contiguous stretch of impervious area.

However, LID measures may not be suitable for all sites, with considerations made to expected rainfall intensities, climate (i.e., relative humidity, solar radiation, air temperature, wind speed) and, in particular, soil permeability. Also, LID by itself may not completely replace the need for conventional storm water controls to mitigate excess flow rates or to provide enhanced storm water treatment.

The proposed Rio Mesa SEGF site appears suitable for implementation of LID measures, based on the dry hot climate and sandy native soils. The applicant has not submitted a site specific Preliminary Draft DESCP containing measures that would ensure impacts from storm water would be less than significant. Examples of measures that satisfy LID, which are also encouraged by Riverside County, for a project to be treated as LID compliant are listed below:

- Vegetation would not be removed but would be mowed (if needed) in areas where grading is not required for access or construction.
- Most of the natural drainage features would be maintained and any grading required would be designed to promote sheet flow where possible.
- Relatively small rock filters and local diversion berms through the heliostat fields to discourage water from concentrating.
- Areas compacted during construction activities would be restored, as appropriate, to approximate preconstruction compaction levels.
- Heliostat assemblies, which contribute to the project's total impervious area, would be installed such that their surface runoff flows to the pervious dirt areas of the solar field.

Staff believes that implementation of the above measures, which would be approved by staff in accordance with Condition of Certification **Soil & Surface Water-1**, sufficiently complies with this SWRCB policy. Although the applicant does not specifically demonstrate that all components of LID are met, namely the objective of maintaining preconstruction runoff volume, the above measures would help reduce the increase in volume. Furthermore, neither Riverside County nor CRB RWQCB requires minimum standards for use of LID practices for this area.

FACILITY CLOSURE

The Rio Mesa SEGF is designed for an operating life of 25 years (RMSEGF, 2011). Facility closure can be either temporary or permanent, and closure options range from "mothballing," with the intent of a restart at some time, to the removal of all equipment and facilities. Closure can result from two circumstances: (1) the facility is closed suddenly and/or unexpectedly because of unplanned events, such as a natural disaster or economic forces or (2) the facility is closed in a planned, orderly manner, such as at the end of its useful economic or mechanical life or due to gradual obsolescence.

In the event of a temporary or unplanned closure, Rio Mesa SEGF would be required to comply with all applicable conditions of certification, including an emergency Risk Management Plan to manage the possible release of hazardous substances present onsite (see the **Hazardous Material Management** section of this PSA). Depending on the expected duration of the shutdown, other appropriate measures would be taken such as removing chemicals from storage tanks or equipment.

Permanent closure (decommissioning) requires a Facility Closure Plan, as discussed in the **Facility Design** and **General Conditions** sections of this PSA, which would be submitted to the Energy Commission for approval prior to decommissioning. Future conditions that could affect decommissioning are largely unknown at this time, however compliance with all applicable LORS, and any local and/or regional plans would be required. The plan would address all concerns in regard to potential erosion and impacts on water quality.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has not received any public or agency comments regarding soil and surface water resources.

CONCLUSIONS

Based on the assessment of the proposed Rio Mesa SEGF project, the Energy Commission staff concludes that:

- the applicant has not provided staff with site-specific plans detailing the best management practices that would be used on the project site to manage storm water erosion and sedimentation impacts. The applicant has submitted a Drainage Erosion and Sediment Control Plan (DESCP) and a Storm Water Pollution Protection Plan (SWPPP) for another one of the applicant's projects as an example of the plan that would be prepared for the Rio Mesa SEGF. These plans demonstrate the applicant can identify the appropriate design and management practices necessary for completion of a plan for the Rio Mesa SEGF. The applicant must submit a copy of the draft DESCP and SWPPP for the Rio Mesa SEGF for staff review and analysis in order for staff to complete the FSA. Implementation of the approved DESCP and SWPPP that comply with Conditions of Certification **Soil & Surface Water-1**, **-2**, and **-3** would ensure that the project would not significantly increase or decrease erosion rates within its watershed during the construction and operation phases; and
- the potential impacts related to the proposed use of evaporation ponds to dispose of the industrial wastewater could be mitigated through effective application of state and local LORS. However, staff could not complete the analysis of this waste disposal method and identify the appropriate mitigation methods because the applicant has not provided all the necessary information to staff and the Colorado River Basin Regional Water Quality Control Board (CRB RWQCB) to complete the in-lieu permit requirements. The applicant must submit the final design and plans to staff and the CRB RWQCB for completion of permit requirements in order for staff to complete the FSA.

ADDITIONAL INFORMATION STAFF REQUIRES FROM THE APPLICANT IN ORDER TO COMPLETE THE FSA

- The applicant is required to submit a copy of the draft DESCP and the SWPPP to manage storm water erosion and sedimentation impacts for the project for staff review and analysis.
- The applicant is required to submit all the necessary information including final design and plans for the two evaporation ponds to Energy Commission staff and the Colorado River Basin Regional Water Quality Control Board (CRB RWQCB) to complete the process of analyzing and issuing Waste Discharge Requirements.

PROPOSED CONDITIONS OF CERTIFICATION

DRAINAGE EROSION AND SEDIMENTATION CONTROL PLAN

Soil & Surface Water-1: Prior to site mobilization, the project owner shall obtain the compliance project manager's (CPM) approval for a site specific DESCP that ensures protection of water quality and soil resources of the project site and all linear facilities for both the construction and operation phases of the project. This plan shall address appropriate methods and actions, both temporary and permanent, for the protection of water quality and soil resources, demonstrate no increase in off-site flooding potential, and identify all monitoring and maintenance activities. The project owner shall complete all engineering plans, reports, and documents necessary for the CPM to conduct a review of the proposed project and provide a written evaluation as to whether the proposed grading, drainage improvements, and flood management activities comply with all requirements presented herein. The plan shall be consistent with the grading and drainage plan as required by Condition of Certification **CIVIL-1** and shall contain the following elements:

- **Vicinity Map:** A map shall be provided indicating the location of all project elements with depictions of all major geographic features to include watercourses, washes, irrigation and drainage canals, major utilities, and sensitive areas.
- **Site Delineation:** The site and all project elements shall be delineated showing boundary lines of all construction areas and the location of all existing and proposed structures, underground utilities, roads, and drainage facilities. Adjacent property owners shall be identified on the plan maps. All maps shall be presented at a legible scale.
- **Drainage:** The DESCP shall include the following elements:

  a. Topography. Topography for off-site areas is required to define the existing upstream tributary areas to the site and downstream to provide enough definition to map the existing storm water flow and flood hazard. Spot elevations shall be required where relatively flat conditions exist.

b. Proposed Grade. Proposed grade contours shall be shown at a scale appropriate for delineation of on-site ephemeral washes, drainage ditches, and tie-ins to the existing topography. A clear indication of on-site storm water containment features (berm, etc.) should also be delineated.

c. Hydrology. Existing and proposed hydrologic calculations for on-site areas and off-site areas that drain to the site; include maps showing the drainage area boundaries and sizes in acres, topography and typical overland flow directions, and show all existing, interim, and proposed drainage infrastructure and their intended direction of flow.

d. Hydraulics. Provide hydraulic calculations to support the selection and sizing of the on-site drainage network, diversion facilities and BMPs.

e. Containment. Description of on-site storm water containment features. Indicate how the project will maintain a “no discharge” status.

- **Watercourses and Critical Areas:** The DESCP shall show the location of all on-site and nearby watercourses including washes, irrigation and drainage canals, and drainage ditches, and shall indicate the proximity of those features to the construction site. Maps shall identify high hazard flood prone areas.
- **Clearing and Grading:** The plan 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, cut/fill depths or other means. The locations of any disposal areas, fills, or other special features shall also be shown. Existing and proposed topography tying in proposed contours with existing topography shall be illustrated. The DESCP shall include a statement of the quantities of material excavated at the site, whether such excavations or fill is temporary or permanent, and the amount of such material to be imported or exported or a statement explaining that there would be no clearing and/or grading conducted for each element of the project. Areas of no disturbance shall be properly identified and delineated on the plan maps.
- **Soil Wind and Water Erosion Control:** The plan shall describe 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 the CPM prior to use.
- **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). BMP implementation schedules shall be provided for each project element for each phase of construction.

- **Best Management Practices:** The DESCP shall show the location, timing, and maintenance schedule of all erosion- and sediment-control BMPs to be used prior to initial grading, during project element excavation and construction, during final grading/stabilization, and after construction. BMPs shall include measures designed to control dust and stabilize construction access roads and entrances. The maintenance schedule shall include post-construction maintenance of treatment-control BMPs applied to disturbed areas following construction.
- **Erosion Control Drawings:** The erosion-control drawings and narrative shall be designed, stamped and sealed by a professional engineer or erosion-control specialist.
- **Agency Comments:** The DESCP shall include copies of recommendations from the Riverside County and CRB RWQCB.
- **Monitoring Plan:** Monitoring activities shall include routine measurement of the volume of accumulated sediment in the on-site containment berms, drainage ditches, and storm water diversions.

Verification: 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 be submitted to the Chief Building Official (CBO) for review and approval. In addition, the project owner shall do all of the following:

1. No later than sixty (60) days prior to start of site mobilization, the project owner shall submit a copy of the DESCP to Riverside County and the CRB RWQCB for review and comment and to the CPM for review and approval. The CPM shall consider comments received from Riverside County and CRB RWQCB and approve the DESCP based on comments as appropriate.

2. During construction, the project owner shall provide an analysis in the monthly compliance report on the effectiveness of the drainage, erosion, and sediment control measures and the results of monitoring and maintenance activities.

3. Once operational, the project owner shall provide in the annual compliance report information on the results of storm water BMP monitoring and maintenance activities. The project owner shall also indicate what maintenance activities were completed to maintain the project's on-site storm water flow.

4. Provide the CPM with two (2) copies each of all monitoring or compliance reports.

CONSTRUCTION - NPDES GENERAL PERMIT (SOLAR PLANT I & II)

Soil & Surface Water-2: The project owner shall fulfill the requirements contained in State Water Resources Control Board's National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities Order No. 2009-0009-DWG, NPDES No. CAS000002 and all subsequent revisions and amendments. The project owner shall develop and implement a construction Storm Water Pollution Prevention Plan (SWPPP) for the construction of the project.

Verification: Thirty (30) days prior to site mobilization, the project owner shall submit the construction SWPPP to the CBO and CPM for approval. A copy of the approved construction SWPPP shall be kept accessible onsite at all times.

INDUSTRIAL - NPDES GENERAL PERMIT (SOLAR PLANT I AND II)

Soil & Surface Water-3: For the operation of Solar Plant I and II, the project owner shall comply with the requirements of the State Water Resources Control Board's NPDES General Permit for Discharges of Storm Water Associated with Industrial Activities (Order No. 97-03-DWQ, NPDES No. CAS000001) and all subsequent revisions and amendments. The project owner shall develop and implement a Storm Water Pollution Prevention Plan (SWPPP) for the operation of each solar plant. The project owner may also submit a Notice of Non- Applicability (NONA) to the RWQCB to apply for an exemption to the general NPDES permit.

Verification: At least thirty (30) days prior to operation of each solar plant, the project owner shall submit copies to the CPM of the operational SWPPP and shall retain a copy on site. Within 10 days of its mailing or receipt, the project owner shall submit to the CPM any correspondence between the project owner and the CRB RWQCB about the general NPDES permit for discharge of storm water associated with this activity. This information shall include a copy of the notice of intent sent by the project owner to the State Water Resources Control Board and the notice of termination. A letter from the CRB RWQCB indicating that there is no requirement for a general NPDES permit for discharges of storm water associated with industrial activity would satisfy this condition.

STORM WATER DAMAGE MONITORING AND RESPONSE PLAN

Soil & Surface Water-4: The project owner shall ensure that the heliostats are designed and installed to withstand storm water scour that may occur as a result of a 100-year storm event. The analysis of the storm event and resulting heliostat stability will be provided within a Pylon Insertion Depth and Heliostat Stability Report to be completed by the applicant. This analysis will incorporate results from site-specific geotechnical stability testing, as well as hydrologic and hydraulic storm water modeling performed by the applicant. The modeling will be completed using methodology and assumptions approved by the CPM.

The project owner shall also develop a Storm Water Damage Monitoring and Response Plan to evaluate potential impacts from storm water, including heliostats that fail due to storm water flow or otherwise break and scatter mirror debris on to the ground surface.

The basis for determination of pylon embedment depths shall employ a step-by-step process as identified below and approved by the CPM:

A. Determination of peak storm water flow within each sub-watershed from a 100-year event:

   - Use of Riverside County Hydrology Manual to specify hydrologic parameters to use in calculations; and
   - HEC -1 and Flo-2D models shall be developed to calculate storm flows from the mountain watersheds upstream of the project site, and flood flows at the project site, based upon hydrologic parameters from Riverside County.

B. Determination of potential total pylon scour depth:

   - Potential channel erosion depths shall be determined using the calculated design flows, as determined in A above, combined with the methodology presented in "FAN, An Alluvial Fan Flooding Computer Program, FEMA, 1990."
   - Potential local scour shall be determined using the calculated design flows, as determined in A above, combined with the Federal Highway Administration (FHWA) equation for local bridge pier scour from the FHWA 2001 report, "Evaluating Scour at Bridges."

C. The results of the scour depth calculations and pylon stability testing shall be used to determine the minimum necessary pylon embedment depth within the active channels. In the inactive portions of the alluvial fans that are not subject to channel erosion and local scour, the minimum pylon embedment depths will be based on the results of the pylon stability testing.

D. The results of the calculated peak storm water flows and channel erosion and heliostat scour analysis together with the recommended heliostat installation depths shall be submitted to the CPM for review and approval sixty (60) days before the start of heliostat installation.

The Storm Water Damage Monitoring and Response Plan shall be submitted to the CPM for review and approval and shall include the following:

- Detailed maps showing the installed location of all heliostats within each project phase;
- Description of the method of removing all soil spoils should any be generated;
- Each heliostat shall be identified by a unique ID number marked to show initial ground surface at its base, and the depth of the pylon below ground;
- Minimum Depth Stability Threshold to be maintained of pylons to meet long-term stability for applicable wind, water and debris loading effects;
- Above and below ground construction details of a typical installed heliostat;

- BMPs to be employed to minimize the potential impact of broken mirrors to soil resources;
- Methods and response time of mirror cleanup and measures that may be used to mitigate further impact to soil resources from broken mirror fragments; and
- Monitoring, documenting, and restoring the downstream playa surface when impacted by sedimentation or broken mirror shards.

A plan to monitor and inspect periodically, before first seasonal and after every storm event:

- Security and Tortoise Exclusion Fence: Inspect for damage and buildup of sediment or debris
- Heliostats within drainages or subject to drainage overflow: Inspect for tilting, mirror damage, depth of scour compared to pylon depth below ground and the Minimum Depth Stability Threshold, collapse, and downstream transport.
- Drainage Channels: Inspect for substantial migration or changes in depth, and transport of broken glass.
- Constructed Diversion Channels: Inspect for scour and structural integrity issues caused by erosion, and for sediment and debris buildup.
- Downstream Playa Surface: Inspect for changes in the surface texture and quality from sediment buildup, erosion, or broken glass.

Short-Term Incident-Based Response:

- Security and Tortoise Exclusion Fence: repair damage, and remove built-up sediment and debris.
- Heliostats: Remove broken glass, damaged structure, and wiring from the ground, and for pylons no longer meeting the Minimum Depth Stability Threshold, either replace/reinforce or remove the mirrors to avoid exposure for broken glass.
- Drainage Channels: no short-term response necessary unless changes indicate risk to facility structures.
- Constructed Diversion Channels: repair damage, maintain erosion control measures and remove built-up sediment and debris.

Long-Term Design-Based Response:

- Propose operation/BMP modifications to address ongoing issues. Include proposed changes to monitoring and response procedures, frequency, or standards.
- Replace/reinforce pylons no longer meeting the Minimum Depth Stability Threshold or remove the mirrors to avoid exposure for broken glass.

- Propose design modifications to address ongoing issues. This may include construction of active storm water management diversion channels and/or detention ponds.
- Inspection, short-term incident response, and long-term design based response may include activities both inside and outside of the project boundaries. For activities outside of the project boundaries the owner shall ensure all appropriate environmental review and approval has been completed before field activities begin.

Verification: At least sixty (60) days prior to construction, the project owner shall submit to the CPM a copy of the Pylon Insertion Depth and Heliostat Stability Report for review and approval. At least sixty (60) days prior to commercial operation, the project owner shall submit to the CPM a copy of the Storm Water Damage Monitoring and Response Plan for review and approval. The project owner shall retain a copy of this plan onsite at the power plant at all times. The project owner shall prepare an annual summary of the number of heliostats failed, cause of the failure, and cleanup and mitigation performed for each failed heliostat.

CONSTRUCTION WASTEWATER DISCHARGE

Soil & Surface Water-5: Prior to hydrostatic test water discharge to land, the project owner shall fulfill the requirements contained in State Water Resources Control Board (SWRCB) *Order No. 2003-003-DWQ Statewide General Waste Discharge Requirements (WDRs) for Discharges to Land with a Low Threat to Water Quality (General WDRs)* and all subsequent revisions and amendments.

Prior to hydrostatic test water discharge to surface waters or designated Waters of the State, the project owner shall fulfill the requirements contained in CRB RWQCB Waste Discharge Requirements and NPDES General Permit for Limited Threat Discharges to Surface Waters.

Prior to transport and disposal of any facility construction-related wastewaters offsite, the project owner shall test and classify the stored wastewater to determine proper management and disposal requirements. The project owner shall provide evidence that wastewater is disposed of at an appropriately licensed facility. The project manager shall ensure that the wastewater is transported and disposed of in accordance with the wastewater's characteristics and classification and all applicable LORS (including any CCR Title 22 Hazardous Waste and Title 23 Waste Discharges to Land requirements).

Verification: The project owner shall submit to the CPM copies of all relevant correspondence between the project owner and the SWRCB or CRB RWQCB about the hydrostatic test water discharge requirements within 10 days of its receipt or submittal. This information shall include copies of the Notice of Intent and Notice of Termination for the project. A letter from the SWRCB or CRB RWQCB indicating that there is no requirement for the discharge of hydrostatic test water would satisfy the corresponding portion of this condition.

Prior to transport and disposal of any facility construction-related wastewaters offsite, the project owner shall test and classify the stored wastewater to determine proper management and disposal requirements. The project owner shall ensure that the wastewater is transported and disposed of in accordance with the wastewater's characteristics and classification and all applicable LORS (including any CCR Title 22 Hazardous Waste and Title 23 Waste Discharges to Land requirements). The project owner shall provide evidence to the CPM of proper wastewater disposal, via a licensed hauler to an appropriately licensed facility, in the monthly compliance report.

SEPTIC SYSTEM AND LEACH FIELD REQUIREMENTS

Soil & Surface Water-6 The project owner shall comply with the requirements of the County of Riverside Ordinance Code Title 8, Chapter 8.124 and the California Plumbing Code (California Code of Regulations Title 24, Part 5) 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. If it is determined based on the engineering report that groundwater may be impacted, the project owner shall include a groundwater quality monitoring program. This program can utilize monitoring wells (if appropriate) used as part of groundwater monitoring in Condition of Certification **Water Supply-4** which can be found in the **Water Supply** section. The engineering report shall specify the proposed groundwater monitoring program (if required), constituents of concern, monitoring frequency and other elements as needed as part of any groundwater monitoring program.

Verification: Sixty (60) days prior to the start of commercial operations, the project owner shall submit to the Riverside County appropriate fees and plans for review and comment for the construction and operation of the project's sanitary waste septic system and leach field. A copy of these plans shall be simultaneously submitted to the CPM for review and approval. The plans shall demonstrate compliance with the sanitary waste disposal facility requirements of Riverside County Code Title 8, Chapter 8.124 and the California Plumbing Code (California Code of Regulations Title 24, Part 5) regarding sanitary waste disposal facilities such as septic systems and leach fields.

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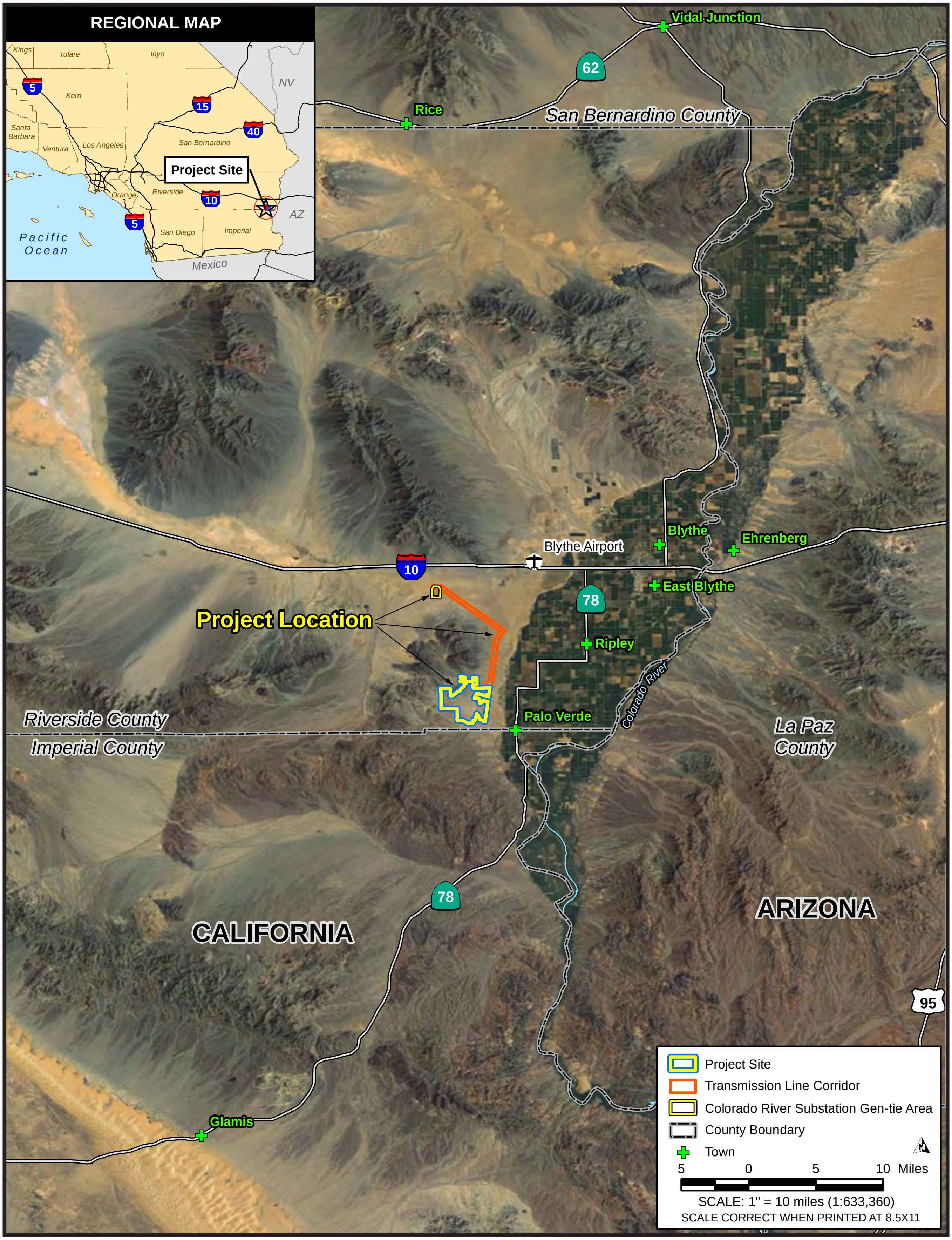
SOIL AND SURFACE WATER - APPENDIX A

Acronyms Used in the Soil and Surface Water Section

amsl	above mean sea level	gpd/ft	gallons per day per foot
AF	acre-feet	gpm	gallons per minute
AF/y, AFY	acre-feet per year	IEPR	Integrated Energy Policy Report
BLM	Bureau of Land Management	lbs	pounds
bgs	below ground surface	LID	Low Impact Development
BMP	Best Management Practices	LORS	laws, ordinances, regulations, and standards
CDPH	California Department of Public Health	MCL	maximum contaminant level
CEQA	California Environmental Quality Act	mg/L	milligrams per liter
cfs	cubic feet per second	mph	miles per hour
CPM	Compliance Project Manager	MOU	Memorandum of Understanding
DESCP	Drainage, Erosion, and Sediment Control Plan	MW	megawatt
DRECP	Desert Renewable Energy Conservation Plan	NEPA	National Environmental Policy Act
DTSC	Department of Toxic Substances Control	NPDES	National Pollutant Discharge Elimination System
DWR	Department of Water Resources	RCRA	Resource Conservation and Recovery Act
ESA	Environmental Site Assessment	REC	Recognized Environmental Condition
FEMA	Federal Emergency Management Agency	RMSEGF	Rio Mesa Solar Energy Generating Facility
ft/day	feet per day	ROC	Record of Conversation
fps	feet per second	RWQCB	Regional Water Quality Control Board
FSA	Final Staff Assessment	SWPPP	Storm Water Pollution Prevention Plan
ft/ft	feet per foot	SWRCB	State Water Resources Control Board
ft/yr	feet per year	TDS	total dissolved solids
GW	gigawatt	µS/cm	microsiemens per centimeter
gpd	gallons per day	USCS	Unified Soil Classification System
		WWTP	wastewater treatment plant

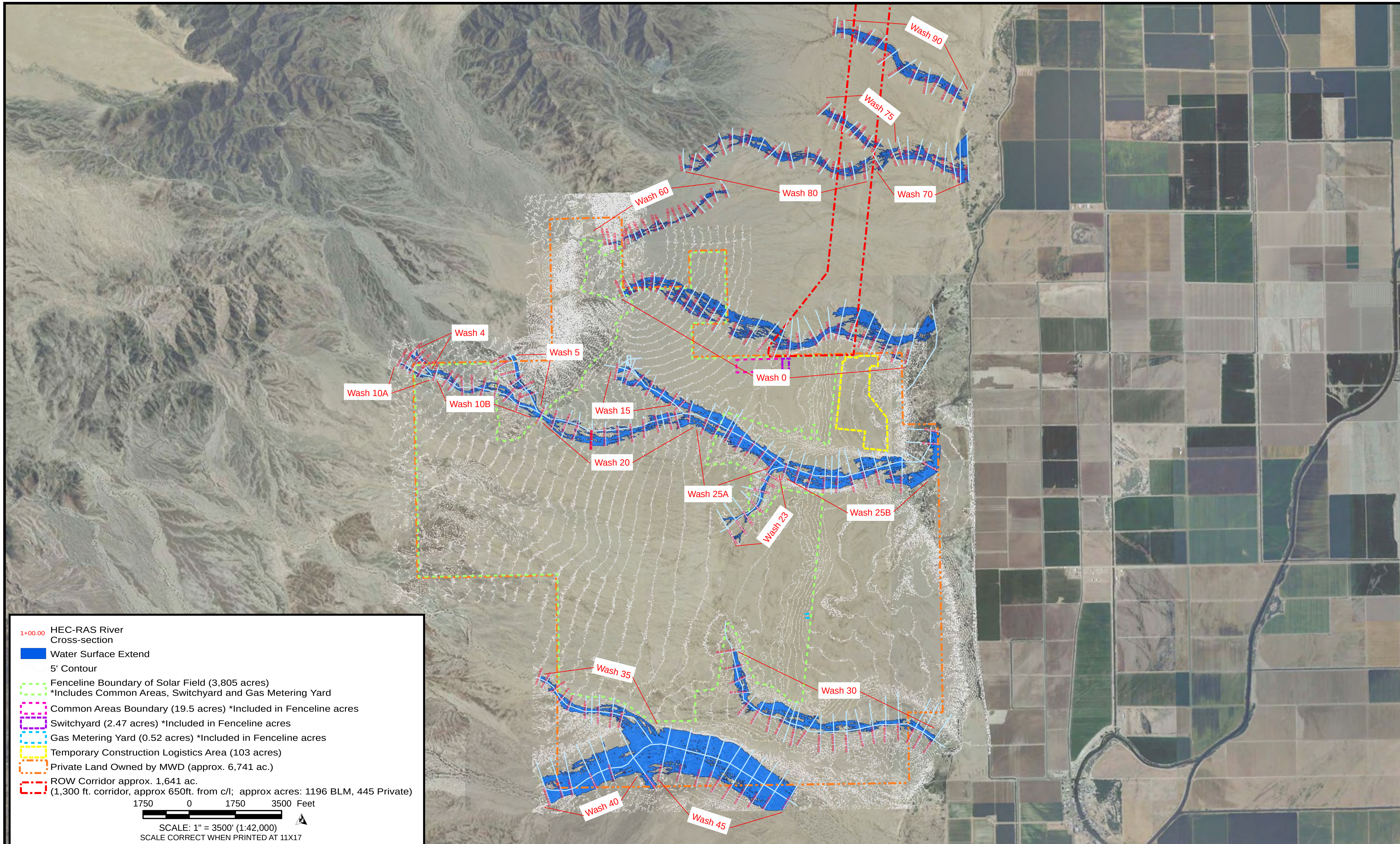
SOIL AND SURFACE WATER - FIGURE 1
Rio Mesa Eletric Generating Facility - Proposed Project Vicinity Map



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Amended AFC 7/23/2012, Fig. 1.1-1 (Rev)

SOIL AND SURFACE WATER - FIGURE 2

Rio Mesa Electric Generating Facility - Drainage Washes in Proposed Project Site

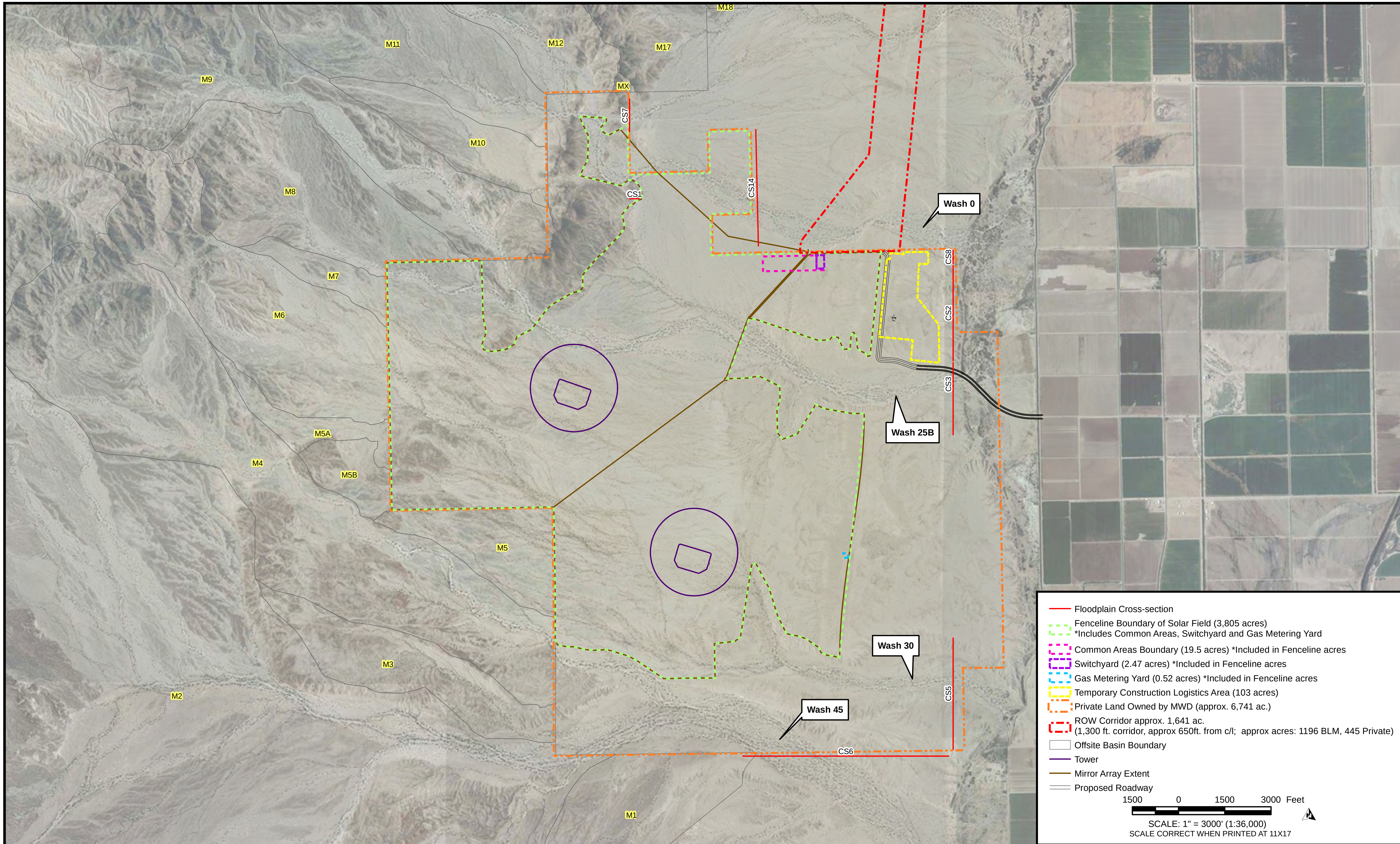


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Amended AFC 7/23/2012, Fig. 5.15-7 (Rev)

SOIL AND SURFACE WATER - FIGURE 3

Rio Mesa Electric Generating Facility - Drainage Washes in Proposed Project Site



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Amended AFC 7/23/2012, Fig. 5.15-8 (Rev)

TRAFFIC AND TRANSPORTATION

Andrea Koch and Gregg Irvin, Ph.D.

SUMMARY OF CONCLUSIONS

California Energy Commission staff has analyzed the information provided in the Application for Certification (AFC) and acquired from other sources to determine the potential for the Rio Mesa Solar Electric Generating Facility (Rio Mesa SEGF) to cause significant impacts to the surrounding traffic and transportation system. Staff has also evaluated mitigation measures that could reduce or eliminate the significance of these impacts.

As currently proposed, construction and operation of the Rio Mesa SEGF could result in significant impacts to the nearby traffic and transportation system. Specifically, the project has the potential to cause significant impacts to traffic level of service, and to cause pilots and motorists to experience distracting glint and glare from the heliostats. Energy Commission staff proposes Conditions of Certification **TRANS-1** through **TRANS-8** to reduce these impacts to less than significant and to ensure that the proposed project would comply with all applicable laws, ordinances, regulations, and standards pertaining to traffic and transportation.

As currently proposed, **TRANS-2** would require implementation of the park-and-ride plan during all phases of construction to mitigate peak construction impacts to traffic level of service (LOS) at two intersections. However, staff acknowledges that the applicant's traffic data showing impacts reflects the "worst case" scenario of peak construction, and that there would be times when construction employment would be lower and would not cause traffic impacts. In an effort to refine the timing of implementation of the park-and-ride plan, staff has provided a Data Request to the applicant asking for: the estimated number of employees during each month of construction; and a traffic analysis determining the threshold number of individually commuting construction employees that would cause LOS at SR-78 (Neighbours Blvd.)/28th Ave. and SR-78 (Rannells Blvd.)/28th Ave. to degrade to LOS D. If the applicant submits this information to staff prior to publication of the Final Staff Assessment (FSA), staff will refine **TRANS-2** to require implementation of the park-and-ride plan during only those months where construction employment would cause LOS at the affected intersections to reach LOS D. Staff has also requested that the applicant provide feasible park-and-ride locations prior to publication of the FSA to ensure that the park-and-ride plan is a feasible mitigation.

Staff is currently investigating the feasibility of preparing a condition of certification to ensure that glint impacts would be less than significant. This condition would require the project owner to prepare a Heliostat Operations Positioning and Monitoring Plan (HPMP) to minimize glint exposure to aircraft and other potential receptors, such as motorists, through strategic heliostat positioning, avoidance of malfunctions, and procedures for investigating and resolving any complaints from the public. Staff has provided a Data Request to the applicant asking for identification of potential receptors and methods to ensure that heliostats would be positioned to avoid reflection onto these receptors. Staff must have this information prior to issuance of the FSA in order to ensure that potential impacts are identified and can be mitigated.

INTRODUCTION

In compliance with California Environmental Quality Act (CEQA) and Energy Commission requirements, this analysis identifies Rio Mesa SEGF's potential impacts to the surrounding traffic and transportation system and proposes mitigation measures (conditions of certification) that would avoid or reduce these impacts to a less than significant level. This analysis also addresses the project's consistency with applicable federal, state, and local transportation-related laws, ordinances, regulations, and standards (LORS).

SETTING

The proposed Rio Mesa SEGF project site is located in Riverside County approximately 13 miles southwest of Blythe, California. The power plant, associated heliostat field, common area facilities, switchyard, and gas metering yard would be located on approximately 3,805 acres of land leased from the Metropolitan Water District of Southern California (MWD). However, the following associated facilities would be located on public land managed by the Bureau of Land Management (BLM): portions of the project's gen-tie line; the upgraded Bradshaw Trail access road; and the 33 kV construction/emergency back-up power supply line. (See the **Project Description** section of this Preliminary Staff Assessment (PSA) for more details on the project description.)

Regional access to the project site would be from Interstate 10 (I-10) and from State Route 78 (SR-78). Local access would be from 30th Avenue/Bradshaw Trail, the primary access. The alternative local access would be via a route beginning at the intersection of SR-78 and 34th Avenue and running westward just north of the County right-of-way for 34th Avenue. On-site, each plant would have perimeter access/maintenance roads. For a map of the project site in relation to nearby roadways and freeways, see **Traffic and Transportation Figure 1 – Local Setting.**

APPLICANT-PROPOSED IMPROVEMENTS AND TRAFFIC MEASURES

In the Application for Certification (AFC) for the Rio Mesa SEGF, the applicant has proposed the following roadway improvements and traffic measures (BS 2011a, BS 2012v):

- Addition of a stop sign to the eastbound approach of the intersection of SR-78 and 30th Avenue/Bradshaw Trail
- Addition of a stop sign to the eastbound approach of the intersection of SR-78 and 34th Avenue
- Paving of Bradshaw Trail between the project site and SR-78 as a two-lane undivided roadway, maintaining the existing intersection geometry of a shared left-through-right lane at the eastbound approach

(Paving of Bradshaw Trail on BLM land would be at the discretion of the BLM, and an alternative improvement may be designated through BLM's SF 299 process.)

- Construction of an unpaved, two-lane, undivided roadway north of the 34th Avenue right-of-way, between the project site and SR-78
- Development and implementation of a standard traffic control and monitoring plan, which would include:
  - o Use of proper signs and traffic control measures in accordance with Caltrans and Riverside County requirements
  - o Scheduling of lane or road closures during off-peak hours whenever possible
  - o Employing cut and cover techniques during the excavation/trenching operations for utilities to minimize roadway delays.
  - o Limiting construction traffic to designated access roads, construction laydown and worker parking areas, and the construction site
  - o Providing orientation and briefing to employees and contractors on the desired construction route
  - o Encouraging worker carpooling to minimize drive-alone worker trips

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Traffic and Transportation Table 1 provides a general description of adopted federal, state, and local laws, ordinances, regulations, and standards (LORS) that apply to this project and pertain to traffic and transportation. As part of staff's analysis of the Rio Mesa SEGF's traffic and transportation impacts, staff evaluated the project's compliance with these LORS.

TRAFFIC AND TRANSPORTATION Table 1
Laws, Ordinances, Regulations, and Standards

Applicable LORS	Description
Federal	
Code of Federal Regulations (CFR) Title 49, Subtitle B: Sections 171-177 and 350-399	Requires proper handling and storage of hazardous materials during transportation.
CFR Title14 Aeronautics and Space, Part 77 - Objects Affecting Navigable Airspace (14 CFR 77)	These regulations establish standards for determining physical obstructions to navigable airspace; set noticing and hearing requirements; provide for aeronautical studies to determine the effect of physical obstructions on the safe and efficient use of airspace; and oversee the development of antenna farm areas.
State	
California Vehicle Code (CVC): Div. 2, Chap. 2.5; Div. 6, Chap. 7; Div. 13, Chap. 5; Div. 14; Div. 14.1; Div. 14.3; Div. 14.7; Div. 14.8; & Div. 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. Addresses the Commission of Highway Patrol's authority to issue licenses for the transportation of hazardous materials.
California Streets and Highway Code (S&HC): Div.1, Chap. 1, Article 3, Section 117; Div. 1, Chap. 3; Div. 2, Chap. 5.5 and 6	Includes regulations for the care and protection of State and County highways and provisions for the issuance of written permits. Requires permits for the location in the right-of-way (ROW) of any structures or fixtures necessary to telegraph, telephone, or electric power lines or of any ditches, pipes, drains, sewers, or underground structures.

Applicable LORS	Description
California Health and Safety Code: Section 25160 et seq.	Pertains to operators of vehicles transporting hazardous materials; promotes safe transportation of hazardous materials.
State of California Department of Transportation (Caltrans), Caltrans Guide for the Preparation of Traffic Impact Studies	Caltrans' target LOS for State highway facilities is at the transition between LOS "C" and LOS "D". However, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the target LOS. If an existing state highway is operating at less than the appropriate target LOS, the existing measure of effectiveness should be maintained.
Local	
County of Riverside General Plan, Circulation Element	Policy C 2.1: Maintain the following countywide target Levels of Service (LOS): • LOS "C" along all County-maintained roads and conventional state highways.
	Policy C 2.5: The cumulative and indirect traffic impacts of development may be mitigated through the payment of various impact mitigation fees such as County Development Impact Fees, Road and Bridge Benefit District Fees, and Transportation Uniform Mitigation Fees to the extent that these programs provide funding for the improvement of facilities impacted by development.
	C 3.6: Require private developers to be primarily responsible for the improvement of streets and highways service access to developing commercial, industrial, and residential areas. These may include road construction or widening, installation of turning lanes and traffic signals, and the improvement of any drainage facility or other auxiliary facility necessary for the safe and efficient movement of traffic or the protection of road facilities.
	C 3.8: Restrict heavy duty truck through-traffic in residential and community center areas and plan land uses so that trucks do not need to traverse these areas.
	C 3.25 Restrict on-street parking to reduce traffic congestion and improve safety in appropriate locations such as General Plan roadways.
	C 3.33 Assure all-weather, paved access to all developing areas.
	C 23.10 Limit truck traffic in residential and commercial areas to designated truck routes; limit construction, delivery, and truck through-traffic to designated routes; and distribute maps of approved truck routes to County traffic officers. (AI 43)
County of Riverside, Ordinance No. 461	Provides road improvement standards and specifications (RCO 2008).
County of Riverside, Ordinance No. 500.1	Amends Ordinance No. 500. Prohibits any commercial vehicle exceeding 14,000 pounds (7 tons) from using any identified County highways or identified County Service Area (CSA) roads within a residential area. Includes exemptions (RCO 2008a).
County of Riverside, Ordinance No. 524.1	Amends Ordinance No. 524. Regulates oversize and overweight vehicles and loads (RCO 1989).
County of Riverside, Ordinance No. 846	Prohibits any commercial vehicle exceeding 14,000 pounds from using the listed local streets within the community of Mesa Verde/CSA 122. Includes exemptions (RCO 2005).
City of Blythe General Plan, Circulation Element	Policy 11: Strive to maintain traffic LOS B on residential streets and LOS C or better on arterial and collector streets, at all intersections, and on principal arterials in the CMP during peak hours.
City of Blythe, Municipal Code Section 12.12.020	Restricts heavy vehicle weights.
Riverside County Transportation Commission, 2011 Riverside County Congestion Management	Establishes a minimum LOS of "E" for Congestion Management Program (CMP) highways and roadways (RCTC 2011).

Applicable LORS	Description
Program	
Riverside County Zoning Ordinance, Section 18.12	Industrial uses such as the Rio Mesa SEGF require at least 1 parking space per 2 employees during the largest shift, and 1 space per vehicle kept in connection with the use.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHODS AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

Significance criteria used in this document for evaluating environmental impacts are based on the CEQA Guidelines, the CEQA Environmental Checklist for Transportation/Traffic, and applicable LORS used by other governmental agencies. Specifically, staff analyzed whether the proposed project would result in the following:

1. cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections);

2. 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;

3. conflict with an applicable congestion management program, including, but not limited to, level of service standards (LOS) and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;

4. substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);

5. result in inadequate emergency access;

6. conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities;

7. 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;

8. produce a thermal plume in an area where flight paths are expected to occur below 1,000 feet from the ground[1]; or

[1] The FAA recommends that pilots avoid overflight of plume-generating industrial sites below 1,000 feet AGL (FAA 2006).

9. have individual environmental effects that, when considered with other impacts from the same project or in conjunction with impacts from other closely related past, present, and reasonably foreseeable future projects, are considerable, compound, or increase other environmental impacts.

ASSESSMENT OF TRAFFIC IMPACTS

Setting

The following freeways and roads provide access to the Rio Mesa SEGF and may be impacted by construction and operations traffic.

Interstate 10 (I-10)

Interstate 10 (I-10) is an east-west freeway that crosses much of the southern United States, running between its westernmost point in Santa Monica, California and its easternmost point in Jacksonville, Florida. In the project area, I-10 has two lanes in each direction and a speed limit of 70 miles per hour. Trucks comprise approximately 39 percent of the traffic in the project area (TVDS 2010).

State Route 78

State Route 78 (SR-78) is a highway in California that begins in Oceanside at its westernmost point and ends in Blythe at its easternmost point. SR-78 provides regional access to the project site from I-10 north of the project and from south of the project, also.

Just east of the project site, SR-78 runs north-south until it turns sharply east along 32nd Avenue. From there, SR-78 turns north along Rannells Boulevard, east along 28th Avenue, and north on S. Neighbours Boulevard, passing through Ripley and continuing north until it meets I-10. Near the project site, SR-78 has 1 lane in each direction, bike lanes on each side, no center divide, and a posted speed limit of 45 miles per hour. This section of SR-78 is also called Ben Hulse Highway.

34th Avenue

34th Avenue is a farm road traversing agricultural fields and stopping and starting again at various points. It is also the link to the project's proposed secondary access road, which would begin at the intersection of SR-78 and 34th Avenue. From this intersection, the secondary access road would be located just north of the County right-of-way for 34th Avenue and would run westward through agricultural lands for approximately one mile before dead-ending into the project site. The applicant proposes to construct the secondary access as an unpaved, two-lane, undivided roadway.

30th Avenue/Bradshaw Trail

Like 34th Avenue, 30th Avenue is a farm road traversing agricultural fields and stopping and starting again at various points. 30th Avenue is the project's proposed primary access. The portion of 30th Avenue that would be used to directly access the Rio Mesa SEGF would be the portion west of SR-78/Rannells Avenue. Just west of its intersection with SR-78, approximately one mile of 30th Avenue is a two-lane paved road with dirt shoulders. As the road approaches the project site, it becomes a graded dirt road varying in width from 15 to 30 feet. The applicant proposes to improve the approximately 3-mile stretch of 30th Avenue/Bradshaw Trail between SR-78 and the project site to a paved, two-lane, undivided roadway.

Near the project site, 30th Avenue continues west as Bradshaw Trail, a 65-mile-long dirt road managed by the BLM and occasionally graded by the Riverside County Transportation Department. Off highway vehicles (OHV) use Bradshaw Trail as an access route.

South Lovekin Boulevard

East of the proposed Rio Mesa SEGF, South Lovekin Boulevard is accessed directly from I-10. In addition to and in combination with SR-78, it provides a secondary regional access route to the project site. From I-10, S. Lovekin Blvd. goes south, passing through the City of Blythe for the first 0.5 mile and then continuing south through Riverside County. S. Lovekin Blvd. is a two-lane paved road with a 55 mph speed limit.

To access the project site from South Lovekin Boulevard, construction workers would access Lovekin Boulevard from I-10, travel south on Lovekin Boulevard, turn west onto 28th Avenue, which continues as SR-78, and then continue to follow SR-78, finally turning westbound onto 30th Avenue/Bradshaw Trail into the site.

Level of Service and Study Locations

Level of Service (LOS) is a generally accepted measure used by traffic engineers and planners to describe and quantify the traffic congestion level on a particular roadway or intersection in terms of speed, travel time, and delay. The *Highway Capacity Manual 2010*[2] includes six levels of service for roadways and intersections. These levels of service range from LOS A, the best and smoothest operating conditions, to LOS F, the worst, most congested operating conditions.

The following locations on the surrounding roadway network were reviewed:

Freeways and Roadways:

- I-10 (West of SR-78)
- I-10 (East of SR-78)
- Neighbours Blvd. (North of I-10)
- SR-78 (South of I-10)
- SR-78 (North of 22nd Ave.)
- SR-78 (North of 30th Ave.)
- SR-78 (South of 34th Ave.)
- Lovekin Blvd. (North of I-10)

[2]The *Highway Capacity Manual* (HCM) is the most widely used resource for traffic analysis. The Highway Capacity Manual is prepared by the Transportation Research Board Committee on Highway Capacity and Quality of Service. The current edition was published in 2010.

- Lovekin Blvd. (South of I-10)
- 28th Ave. (West of Lovekin Blvd.)

Intersections:

- SR-78 (Neighbours Blvd.)/I-10 WB ramps
- SR-78 (Neighbours Blvd.)/I-10 EB ramps
- SR-78 (Neighbours Blvd.)/22nd Ave.
- SR-78 (Neighbours Blvd.)/28th Ave.
- SR-78 (Rannells Blvd.)/28th Ave.
- SR-78/30th Ave.
- SR-78/34th Ave.
- Lovekin Blvd./I-10 WB ramps
- Lovekin Blvd./I-10 EB ramps
- Lovekin Blvd./14th Ave.
- Lovekin Blvd./16th Ave.

The following agencies/jurisdictions have established LOS standards for the various roadways and intersections in the vicinity of the Rio Mesa SEGF. Staff uses these LOS standards as significance thresholds to determine whether Rio Mesa SEGF-generated traffic impacts would be significant. The following is a list of the agencies regulating LOS and their applicable LOS standards:

- **County of Riverside –**

  General Plan, Circulation Element, Policy C 2.1 (RCGP 2003)

  The County of Riverside level of service standard is LOS “C” or above along all County-maintained roads and conventional state highways.

- **Riverside County Transportation Commission**

  2011 Riverside County Congestion Management Program, CMP Level of Service Standards (RCTC 2011)

  The Riverside County Transportation Commission (RCTC) requires a traffic level of service standard of LOS “E” or above on Congestion Management Program (CMP) highways and roadways, which include I-10 and SR-78 near the proposed Rio Mesa SEGF.

  The RCTC acknowledges that Caltrans and local agencies in Riverside County may adopt higher LOS standards of “C” or “D”, which the RCTC designates as the “ceiling” of the minimum LOS standard. RCTC refers to its own LOS “E” standard as the “floor” of the minimum LOS standard.

CMP roadway segments or intersections that had an LOS of “F” in 1991 are exempt from the RCTC’s LOS standard of “E”. No CMP roadway segments or intersections near the Rio Mesa SEGF operated at LOS “F” in 1991; therefore, all CMP roadway segments and intersections near the Rio Mesa SEGF are subject to the RCTC’s minimum LOS of “E”.

- **City of Blythe**

  2025 General Plan, Circulation Element, Policy 11 (COB 2007)

  The City of Blythe strives to maintain a minimum LOS of “B” on residential streets and a minimum LOS of “C” on arterial and collector streets, at all intersections, and on principal arterials in the CMP during peak hours.

- **State of California Department of Transportation (Caltrans)**

  Caltrans Guide for the Preparation of Traffic Impact Studies (DOT 2002)

  Caltrans’ target LOS for State highway facilities is at the transition between LOS “C” and LOS “D”. However, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the target LOS. If an existing state highway is operating at less than the appropriate target LOS, the existing measure of effectiveness should be maintained.

Direct/Indirect Traffic Impacts and Mitigation

The direct and indirect traffic impacts of the proposed Rio Mesa SEGF are discussed in this section and are based on an analysis comparing pre-project and post-project traffic conditions and LOS. Staff evaluated the Rio Mesa SEGF’s traffic impacts for two separate future scenarios: the peak construction period (when construction activity and employment would be maximized) and the first year of full project operation.

Traffic during the decommissioning period would likely be similar to traffic volumes experienced during construction, depending on the duration and extent of decommissioning, including dismantling of facilities and/or site remediation.

Construction Traffic

Construction of the Rio Mesa SEGF would begin during the fourth quarter of 2013 and be completed by the first quarter of 2016, a total construction period of 35 months. Construction of the Rio Mesa SEGF would be phased, with construction of Plant 1 beginning during the fourth quarter of 2013 and starting operation during the fourth quarter of 2015, and construction of Plant 2 beginning during the first quarter of 2014 and starting operation during the first quarter of 2016.

Construction would generally occur between 5 AM and 7 PM, with adjustments for the summer months and possibly to complete critical construction activities or make up for deficiencies in the project schedule. During some construction periods and during the start-up phase of the project, construction activities would occur 24 hours a day, 7 days a week.

Each construction worker would generally work 10-hour shifts comprising a 40-hour work week, starting each day between 5 AM and 7 PM and departing between 4 PM and 6 PM. Some construction workers would work 8-hour shifts, arriving between 5 AM and 7 AM like the other workers, but departing earlier between 2 PM and 4 PM. Assuming an additional hour for lunch, the shifts would be as follows:

10-hour shift (with an hour for lunch):

5 AM – 4 PM (Traveling during peak evening hours[3])

6 AM – 5 PM (Traveling during peak evening hours)

7 AM – 6 PM (Traveling during peak morning hours, but departing at end of peak evening hours)

8-hour shift (with an hour for lunch):

5 AM – 2 PM

6 AM – 3 PM

7 AM – 4 PM (Traveling during peak morning and evening hours)

Worker Traffic

Analysis of Rio Mesa SEGF construction impacts focuses on the peak construction period, which would employ the highest number of workers compared to other phases of construction, generate the most vehicle trips, and result in the worst-case scenario for traffic impacts.

The peak construction period would occur during the 22nd and 23rd months of construction in the year 2015 and would involve 2,200 construction workers (as compared to the average daily workforce of 840). Workers would make a total of 1,370 round trips per day during peak month, assuming two passengers per vehicle, which translates to 2,740 daily one-way trips. The applicant projects that 55 percent of worker trips would occur during morning peak (7-9 AM) and evening peak (4-6 PM) hours. This would result in 754 one-way workforce vehicle arrival trips during the morning peak hour and 754 one-way workforce vehicle departure trips during the evening peak hour. These trips would be staggered within the peak hours, with arrivals and departures not occurring at precisely the same times. See **Traffic and Transportation Table 2** (below) for a summary of the project's construction worker trip generation:

Traffic and Transportation Table 2
Daily Construction Worker Trip Generation during Peak Construction

Construction Worker Vehicles	Daily Trips	One-Way AM Peak Hour Trips	One-Way PM Peak Hour Trips
1,370 [1]	1,370 roundtrips = 2,740 one-way trips	754 inbound [2]	754 outbound [2]

[1] The peak workforce would be approximately 2,200 workers. Assuming that some of them carpool, the construction workers would use approximately 1,370 vehicles daily to commute.

[3] "Peak hours" are the hours of the day with the highest traffic volumes. For this project, peak morning hours are estimated to be 7 AM – 9 AM. Peak evening hours are estimated to be 4 PM to 6 PM.

[2] This analysis assumes that 55 percent of worker vehicles would arrive during the morning peak hours (7-9 AM) and leave during the evening peak hours (4-6 PM).

The majority of the Rio Mesa SEGF construction workforce would commute from locations near the project site, regionally or locally. (See the **Socioeconomics** section of this PSA for more information.) The following is a breakdown of the approximate percentage of worker traffic traveling on each route to the Rio Mesa SEGF site:

- 60 percent from the west via I-10
- 30 percent from the east via I-10
- 5 percent from Blythe and Ripley
- 5 percent from the south (Imperial County) via SR-78

For local access to the project site, approximately 50 percent of workers would travel on SR-78 and turn westbound onto 30th Avenue/Bradshaw Trail into the site. The remaining approximately 50 percent of workers would travel south on Lovekin Blvd., turn west onto 28th Ave., which continues as SR-78, and then continue to follow SR-78, finally turning westbound onto 30th Ave./Bradshaw Trail into the site.

Truck Traffic

Peak construction would generate approximately 8 daily truck (delivery/haul vehicle) roundtrips. For this traffic analysis, truck trips were converted to passenger car equivalent (PCE) trips at a ratio of 3 passenger cars for each truck, resulting in 24 PCE roundtrips. This translates to 48 daily PCE one-way truck trips.

Truck deliveries would normally be on weekdays between 7 AM and 5 PM. Trucks would likely arrive and depart throughout the day, but approximately 50 percent of truck trips would occur during peak morning or evening hours. See **Traffic and Transportation Table 3** (below) for a summary of the project's truck trip generation:

Traffic and Transportation Table 3
Daily Truck Trip Generation during Peak Construction (in PCE units[1])

Trucks (Delivery/Haul Vehicles)	Daily Trips (PCE)	One-Way AM Peak Hour Trips (PCE)	One-Way PM Peak Hour Trips (PCE)
8 trucks = 24 passenger car equivalent (PCE)	24 roundtrips = 48 one-way trips	12 inbound 6 outbound [2]	6 outbound [3]

[1] PCE, or passenger car equivalent, is a conversion unit for comparing the traffic impacts of a large truck with the traffic impacts of a smaller car.
[2] This analysis assumes that 50 percent of the 24 PCE trucks arrive and 25 percent depart during the morning peak hours (7-9 AM).
[3] This analysis assumes that 25 percent of the 24 PCE trucks depart during the evening peak hours (4-6 PM).
Overall, 50 percent of one-way truck trips would occur during the peak morning or evening hours:
12 inbound (AM peak) + 6 outbound (AM peak) + 6 outbound (PM peak) = 24 peak hour one-way trips.
24 peak hour one-way trips/48 daily one-way trips = 0.50, or 50 percent

Construction truck traffic would access the site from I-10, turning south on SR-78 and traveling west on 30th Ave./Bradshaw Trail to enter the project site. The proposed truck route appears to be consistent with all relevant jurisdictions' regulations. To further ensure that the truck routes would comply with limitations set by local jurisdictions and

Caltrans, staff has included proposed Condition of Certification **TRANS-1** to require the applicant to obtain any necessary ministerial permits from Caltrans and other relevant jurisdictions, including the City of Blythe and the County of Riverside, on vehicle sizes and weights, driver licensing, and truck routes.

Total Construction Traffic

The total workforce and truck trips generated during peak construction would be 2,788 daily one-way trips (2,740 worker trips added to 48 PCE truck trips). Approximately 1,532 of these one-way trips would occur during peak hours: 772 during the morning peak and 760 during the evening peak. (See **Traffic and Transportation Table 4** below. This table summarizes all peak construction traffic generated by the Rio Mesa SEGF, including construction worker trips and delivery/haul truck trips.)

Traffic and Transportation Table 4
Total Daily Trips during Peak Construction

Vehicle Type	Daily Roundtrips	One-Way Daily Trips	One-Way AM Peak Hour Trips	One-Way PM Peak Hour Trips
Construction Worker Vehicles	1,370	2,740	754	754
Trucks (Delivery/Haul Vehicles) (PCE)	24	48	18	6
Total	1,394	2,788	772	760

As discussed previously in the “Study Locations” section, staff analyzed the proposed Rio Mesa SEGF’s potential construction traffic impacts by evaluating level-of-service (LOS) on freeway segments, roadway segments, and intersections in the vicinity of the project site. Staff compared pre-construction traffic volumes and LOS to traffic volumes and LOS projected after addition of Rio Mesa SEGF construction workforce and truck traffic.

Traffic and Transportation Table 5, below, compares pre-construction and peak construction daily traffic volumes and LOS on study freeway and roadway segments. As can be seen from the table, all freeway and roadway segments would operate at LOS C pre-construction, and they would continue to operate at LOS C during peak construction. LOS C is an acceptable LOS per the various LOS standards that apply. (See **Traffic and Transportation Table 5**’s footnotes for more information.) Therefore, peak project construction would not significantly impact daily LOS on nearby freeways and roadways.

Traffic and Transportation Table 5
Average Daily Traffic (ADT) during the Year 2015: A Comparison between Baseline and Peak Construction Conditions

[1] In several instances, there is more than one LOS standard which applies. In this column, staff has provided the most restrictive

Freeway/Road Segment	2015 – No Project ADT[4]	2015 – No Project LOS[4]	Project-Added Trips	2015 – Peak Construction ADT[5]	2015 – Peak Construction LOS[5]	LOS Standard[1]
I-10, West of SR-78	24,300	LOS C	1,657	25,957	LOS C	LOS C[2]
Freeway/Road Segment	**2015 – No Project ADT[4]**	**2015 – No Project LOS[4]**	**Project-Added Trips**	**2015 – Peak Construction ADT[5]**	**2015 – Peak Construction LOS[5]**	**LOS Standard[1]**
I-10, East of SR-78	25,704	LOS C	1,336	27,040	LOS C	LOS C[2]
Neighbours Blvd., North of I-10	1,642	LOS C	0	1,642	LOS C	LOS C[3]
SR-78, South of I-10	1,728	LOS C	1,350	3,078	LOS C	LOS C[2]
SR-78, North of 22nd Ave.	2,268	LOS C	1,350	3,618	LOS C	LOS C[2]
SR-78, North of 30th Ave.	1,404	LOS C	2,652	4,056	LOS C	LOS C[2]
SR-78, South of 34th Ave.	1,188	LOS C	137	1,325	LOS C	LOS C[2]
Lovekin Blvd., North of I-10	9,418	LOS C	107	9,525	LOS C	LOS C[3]
Lovekin Blvd., South of I-10	7,301	LOS C	1,302	8,603	LOS C	LOS C[3]
28th Ave., West of Lovekin Blvd.	778	LOS C	1,302	2,080	LOS C	LOS C[2]

LOS standard.

[2] The most restrictive applicable LOS standard is Riverside County's standard of LOS "C" or above along all County-maintained roads and conventional state highways.

[3] The applicable LOS standard is the City of Blythe's minimum standard of LOS "C" on arterial and collector streets, at all intersections, and on principal arterials in the CMP during peak hours.

[4] BS 2011a

[5] CEC 2012aw

Traffic and Transportation Table 6, below, compares pre-construction and peak construction delays and LOS at study intersections during the morning and evening peak hours. This table focuses on the project's peak hour impacts and maximum congestion levels. Unlike **Traffic and Transportation Table 5**, it does not focus on traffic spread throughout the day as a daily average.

Prior to project construction, all intersections would operate at LOS A or B, better than the LOS standard of C. During peak construction, traffic delays would increase at almost all intersections, but even with these increased delays, the majority of the study intersections would continue to operate at an acceptable LOS. However, two intersections, SR-78 (Neighbours Blvd.)/28th Ave. (evening peak hour) and SR-78 (Rannells Blvd.)/28th Ave. (morning peak hour), would exceed LOS thresholds identified by local jurisdictions. At these intersections, LOS would change from LOS A pre-construction to LOS D during peak construction. (See **Traffic and Transportation Table 6**.) To mitigate this impact, staff has proposed Condition of Certification **TRANS-2**, which would require the project owner to prepare and implement a park-and-ride plan for busing construction employees to the project site. With implementation of **TRANS-2**, the identified intersections would continue to operate at an acceptable LOS during peak construction.

As currently proposed, the project owner would be required to implement the park-and-ride plan during all phases of construction. However, staff acknowledges that construction employment would vary throughout project construction, and that there would be certain phases of construction where employment would not be sufficiently high to degrade LOS at the affected intersections to LOS D. Staff has provided a Data Request to the applicant asking for: the estimated number of employees during each month of construction; and a traffic analysis determining the threshold number of individually commuting construction employees that would cause LOS at SR-78 (Neighbours Blvd.)/28th Ave. and SR-78 (Rannells Blvd.)/28th Ave. to degrade to LOS D. If the applicant submits this information to staff prior to publication of the Final Staff Assessment (FSA), staff will refine **TRANS-2** to require implementation of the park-and-ride plan during only those months where construction employment would cause LOS at the affected intersections to reach LOS D. Staff has also requested that the applicant provide feasible park-and-ride locations prior to publication of the FSA to ensure that the park-and-ride plan is a feasible mitigation.

Traffic and Transportation Table 6
Intersection Delay during the Year 2015: A Comparison between Baseline and Peak Construction, Peak Hour Conditions

Study Intersection	**Year 2015 AM Peak Hour Delay (seconds) and LOS**		**Year 2015 PM Peak Hour Delay (seconds) and LOS**		**LOS Standard**
	No Project[1]	With Project[2]	No Project[1]	With Project[2]	
SR-78 (Neighbours Blvd.)/I-10 WB Ramps	9.1 LOS A	9.8 LOS B	9.1 LOS A	13.2 LOS B	LOS C[3]
SR-78 (Neighbours Blvd.)/I-10 EB Ramps	9.0 LOS A	10.8 LOS B	9.3 LOS A	10.9 LOS B	LOS C[4]
SR-78 (Neighbours Blvd.)/22nd Ave.	9.3 LOS A	12.5 LOS B	9.3 LOS A	12.4 LOS B	LOS C[4]
SR-78 (Neighbours Blvd.)/28th Ave.	6.9 LOS A	11.9 LOS B	**7.0 LOS A**	**27.0 LOS D**	LOS C[4]

Study Intersection	Year 2015 AM Peak Hour Delay (seconds) and LOS		Year 2015 PM Peak Hour Delay (seconds) and LOS		LOS Standard
SR-78 (Rannells Blvd.)/28th Ave.	**7.0 LOS A**	**27.9 LOS D**	7.0 LOS A	13.8 LOS B	LOS C[4]
SR-78/30th Ave.	0 LOS A	13.0 LOS B	0 LOS A	20.8 LOS C	LOS C[4]
SR-78/34th Ave.	0 LOS A	8.2 LOS A	0 LOS A	11.7 LOS B	LOS C[4]
Lovekin Blvd./I-10 WB Ramps	10.5 LOS B	14.4 LOS B	9.9 LOS A	6.6 LOS A	LOS C[3]
Lovekin Blvd./I-10 EB Ramps	8.4 LOS A	17.4 LOS B	10.5 LOS B	9.0 LOS A	LOS C[3]
Lovekin Blvd./14th Ave.	8.0 LOS A	11.9 LOS B	8.0 LOS A	12.3 LOS B	LOS C[3]
Lovekin Blvd./16th Ave.	7.4 LOS A	8.8 LOS A	7.3 LOS A	11.1 LOS B	LOS C[4]

[1] BS 2011a
[2] BS 2012v
[3] The applicable LOS standard is the City of Blythe's minimum standard of LOS "C" on arterial and collector streets, at all intersections, and on principal arterials in the CMP during peak hours.
[4] The most restrictive applicable LOS standard is Riverside County's standard of LOS "C" or above along all County-maintained roads and conventional state highways.

During peak construction, heavy haul vehicles could also cause significant deterioration of local roadway pavement surfaces or damage Palo Verde Irrigation District (PVID) infrastructure, such as canals and drains. Staff has recommended Condition of Certification **TRANS-3,** which would require the project owner to restore all public roads, easements, and rights-of-way and any PVID infrastructure damaged by project-related traffic or construction activities.

Furthermore, construction vehicles could create a hazard to the public by limiting motorists' views, obstructing lane space, and increasing roadway traffic during project construction. **TRANS-2** would mitigate these impacts by requiring the project owner, as part of the Traffic Control Plan (TCP), to provide:

- an approved Heavy Haul Plan (HHP) to ensure that the project owner complies with vehicle size and weight limitations imposed by Caltrans and relevant local jurisdictions;
- plans for proper construction vehicle routes;
- a schedule of heavy equipment and building material deliveries; and
- street and/or lane closure details, such as placement of signage, lighting, or other traffic control devices.

Staff is also recommending implementation of Condition of Certification **TRANS-4** to require the applicant to obtain all the necessary encroachment permits for construction work and activities within road rights-of-way. This ensures the project owner's compliance with LORS governing encroachment.

With implementation of **TRANS-1** through **TRANS-4**, construction traffic impacts would be less than significant.

Operations Traffic

The applicant anticipates that the entire Rio Mesa SEGF project would be operational by the first quarter of 2016. Plant operations would require approximately 100 full-time employees, with up to 80 employees at the site daily during weekdays. Staff analyzed the project's potential operations traffic impacts by evaluating level-of-service (LOS) on freeway segments, roadway segments, and intersections in the vicinity of the project site. Staff compared pre-construction traffic volumes and LOS to traffic volumes and LOS projected after addition of operations workforce traffic.

Traffic and Transportation Table 7, below, compares pre-construction and project operations daily traffic volumes and LOS on study freeway and roadway segments. As reflected in the table, all freeway and roadway segments would operate at LOS C pre-construction, and they would continue to operate at LOS C during operation. As indicated earlier in this analysis, LOS C is an acceptable LOS per thresholds identified by the relevant local agencies/jurisdictions. (See **Traffic and Transportation Table 7**'s footnotes for more information.) Therefore, project operations would not significantly impact daily LOS on nearby freeways and roadways.

Traffic and Transportation Table 7
Average Daily Traffic (ADT) during the Year 2016: A Comparison between Baseline and Operations Conditions

Freeway/ Road Segment	2016 – No Project ADT[4]	2016 – No Project LOS[4]	Project-Added Trips	2016 – Operations ADT[5]	2016 – Operations LOS[5]	LOS Standard[1]
I-10, West of SR-78	24,750	LOS C	32	24,782	LOS C	LOS C[2]
I-10, East of SR-78	26,180	LOS C	48	26,228	LOS C	LOS C[2]
Neighbours Blvd., North of I-10	1,672	LOS C	0	1,672	LOS C	LOS C[3]
SR-78, South of I-10	2,310	LOS C	80	2,390	LOS C	LOS C[2]
SR-78, North of 22nd Ave.	1,760	LOS C	80	1,840	LOS C	LOS C[2]
Freeway/ Road Segment	**2016 – No Project ADT[4]**	**2016 – No Project LOS[4]**	**Project-Added Trips**	**2016 – Operations ADT[5]**	**2016 – Operations LOS[5]**	**LOS Standard[1]**
SR-78, South of 34th Ave.	1,210	LOS C	0	1,210	LOS C	LOS C[2]
Lovekin Blvd., North of I-10	9,592	LOS C	0	9,592	LOS C	LOS C[3]
Lovekin Blvd., South of I-10	7,436	LOS C	0	7,436	LOS C	LOS C[3]

28th Ave., West of Lovekin Blvd.	792	LOS C	0	792	LOS C	LOS C[2]

[1] In several instances, there is more than one LOS standard which applies. In this column, staff has provided the most restrictive LOS standard.

[2] The most restrictive applicable LOS standard is Riverside County's standard of LOS "C" or above along all County-maintained roads and conventional state highways.

[3] The applicable LOS standard is the City of Blythe's minimum standard of LOS "C" on arterial and collector streets, at all intersections, and on principal arterials in the CMP during peak hours.

[4] BS 2011a

[5] BS 2012v

Traffic and Transportation Table 8, below, compares pre-construction and project operations delay and LOS at study intersections during the morning and evening peak hours. As can be seen from the table, all intersections would operate at LOS A or B pre-construction, and project operations traffic would not change the LOS at any of these intersections. All intersections would continue to operate at an LOS above the standard of "C". Therefore, project operations would not significantly impact LOS at nearby intersections.

Traffic and Transportation Table 8
Intersection Delay during the Year 2016: A Comparison between Baseline and Project Operations, Peak Hour Conditions

Study Intersection	Year 2016 AM Peak Hour Delay (seconds) and LOS		Year 2016 PM Peak Hour Delay (seconds) and LOS		LOS Standard
	No Project[1]	With Project[2]	No Project[1]	With Project[2]	
SR-78 (Neighbours Blvd.)/I-10 WB Ramps	9.0 LOS A	9.2 LOS A	9.1 LOS A	9.5 LOS A	LOS C[3]
SR-78 (Neighbours Blvd.)/I-10 EB Ramps	9.0 LOS A	9.1 LOS A	9.2 LOS A	9.5 LOS A	LOS C[4]
SR-78 (Neighbours Blvd.)/22nd Ave.	9.3 LOS A	9.9 LOS A	9.4 LOS A	9.9 LOS A	LOS C[4]
SR-78 (Neighbours Blvd.)/28th Ave.	6.9 LOS A	7.0 LOS A	7.1 LOS A	7.5 LOS A	LOS C[4]
SR-78 (Rannells Blvd.)/28th Ave.	7.0 LOS A	7.6 LOS A	7.0 LOS A	7.0 LOS A	LOS C[4]
SR-78/30th Ave.	0 LOS A	0 LOS A	0 LOS A	9.2 LOS A	LOS C[4]
SR-78/34th Ave.	0 LOS A	0 LOS A	0 LOS A	0 LOS A	LOS C[4]
Lovekin Blvd./I-10 WB Ramps	10.6 LOS B	10.6 LOS B	10.1 LOS B	10.1 LOS B	LOS C[3]
Lovekin Blvd./I-10 EB Ramps	8.4 LOS A	8.4 LOS A	10.5 LOS B	10.5 LOS B	LOS C[3]
Lovekin	8.1	8.1	8.1	8.1	LOS C[3]

Blvd./14th Ave.	LOS A	LOS A	LOS A	LOS A	
Lovekin Blvd./16th Ave.	7.4 LOS A	7.4 LOS A	7.3 LOS A	7.3 LOS A	LOS C[4]

[1] BS 2011a
[2] BS 2012v
[3] The applicable LOS standard is the City of Blythe's minimum standard of LOS "C" on arterial and collector streets, at all intersections, and on principal arterials in the CMP during peak hours.
[4] The most restrictive applicable LOS standard is Riverside County's standard of LOS "C" or above along all County-maintained roads and conventional state highways.

In summary, due to the minimal number of operations worker trips, project operations would have less than significant impacts on the nearby traffic and transportation system. As shown by **Traffic and Transportation Tables 7 and 8**, operations trips would not cause freeways, roadways, and intersections to operate at unacceptable LOS (below LOS C). Furthermore, the minimal number of operations trips would not be expected to damage the nearby roadway system.

Parking

Construction

Rio Mesa SEGF construction would require vehicle parking and lay-down areas for materials delivery and storage. During the initial construction stages, such as temporary site fencing and relocation of special status species, a limited amount of construction workers may need to park on the shoulders of nearby local roads. After completion of these activities, on-site parking would be available at the following locations: near each power plant, either outside the heliostat fields or in areas not previously or currently under construction; at the common area; and on approximately 103 acres (known as the Construction Logistics Area) near the eastern border of the project.

Staff confirmed that the Construction Logistics Area would adequately accommodate construction parking and materials storage. On average, a parking lot must have 350 square feet of space for every parked vehicle, which includes both the actual parking space and room for circulation. During peak construction, the proposed project would require parking for approximately 1,370 construction worker vehicles. Using the standard of 350 square feet needed for each parking space, approximately 11 acres would be needed for construction vehicle parking. Because the Construction Logistics Area is 103 acres, and because there would be even more parking available near each power plant and at the common area, there would be sufficient on-site parking and lay-down areas. Riverside County's parking requirement for industrial uses of 1 space for every 2 employees during the largest shift would be met and exceeded; the largest shift would be 2,200 workers, requiring 1,100 parking spaces. Riverside County also requires 1 space per vehicle kept in connection with the use (RCOZO 1996). There would be plenty of space on-site to accommodate any other construction vehicles.

As discussed earlier in this analysis, during peak construction, two intersections, SR-78 (Neighbours Blvd.)/28th Ave. (evening peak hour) and SR-78 (Rannells Blvd.)/28th Ave. (morning peak hour), would exceed LOS thresholds identified by local jurisdictions. At these intersections, LOS would change from LOS A pre-construction to LOS D during peak construction. Although on-site parking would be sufficient to handle construction workers, to reduce LOS impacts, staff has recommended **TRANS-2**, which would require the project owner to secure an off-site parking area and shuttle construction workers to the project site.

Operation

During project operations, 100 full-time employees would work at the Rio Mesa SEGF: 30 employees at the Rio Mesa I site, 30 employees at the Rio Mesa II site, and 40 employees at the common area. The largest shift at each location would be:

- 10 employees per shift at each power block
- 20 employees per shift at the common area (CEC 2012aw)

Riverside County requires that industrial uses provide at least 1 parking space per 2 employees during the largest shift, and 1 parking space per vehicle kept in connection with the use (RCOZO 1996). Each power block would provide 24 parking spaces, and the common area would provide 79 parking spaces. In all instances, the parking would exceed the number of parking spaces required by Riverside County. Therefore, project operations parking would comply with Riverside County's parking standards.

Hazardous Materials Transportation

Rio Mesa SEGF construction and operation would generate hazardous materials. During construction, hazardous materials used on-site would be paint, cleaners, solvents, gasoline, diesel fuel, motor oil, welding gases, and lubricants. Project operations would generate hazardous materials such as cleaning agents, lube oil, sodium hydroxide, diesel fuel, aqueous ammonia (19 percent), sulfuric acid (93 percent) and other various chemicals. (See the **Hazardous Materials Management** section of this PSA for more information.)

All trucks delivering hazardous materials would access the site from I-10, heading south on SR-78 and then west via 30th Avenue into the project site. Trucks leaving the project site would exit via the same route. This route is the same as that used for regular truck deliveries and is the most direct route for hazardous materials transportation to the site. (See the **Hazardous Materials Management** section for further discussion of hazardous materials handling.)

To ensure that transportation of hazardous materials would occur in the safest way possible, minimizing the risk of spills and accidents that could potentially harm the public, staff has proposed Condition of Certification **TRANS-5**. This condition would require the project owner to secure permits and licenses for the transportation of hazardous materials and comply with all applicable regulations, including those in the Code of Federal Regulations, the California Vehicle Code, and the California Health and Safety Code.

The **Hazardous Materials Management** section of this PSA also includes conditions of certification for minimizing transportation hazards, such as **HAZ-3**, which requires the project owner to prepare and implement a Safety Management Plan for delivery of liquid hazardous materials. With implementation of **TRANS-5** and the conditions of certification in the **Hazardous Materials Management** section, impacts from transportation of hazardous materials would be less than significant.

Emergency Access

Regionally, emergency vehicles would access the Rio Mesa SEGF from I-10, following SR-78 south and turning west onto the access road just north of 34th Avenue, which is the alternate/emergency access into the site. (The primary access to the site is 30th Avenue/Bradshaw Trail.) Emergency vehicles could also access the site from I-10 via Lovekin Boulevard in Blythe, following southbound Lovekin Boulevard., turning west onto 28th Ave., which continues as SR-78, and then continuing to follow SR-78, turning westbound onto the access road just north of 34th Avenue into the site. Local access would use SR-78 and any of the nearby County roads, including those mentioned above.

To ensure sufficient emergency access, staff has proposed Condition of Certification **TRANS-6** to require the project owner to improve the 30th Avenue/Bradshaw Trail access and the access just north of 34th Avenue as all-weather roads designed to allow for emergency vehicle access during all weather and soil conditions. With implementation of **TRANS-6**, all access points into the project site would be in accordance with Riverside County Fire Department and Fire Code requirements (RCFD 2011a; RCFD 2012a).

In a letter dated March 14, 2012, the Riverside County Fire Department (RCFD), expressed concern that Rio Mesa SEGF construction traffic could affect emergency response times within the community of Ripley (RCFD 2012a). Energy Commission staff found that peak construction of the project would degrade level of service (LOS) at two intersections south of Ripley to an unacceptable LOS of D. These intersections are SR-78 (Neighbours Blvd.)/28th Ave. (during the evening peak hour) and SR-78 (Rannells Blvd.)/28th Ave. (during the morning peak hour). To mitigate impacts to LOS at these intersections, staff has proposed **TRANS-2**, which would require the project owner to provide a coordinated park-and-ride program for busing construction workers to the project site. With implementation of **TRANS-2**, the project's impacts to LOS would be less than significant and would not significantly affect emergency access. See the "Construction Traffic" part of this section for more information.

Also, see the **Worker Safety and Fire Protection** section of this PSA for further discussion of emergency access, including the project's compliance with the California Fire Code, the Riverside County Fire Code, and Riverside County Subdivision Regulations pertaining to fire protection and access requirements. With implementation of **TRANS-6**, **TRANS-2** and the conditions of certification discussed in the **Worker Safety and Fire Protection** section, construction and operations impacts to emergency access would be less than significant.

ASSESSMENT OF IMPACTS TO OTHER TRANSPORTATION SYSTEMS

Rail Service

Freight and passenger rail do not exist in the immediate project area (PVVT 2011, RA 2012, AMTRAK 2012). The Arizona & California Railroad provides the nearest freight rail service about 40 miles north of the project site (RA 2012, BNSF 2012); Amtrak provides the nearest passenger rail service in Palm Springs, California and Yuma, Arizona, and a bus connection to Indio, California (AMTRAK 2012).

Because freight and rail service do not exist in the project area, the project would not impact rail service.

Bus Service

The Palo Verde Valley Transit Agency (PVVTA) provides bus service in Eastern Riverside County, including the city of Blythe. Near the proposed Rio Mesa SEGF, buses operate on I-10, SR-78 through Ripley, and South Lovekin Blvd. (PVVTA 2012). National bus service is provided by Greyhound Lines, which has a station in Blythe (GH 2012).

Bus service could potentially be significantly impacted by Rio Mesa SEGF construction traffic, as construction traffic would degrade LOS to D at two intersections south of Ripley: SR-78 (Neighbours Blvd.)/28th Ave. (during the evening peak hour) and SR-78 (Rannells Blvd.)/28th Ave. (during the morning peak hour). However, with implementation of Condition of Certification **TRANS-2**, which requires a coordinated park-and-ride plan for busing construction employees to the project site, thus reducing impacts to traffic LOS, traffic impacts to bus service would be less than significant.

Bicycle Facilities

The nearest designated bicycle routes near the project site are in Blythe along Lovekin Boulevard. Between 10th and 14th Avenues, Lovekin Boulevard is a designated Class II Bike Lane, with street marking delineating areas in the roadway where bicycle use is preferential over vehicle use. Between 14th and 18th Avenues, Lovekin Boulevard is a Class I Bike Lane, which provides exclusive right-of-way for bicyclists with cross flows by motorists minimized (COB 2007, RCGP 2003). Construction traffic would not result in significant LOS impacts to Lovekin Boulevard and would not obstruct bike lanes; therefore, the project's impacts to bicycle facilities would be less than significant.

Pedestrian Facilities

Because the proposed project site is located in a rural area, there are minimal pedestrian activities and facilities nearby. There are no sidewalks or crosswalks within the immediate vicinity of the project site; the nearest sidewalks and crosswalks are in Blythe. The Bradshaw Trail, a historic trail, could potentially be used by pedestrians; however, the project is located just south of the Bradshaw Trail and would not impede access. Therefore, the Rio Mesa SEGF facility and the associated construction and operations traffic would not impact pedestrian activities or facilities.

Airports/Aviation Activities

Aviation Background

There are a number of small private airports in the vicinity of the proposed Rio Mesa SEGF site, including Walter's Camp Airport, W R Byron Airport, and Desert Center Airport. However, the airports closest to the project site, and therefore more likely to be affected by the proposed Rio Mesa SEGF, are the Blythe Airport and Cyr Aviation Airport. The project could also potentially impact military aircraft near the project site originating from the Yuma Proving Ground or the March Air Reserve Base, or military aircraft operating at the Chocolate Mountain Aerial Gunnery Range. The following aviation analysis focuses on these airports and aviation activities. See **Traffic and Transportation Figure 2 – Aviation** for the locations of these airports and facilities.

Blythe Airport

The Blythe Airport is a public airport owned by the County of Riverside and located approximately 9 miles northeast of Rio Mesa's northern border and 6 miles west of the city of Blythe. The Blythe Airport is home to approximately 5 aircraft: 3 single-engine and 2 multi-engine airplanes. Aircraft operations average 69 flights per day[4]. Approximately 50 percent of operations are comprised of transient general aviation, with the other approximately 50 percent comprised of local general aviation based out of the Blythe Airport. Military use comprises less than 1 percent of operations (AIRNAV 2012).

The Blythe Airport has two runways: Runway 8-26 (running east-west) and Runway 17-35 (running south-north)[5]. Both runways have a left-hand traffic pattern[6]. Runway 8-26 is 6,543 feet long and 150 feet wide. Runway 8 has non-precision markings, while Runway 26 has precision markings[7]. Runway 17-35 is 5,800 feet long and 100 feet wide. It has a visual flight path approach[8]. The pattern altitude of the Blythe Airport is 1,199 feet above mean sea level (AMSL) or 800 feet above airfield elevation (AFL) (AIRNAV 2012).

Aircraft departing from or arriving at the Blythe Airport could potentially pass over the proposed Rio Mesa SEGF site, although aircraft would not need to fly over the project site in order to enter or exit the traffic pattern. Any aircraft flying above the project site would normally be at altitudes higher than 1,199 feet AMSL, or 800 feet AFL, which is the airport's pattern altitude.

The proposed Rio Mesa SEGF project site is not within the Blythe Airport Influence Area as defined in the Riverside County Airport Land Use Compatibility Plan (RC-ALUCP)

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[4] This is the average number of daily aircraft operations during the year 2010 (AIRNAV 2012).

[5] Runways are numbered based on their compass heading, rounded to the nearest ten degrees. Because runways are used in both directions, they have two numbers. Runway 8-26 is oriented generally east-west. When used for landings and take-offs to the east, it is referred to as Runway 8 (magnetic compass heading of approximately 80 degrees). When used for landings and take-offs to the west, it is referred to as Runway 26 (magnetic compass heading of approximately 260 degrees).

[6] The Energy Commission has recommended that the owner of Blythe Energy Project II, located immediately east of Runway 8-26, petition the FAA to change the traffic pattern for Runway 26 to a standard right pattern so that planes could avoid direct overflights of Blythe II's thermal plume. The FAA has the sole authority to implement this change. As of the date of publication of this Staff Assessment, the traffic pattern has not been changed (CEC 2005; CEC 2010, page 19).

[7] Both non-precision and precision approach procedures use navigational instruments and information allowing pilots to land in reduced visibility. A non-precision approach uses only lateral information (runway markings) for navigation, while a precision approach uses both lateral and vertical guidance for instrument approaches.

[8] A runway with a visual flight path approach is used by pilots flying under visual flight rules (VFR). A VFR pilot is expected to "see and avoid" obstacles and other aircraft and is not generally assigned routes and altitudes by air traffic control. Because a VFR pilot relies on sight instead of instruments for navigation, VFR flight may only occur during favorable weather conditions.

(RCO ALUC 2004). See **Traffic and Transportation Figure 3 – Blythe Airport Influence Area**. Therefore, the project is not subject to specific RC-ALUCP policies governing land use in the various Blythe Airport compatibility areas.

Cyr Aviation Airport

Cyr Aviation Airport is a privately owned airport located approximately 12 miles northeast of the Rio Mesa site, along South Lovekin Boulevard (south of 14th Avenue). It is surrounded by agricultural fields. Cyr Aviation Airport has one runway, Runway 16-34, which is 2,400 feet long and 50 feet wide. Nine aircraft are based at the field, including 8 single-engine airplanes and 1 multi-engine airplane (AIRNAV 2012). It is likely that many of the planes based at the airport are crop dusters. It is unknown whether or not aircraft departing or arriving at the Cyr Aviation Airport regularly fly over the Rio Mesa SEGF site.

March Air Reserve Base Training Route

March Air Reserve Base (MARB) is located approximately 10 miles southeast of Riverside, California near Perris. MARB is both an air reserve base and a provider of regional air cargo service, with plans to gradually reduce military use of the facility in favor of increased air cargo services (RCGP 2003).

A visual military training route called VR-296 is associated with MARB operations. This route traverses the airspace directly above the proposed Rio Mesa SEGF site. Military pilots flying along VR-296 may fly as low as 300 feet above ground level (AGL).

Laguna Army Airfield and Castle Dome Army Heliport (Yuma Proving Ground)

The Laguna Army Airfield (Laguna AAF) and Castle Dome Army Heliport, both owned by the U.S. Army (AIRNAV 2012), are located in Arizona approximately 41-45 miles southeast of the proposed Rio Mesa site. Both aviation facilities serve the U.S. Army Yuma Proving Ground (YPG) in Arizona, a multi-purpose desert military development and testing facility that includes more than 1,300 square miles of terrain and 2,000 square miles of restricted airspace. At the YPG, the military tests weapon systems, munitions, and aviation systems, including missile-firing aircraft, manned and unmanned aviation systems, cargo and personnel parachutes, air delivery systems, and precision navigation systems (USARMY 2012, USARMY 2012a, USARMY2012b).

Aircraft operating out of the Laguna Army Airfield and Castle Dome Army Heliport would not fly directly over the project site.

Chocolate Mountain Aerial Gunnery Range

The Chocolate Mountain Aerial Gunnery Range (CMAGR) is located in Imperial and Riverside counties approximately 20 miles southwest of the Rio Mesa project. The U.S. Navy and Marines use this approximately 459,000-acre area for military aircrew training in air combat maneuvering and tactics, airborne laser system operations, gunnery, live fire aerial gunnery practice, aerial bombing, rocketry, and strafing (attacking ground targets). The Department of the Navy (DoN) owns approximately half of the CMAGR, while the Bureau of Land Management (BLM) manages the other half. The military's right to use the BLM-managed land expires in 2014, so the DoN is requesting that

Congress renew its use of the land and continue the military reservation for another 25 years (DON 2012).

Pilots flying over the Chocolate Mountain Aerial Gunnery Range would not fly directly over the project site.

In conclusion, aircraft based at the March Air Reserve Base do currently fly directly over the Rio Mesa SEGF site when flying training route VR-296. Aircraft from the Blythe Airport and the Cyr Aviation Airport may occasionally fly over the site, but do not need to do so in order to enter or exit the traffic pattern. Aircraft operating out of the Laguna Army Airfield and Castle Dome Army Heliport and aircraft operating within the Chocolate Mountain Aerial Gunnery Range do not traverse the project site.

Aviation Impacts

To assess the Rio Mesa SEGF's aviation impacts, staff examined whether the project's 760-foot-high towers[9], gen-tie structures, and thermal plumes could obstruct airspace.

Tower Height/Obstruction of Airspace

The Rio Mesa SEGF's 760-foot-high towers would exceed 200 feet in height above ground level (AGL) and therefore, under Title 14, Part 77 of the Code of Federal Regulations, require review by the Federal Aviation Administration (FAA). In compliance with this regulation, the applicant submitted Form 7460-1 "Notice of Proposed Construction or Alteration" to the FAA for each tower. The applicant's submittal was for structures of 820 feet AGL to allow some flexibility for project design. On February 22, 2012, the FAA issued a "Determination of No Hazard to Air Navigation" for each structure, concluding that the structures would have no substantial adverse effect on the safe and efficient use of navigable airspace by aircraft or on the operation of air navigation facilities (URS 2012a).

As part of their determination, the FAA included a condition that each structure exceeding 200 feet AGL be marked and/or lighted in accordance with FAA Advisory Circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, a med-dual system-Chapters 4, 8 (M-Dual), and 12. The FAA also required that FAA Form 7460-2 "Notice of Actual Construction or Alteration", be completed and returned to the FAA in the case of project abandonment, or at least 10 days prior to the start of construction and within 5 days after the construction reaches its greatest height (URS 2012a). The FAA's condition would also apply to any construction cranes exceeding 200 feet that would be needed for project construction.

For project compliance with FAA conditions, staff is proposing Condition of Certification **TRANS-7**, which would require the project owner to install obstruction marking and lighting on construction cranes exceeding 200 feet AGL and on the 760-foot-high towers. It would also require the project owner to submit Form 7460-2 "Notice of Actual Construction or Alteration" to the FAA. Staff is also proposing **TRANS-8** to require that the project owner notify the FAA of any construction cranes exceeding 200 feet in height. With implementation of these conditions, the project would comply with FAA

[9] The total tower height of 760 feet is comprised of a 750-foot-high tower with a 10-foot-high lightning rod at the top.

regulations, and would therefore not create a significant impact by conflicting with FAA laws, ordinances, regulations, and standards (LORS).

As discussed earlier, pilots operating out of the Blythe Airport or Cyr Aviation Airport would have no need to overfly the site when entering or exiting the traffic pattern, and any pilots overflying the site would likely be flying at altitudes far exceeding 800 AFL. However, there remains a possibility that a few pilots could overfly the site at low altitudes. **TRANS-7,** which would require obstruction marking and lighting on all structures exceeding 200 feet AGL, would ensure pilot awareness of the presence of tall structures so that they could avoid them by flying elsewhere or flying at higher altitudes. With implementation of **TRANS-7**, the impact of the towers on aircraft would be less than significant.

Also, as discussed earlier, pilots at March Air Reserve Base (MARB) use a visual military training route, VR-296, which passes directly over the project site, and sometimes fly as low as 300 feet on this route. However, Department of Defense officials had no concern over the project and stated that aircraft would fly around the project or at higher altitudes over the project if it was built (BS 2011a, CEC 2012an, CEC 2012aq). This is consistent with FAA regulations requiring that aircraft maintain an altitude of at least 500 feet AGL above any person, vessel, vehicle, or structure in sparsely populated areas (FAA 2012). Impacts to military training routes would be less than significant.

In conclusion, impacts to aviation from the project's towers and construction cranes would be less than significant with the implementation of **TRANS-7 and TRANS-8**.

<u>Gen-Tie Structures/Obstruction of Airspace</u>

Several of the proposed Rio Mesa SEGF's gen-tie structures are located approximately 25,000 feet from Runway 8 at the Blythe Airport. The gen-tie structures would range from 85-120 feet in height. According to Title 14, Part 77 of the Code of Federal Regulations, the gen-tie structures do not meet the threshold for FAA notification and review due to their distance from the runway and their heights. Therefore, the transmission poles comply with Title 14, Part 77 of the Code of Federal Regulations. The gen-tie structures are also not located within the Blythe Airport Influence Area (RCO ALUC 2004), and are therefore not subject to Riverside County Airport Land Use Compatibility Plan policies. (**See Traffic and Transportation Figure 3 – Blythe Airport Influence Area**).

The Blythe Airport Master Plan includes plans for a future 3,450-foot westward extension of Runway 8-26 (RCALUC 2004). Considering the runway extension, the closest Rio Mesa SEGF gen-tie structure would be more than 22,000 feet away from the runway and would still not meet the distance threshold (20,000 feet) for FAA notification or review.

In summary, the proposed gen-tie structures are not sufficiently tall or close to Blythe Airport's runways to require FAA notification due to potential obstruction hazards, and the structures are not located within the Blythe Airport Influence Area. Furthermore, even in the absence of the Rio Mesa SEGF's gen-tie structures, aircraft would be unable to fly at low altitudes in the area due to the presence of other nearby transmission lines. Because the gen-tie structures do not obstruct airspace or conflict with any federal or local aviation policies or regulations, they would have less than significant impacts on aviation.

Thermal Plumes

The Rio Mesa SEGF's wet surface air cooler, auxiliary boiler, and nighttime boiler would produce thermal plumes. Thermal plume velocities would be greatest at the discharge points, with plume velocities decreasing with increasing altitude. Aircraft flying through parts of thermal plumes exceeding 4.3 meters/second (m/s) in vertical velocity may experience moderate to significant turbulence, which could compromise pilot control and aircraft stability.[10]

To determine whether the thermal plumes emitted from the Rio Mesa SEGF would exceed 4.3 m/s at altitudes where aircraft could fly, Energy Commission Air Quality staff (Wenjun Qian) modeled plume velocities for the project's wet surface air cooler, auxiliary boiler, and nighttime boiler. Air Quality staff found that in each case, thermal plume vertical velocity exceeded 4.3 m/s at altitudes of approximately 200 feet above ground level (AGL) or below. At altitudes higher than approximately 200 feet AGL, thermal plume velocity was below the critical 4.3 m/s threshold for endangering aircraft. Aircraft would generally be flying at altitudes much higher than 200 feet AGL; therefore, the thermal plumes would have less than significant impacts to aviation.

Glint and Glare

The proposed Rio Mesa SEGF's mirrored heliostats and solar receiver steam generator (SRSG) tower would generate glint and glare, which could cause impacts to both ground traffic and aviation if sufficient to compromise a driver's or pilot's ability to operate his/her vehicle or aircraft. Staff analyzed whether this design feature of the project would cause significant safety hazards to drivers and pilots.

Glint

Glint is a temporary flash of brilliant light that causes a viewer to experience difficulty seeing. Heliostats could potentially cause drivers along I-10, SR-78, and other nearby roadways to experience glint. Also, in their respective standby positions, the heliostats would produce glint experienced by aircraft pilots. This glint would potentially be intermittent for a considerable amount of time during flight within 10 miles of the project site. While this glint would be visually distracting to drivers and pilots, it would not be visually debilitating. However, improperly positioned or malfunctioning heliostats could potentially increase glint impacts to drivers and aircraft pilots.

[10] This is based on staff's review of a 2004 safety circular (AC 139-05(0)), prepared by the Australian Government Civil Aviation Safety Authority, that noted "aviation authorities have established that an exhaust plume with a vertical velocity in excess of 4.3 meters per second (m/s) may cause damage to an aircraft airframe or upset an aircraft when flying at low levels" (CASA 2004). In their safety study on thermal plumes the FAA noted that they "do not necessarily approve/disapprove or warrant the data contained in the CASA AC 139-05." The safety team accepted "the information and data contained in AC 139-05 as a valid representation of hazardous exhaust velocities" (FAA 2006).

Staff is currently investigating the feasibility of preparing a Condition of Certification to ensure that glint impacts would be less than significant. This condition would require the project owner to prepare a Heliostat Operations Positioning and Monitoring Plan (HPMP) to minimize glint exposure to aircraft and other potential receptors, such as motorists, through strategic heliostat positioning, avoidance of malfunctions, and procedures for investigating and resolving any complaints from the public. Staff has provided a Data Request to the applicant asking for identification of potential receptors and methods to ensure that heliostats would be positioned to avoid reflection onto these receptors. Staff must have this information prior to issuance of the FSA in order to ensure that potential impacts are identified and can be mitigated.

Glare

Glare is a more sustained bright light (such as direct or reflected sunlight, or artificial light such as car headlamps at night) that causes a viewer to experience difficulty seeing. The SRSGs would produce unavoidable glare. Staff has determined that up to a viewing distance of approximately 8.5 miles from the Rio Mesa SEGF SRSGs, the glare from the SRSGs under nominal power generation conditions would be significantly distracting and uncomfortable for a viewer looking directly at the SRSGs. This distracting glare would be experienced by drivers on SR-78 and other local roads that are within 8.5 miles of the Rio Mesa SEGFs. However, this glare would not be a disability glare, and it would only be significantly distracting if the viewer was staring at the SRSGs; therefore, glare would not significantly affect drivers' and pilots' abilities to operate their vehicles and planes.

For a full discussion of glint and glare and proposed conditions of certification, refer to **Appendix TT1 – Glint and Glare Safety Impact Assessment** (at the end of this section) and the **Visual Resources** section of this PSA.

CUMULATIVE IMPACTS

A project may result in a significant adverse cumulative impact when its effects are cumulatively considerable. *Cumulatively considerable* means that the incremental effects of an individual project, such as the Rio Mesa SEGF, are significant when viewed in connection with the effects of (1) past projects; (2) other current projects; and (3) probable future projects (California Code of Regulations, Title 14, Section 15130). In this section, staff discusses whether the Rio Mesa SEGF could combine with other projects to create cumulatively considerable adverse impacts to traffic and transportation.

Traffic Impacts

Staff reviewed known past, current, and reasonably foreseeable future projects listed in **Table 1** of the **Executive Summary** section of this PSA. However, staff's complete review of the projects is pending and will be included in the FSA.

Staff focused on projects located within 20 miles of the proposed Rio Mesa SEGF project site, as traffic generated by these projects would be most likely to share the same roadway system used by Rio Mesa SEGF traffic. The Genesis Solar Energy Project (GSEP) is the only project that would generate large traffic volumes that could combine with the Rio Mesa SEGF to potentially result in cumulatively considerable Rio Mesa SEGF traffic impacts. See **Traffic and Transportation Table 9** (below) for information about the GSEP.

Traffic and Transportation Table 9
Development Considered in the Cumulative Condition

Project	County	Location	Description	Status of Project
Genesis Solar Energy Project	Riverside	4 miles north of I-10 off the Wiley's Well Road exit. Approximately 14 miles northwest of the Rio Mesa SEGF site.	250-MW solar power plant. Construction will span 37 months and require an average of 646 workers per day, with a peak of 1,085 workers during Month 23 of construction. Commercial operation will begin the second quarter of 2013 (CEC 2012compa).	**Approved and Under Construction** As of June 29, 2012, the project was 15% complete (CEC 2012comp).

While the GSEP would generate significant peak construction worker traffic on I-10, as shown in the table above, the GSEP would be fully operational before the start of Rio Mesa SEGF construction. The two projects' construction periods would not overlap, and therefore, there would be no significant cumulative impacts to traffic.

Aviation Impacts

The Rio Mesa SEGF's heliostats would, in their respective standby positions, result in glint that pilots flying within 10 miles of the project site would experience intermittently. This glint would be visually distracting, but not visually debilitating. As discussed earlier, staff is investigating the feasibility of a Condition of Certification requiring implementation of a Heliostat Operations Positioning and Monitoring Plan (HPMP) which would ensure proper positioning of heliostats and ensure that glint impacts to pilots from the Rio Mesa SEGF would remain less than significant.

While there are other existing and proposed energy projects in the Blythe area, no other project would combine with the Rio Mesa SEGF to produce cumulative glint impacts to pilots. Many nearby energy projects use solar photovoltaic technology, which is designed to absorb solar energy rather than reflect it, and therefore does not generate glint impacts to pilots. Viewed by a pilot from the air, a photovoltaic plant looks similar to a body of water, such as a lake. Two other nearby power plant projects, Blythe Solar Power Project (BSPP) (approved by the Energy Commission) and Genesis Solar Energy Project (GSEP) (approved by the Energy Commission and under construction), use mirror technology, specifically parabolic troughs. These projects could potentially produce glint experienced by pilots. However, an amendment has been filed with the Energy Commission to convert the BSPP to photovoltaic technology, and the GSEP is approximately 14 miles northwest of the Rio Mesa SEGF site, making it unlikely that pilots would experience glint from both projects at the same time. (The Rio Mesa SEGF would cause glint impacts to aircraft flying within 10 miles of the site.)

With regard to cumulative impacts from the height of the Rio Mesa SEGF, the proposed Rio Mesa SEGF location is not within the immediate vicinity of the Blythe Airport or its traffic pattern, and aircraft entering or exiting the Blythe Airport's traffic pattern would have no need to overfly the project site and the project's 760-foot-tall towers. Even if aircraft were to overfly the site, they would likely be at altitudes far exceeding the height of the power towers. For these reasons, the Rio Mesa SEGF would not combine with any other projects near the airport to obstruct or limit airport traffic patterns or flight routes.

In conclusion, the Rio Mesa SEGF's cumulative impacts to aviation would be less than significant.

Additionally, staff has reviewed **Socioeconomics Figure 1**, which shows that the minority population within a six-mile buffer of the proposed Rio Mesa SEGF is not greater than fifty percent. Also, the minority population within the six-mile project buffer is not meaningfully greater than the minority population in the local area or in Riverside County. Therefore, the minority population in the six-mile buffer does not constitute an environmental justice population. (See the **Socioeconomics** and **Executive Summary** sections of this PSA for further discussion of environmental justice.) Therefore, construction and operation of the proposed project would not cause disproportionate individual or cumulative **Traffic and Transportation** impacts to an environmental justice population.

COMPLIANCE WITH LORS

With the proposed conditions of certification, the Rio Mesa SEGF would comply with all LORS. **Traffic and Transportation Table 10** provides a general description of the applicable laws, ordinances, and regulations (LORS) and a summary of project compliance.

TRAFFIC AND TRANSPORTATION Table 10
Project Compliance with Adopted Traffic and Transportation LORS

Applicable LORS	Description	Consistency
Federal		
Code of Federal Regulations (CFR) Title 49, Subtitle B: Sections 171-177 and 350-399	Requires proper handling and storage of hazardous materials during transportation.	Consistent with implementation of **TRANS-5**, which requires the project owner to comply with all regulations and obtain all permits for the transportation of hazardous materials.
CFR Title14 Aeronautics and Space, Part 77 - Objects Affecting Navigable Airspace (14 CFR 77)	These regulations establish standards for determining physical obstructions to navigable airspace; set noticing and hearing requirements; provide for aeronautical studies to determine the effect of physical obstructions on the safe and efficient use of airspace; and oversee the development of antenna farm areas.	Consistent with implementation of **TRANS-7** and **TRANS-8**. **TRANS-7** requires the project owner to install FAA-compliant obstruction marking and lighting on towers and construction cranes. **TRANS-8** requires the project owner to notify the FAA of the use of any construction cranes exceeding 200 feet in height.

Applicable LORS	Description	Consistency
State		
California Vehicle Code (CVC): Div. 2, Chap. 2.5; Div. 6, Chap. 7; Div. 13, Chap. 5; Div. 14; Div. 14.1; Div. 14.3; Div. 14.7; Div. 14.8; & Div. 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. Addresses the Commission of Highway Patrol's authority to issue licenses for the transportation of hazardous materials.	Consistent with implementation of **TRANS-1** and **TRANS-5**. **TRANS-1** requires the project owner to comply with the applicable agencies' limits on vehicle sizes and weights, driver licensing, and truck routes, and requires the project owner to obtain the necessary permits for roadway use. **TRANS-5** requires the project owner to comply with all regulations and obtain all permits for the transportation of hazardous materials.
California Streets and Highway Code (S&HC): Div.1, Chap. 1, Article 3, Section 117; Div. 1, Chap. 3; Div. 2, Chap. 5.5 and 6	Includes regulations for the care and protection of State and County highways and provisions for the issuance of written permits. Requires permits for the location in the right-of-way (ROW) of any structures or fixtures necessary to telegraph, telephone, or electric power lines or of any ditches, pipes, drains, sewers, or underground structures.	Consistent with implementation of **TRANS-4**, which requires that the project owner obtain all required encroachment permits and comply with all applicable regulations for improvements, such as roadway standards.
California Health and Safety Code: Section 25160 et seq.	Pertains to operators of vehicles transporting hazardous materials; promotes safe transportation of hazardous materials.	Consistent with implementation of **TRANS-5**, which requires the project owner to comply with all regulations and obtain all permits for the transportation of hazardous materials.
State of California Department of Transportation (Caltrans), Caltrans Guide for the Preparation of Traffic Impact Studies	Caltrans' target LOS for State highway facilities is at the transition between LOS "C" and LOS "D". However, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the target LOS. If an existing state highway is operating at less than the appropriate target LOS, the existing measure of effectiveness should be maintained.	Consistent. During project construction and operation, LOS on I-10 and SR-78 would meet this standard. **TRANS-2** would ensure compliance. **TRANS-2** requires the project owner to prepare and implement a Traffic Control Plan, Heavy Haul Plan, and Parking/Staging Plan, and requires the project owner to implement a coordinated park-and-ride plan for busing construction workers to the site, thereby reducing LOS impacts.
Local		
County of Riverside General Plan, Circulation Element	Policy C 2.1: Maintain the following countywide target Levels of Service: • LOS "C" along all County-maintained roads and conventional state highways.	Consistent with implementation of **TRANS-2**, which requires the project owner to prepare and implement a Traffic Control Plan, Heavy Haul Plan, and Parking/Staging Plan, and that requires the project owner to implement a coordinated park-and-ride plan for busing construction workers to the site, thereby reducing LOS impacts.

Applicable LORS	Description	Consistency
	C 3.6: Require private developers to be primarily responsible for the improvement of streets and highways service access to developing commercial, industrial, and residential areas. These may include road construction or widening, installation of turning lanes and traffic signals, and the improvement of any drainage facility or other auxiliary facility necessary for the safe and efficient movement of traffic or the protection of road facilities.	Consistent with implementation of **TRANS-4**, which requires that the project owner obtain all required encroachment permits and comply with all applicable regulations for improvements, such as roadway standards.
	C 3.8: Restrict heavy duty truck through-traffic in residential and community center areas and plan land uses so that trucks do not need to traverse these areas.	Consistent. The truck route would be the most direct route possible and would minimize truck traffic through residential areas. Implementation of **TRANS-1** and **TRANS-2** would ensure compliance. **TRANS-1** requires the project owner to comply with the applicable agencies' limits on vehicle sizes and weights, driver licensing, and truck routes, and requires the project owner to obtain the necessary permits for roadway use. **TRANS-2** requires the project owner to prepare and implement a Heavy Haul Plan.
	C 3.25 Restrict on-street parking to reduce traffic congestion and improve safety in appropriate locations such as General Plan roadways.	Consistent. All construction and operations parking would occur on-site. **TRANS-2** ensures compliance by requiring the project owner to prepare a Parking/Staging Plan.
	C 3.33 Assure all-weather, paved access to all developing areas.	Consistent with implementation of **TRANS-6**, which requires the project owner to improve the project accesses as all-weather roads designed for emergency vehicle use.
	C 23.10 Limit truck traffic in residential and commercial areas to designated truck routes; limit construction, delivery, and truck through-traffic to designated routes; and distribute maps of approved truck routes to County traffic officers. (AI 43)	Consistent with implementation of **TRANS-1** and **TRANS-2**. **TRANS-1** requires the project owner to comply with the applicable agencies' limits on vehicle sizes and weights, driver licensing, and truck routes, and requires the project owner to obtain the necessary permits for roadway use. **TRANS-2** requires the project owner to prepare and implement a Traffic Control Plan and Heavy Haul Plan.
County of Riverside, Ordinance No. 461	Provides road improvement standards and specifications (RCO 2008).	Consistent with implementation of **TRANS-4** and **TRANS-6**. **TRANS-4** requires the project owner to comply with all applicable regulations for improvements, such as roadway standards. **TRANS-6** requires the

Applicable LORS	Description	Consistency
		project owner to construct all-weather access roads compliant with the Riverside County Fire Code.
County of Riverside, Ordinance No. 500.1	Amends Ordinance No. 500. Prohibits any commercial vehicle exceeding 14,000 pounds (7 tons) from using any identified County highways or identified County Service Area (CSA) roads within a residential area. Includes exemptions (RCO 2008a).	<u>Consistent</u> with implementation of **TRANS-1**, which requires the project owner to comply with all applicable agencies' limits on vehicle sizes and weights, driver licensing, and truck routes, and requires the project owner to obtain the necessary permits for roadway use.
County of Riverside, Ordinance No. 524.1	Amends Ordinance No. 524. Regulates oversize and overweight vehicles and loads (RCO 1989).	<u>Consistent</u> with implementation of **TRANS-1** and **TRANS-2**. **TRANS-1** requires the project owner to comply with all applicable agencies' limits on vehicle sizes and weights, driver licensing, and truck routes, and requires the project owner to obtain the necessary permits for roadway use. **TRANS-2** requires the project owner to prepare and implement a Heavy Haul Plan.
County of Riverside, Ordinance No. 846	Prohibits any commercial vehicle exceeding 14,000 pounds from using the listed local streets within the community of Mesa Verde/CSA 122. Includes exemptions (RCO 2005).	<u>Consistent</u>. Truck traffic would not use these roads. Implementation of **TRANS-1** ensures compliance. **TRANS-1** requires the project owner to comply with all applicable agencies' limits on vehicle sizes and weights, driver licensing, and truck routes, and requires the project owner to obtain the necessary permits for roadway use.
City of Blythe General Plan, Circulation Element	Policy 11: Strive to maintain traffic LOS B on residential streets and LOS C or better on arterial and collector streets, at all intersections, and on principal arterials in the CMP during peak hours.	<u>Consistent.</u> During project construction and operation, LOS on streets and intersections in the City of Blythe would meet this standard. **TRANS-2** would ensure compliance. **TRANS-2** requires the project owner to implement a Traffic Control Plan and a coordinated park-and-ride plan to bus construction workers to the project site, thereby reducing impacts to LOS.
City of Blythe, Municipal Code Section 12.12.020	Restricts heavy vehicle weights.	<u>Consistent</u>. No truck traffic would pass through the City of Blythe. **TRANS-1** and **TRANS-2** would ensure compliance. **TRANS-1** requires the project owner to comply with the applicable agencies' limits on vehicle sizes and weights, driver licensing, and truck routes, and requires the project owner to obtain all necessary permits for roadway use. **TRANS-2** requires the project owner to implement a Heavy Haul Plan.

Applicable LORS	Description	Consistency
Riverside County Transportation Commission, 2011 Riverside County Congestion Management Program	Establishes a minimum LOS of "E" for Congestion Management Program (CMP) highways and roadways (RCTC 2011).	Consistent. During project construction and operation, LOS on I-10 and SR-78 would meet this standard. **TRANS-2** would ensure compliance. **TRANS-2** requires the project owner to prepare and implement a Traffic Control Plan, Heavy Haul Plan, and Parking/Staging Plan, and requires the project owner to implement a coordinated park-and-ride plan for busing construction workers to the site, thereby reducing LOS impacts.
Riverside County Zoning Ordinance, Section 18.12	Industrial uses such as the Rio Mesa SEGF require at least 1 parking space per 2 employees during the largest shift, and 1 space per vehicle kept in connection with the use.	Consistent. The project plans show that construction and operations parking would meet this standard. **TRANS-2** ensures compliance by requiring a Parking/Staging Plan.

NOTEWORTHY PUBLIC BENEFITS

While development of the Rio Mesa SEGF is intended to address the requirements of federal and state mandates to develop renewable energy, it would not yield any noteworthy public benefits related to traffic and transportation.

RESPONSE TO COMMENTS

Staff has received the following comments on aspects of the Rio Mesa SEGF related to traffic and transportation:

RIVERSIDE COUNTY AIRPORT LAND USE COMMISSION, ED COOPER, DIRECTOR

January 19, 2012 (ALUC 2012a)

Comment: The Riverside County Airport Land Use Compatibility Plan (RCALUCP) requires review by the Airport Land Use Commission (ALUC) for "any proposal for construction or alteration of a structure (including antennas) taller than 200 feet above ground level at the site". These types of proposals are considered major land use actions and require ALUC review "regardless of location within Riverside County".

> **Response:** Energy Commission staff welcomes Riverside County ALUC review of this project. The ALUC was included on the project e-mail list and has received project materials throughout the PSA process. Please submit comments at any time, and feel free to contact staff's Traffic and Transportation analyst or Project Manager with any questions or concerns.

Comment: Given the proximity of the project to the Blythe Airport, airport operations may be adversely impacted. The project is not the first or only solar power plant project potentially impacting Blythe Airport. The ALUC has previously commented to the CEC on the Blythe Solar Power Project northwest of the airport. There are additional photovoltaic solar power plant projects on and around the Blythe Airport. The volume of solar power plant projects and mix of solar thermal and photovoltaic technologies raises pilot safety issues associated with glint and glare. The ALUC is concerned that the cumulative glint and glare effects of the multiple solar power plant projects may affect the usability of the Blythe Airport.

While only one solar power plant project with County approval has been constructed in the vicinity to date, a 100 megawatt (MW) facility has been approved on airport grounds and four additional solar power plant projects with a combined potential capacity of 1,039.75 MW are in process. We, therefore, urge the CEC to require the project proponent to file an application with the ALUC for project review. The ALUC would require a comprehensive analysis of the glint/glare effects potentially affecting the safety of air navigation in the vicinity of the Blythe Airport.

Response: Please see the "Cumulative Impacts" section, where staff determined that cumulative impacts to aviation would be less than significant.

Comment: The project proponent should be required to analyze whether the auxiliary boilers, air cooled condensers, or any other element of the project would produce thermal plumes, and the characteristics of those plumes, if any, that could potentially affect aircraft handling.

Response: Energy Commission Air Quality staff modeled the plumes that would be generated by the project's wet surface air cooler, auxiliary boiler, and nighttime boiler. Staff found that the plumes would not reach velocities sufficient to pose a hazard to aircraft. For a more detailed discussion, please see the "Thermal Plumes" discussion in the "Aviation Impacts" section.

Comment: The Land Use section of the AFC references Blythe Airport runways as being 5,800 feet and 6,543 feet in length and states that the proposed 220 kilovolt (kV) generator tie-line structures (gen-tie) will, at their closest point, be located approximately 25,000 feet from the end of the nearest runway. However, the Blythe Airport Land Use Compatibility Plan, and the Airport Master Plan upon which it was based, call for a runway extension to the west, which may reduce the distance from the proposed gen-tie to the runway. The project proponent should be required to provide information regarding the distance from the gen-tie to the nearest point on the runway as proposed for extension. The ALUC has concerns about the location and elevation of the gen-tie in relation to the Blythe Airport runways.

Response: Considering the runway extension, the closest Rio Mesa SEGF gen tie structure would be more than 22,000 feet away from the runway. For a more detailed discussion, please see the "Gen Tie Structures/Obstruction of Airspace" discussion in the "Aviation Impacts" section.

Comment: The Appendix to the AFC includes an Obstacle Evaluation Study prepared by Capitol Airspace Group of Alexandria, Virginia. The report notes that the proposed facility "is located within the lateral boundaries of VR-296, a visual military training route used for terrain following operations originating at March Air Reserve Base, California. This route may be used for military pilots to conduct operations as low as 300 feet above ground level". Accordingly, the CEC should require the project proponent to provide documentation establishing military approval of the project.

Response: The applicant submitted a letter dated August 30, 2011 from H. David Belote, Executive Director of the Department of Defense (DoD) Siting Clearinghouse. In the letter, Mr. Belote stated that the DoD Siting Clearinghouse had reviewed the proposed project. He stated: "While we predict the project will impact the training we conduct in military training route VR-296, we believe those impacts can be mitigated. Therefore, the Department of Defense will not oppose construction of the project; however, we ask you to continue to coordinate with us as you make micrositing decisions" (BS 2011a).

To follow up on this letter, staff contacted Anthony Parisi, Regional Environmental Coordinator for DoD. Staff asked Mr. Parisi if DoD would move VR-296 in response to construction of the Rio Mesa SEGF. Mr. Parisi stated that DoD would not move VR-296, but that if the project is built, any aircraft using this route would fly around the project or higher above the project (CEC 2012aq).

CONCLUSIONS AND RECOMMENDATIONS

Staff has analyzed the proposed Rio Mesa SEGF's impacts to the nearby traffic and transportation system. With implementation of the proposed conditions of certification listed below (**TRANS-1** through **TRANS-8**), the Rio Mesa SEGF would comply with all applicable LORS related to traffic and transportation and would result in less than significant impacts to the traffic and transportation system.

ADDITIONAL INFORMATION STAFF REQUIRES FROM THE APPLICANT IN ORDER TO COMPLETE THE FSA

The applicant is required to identify potential heliostat glint receptors and present proposed methods to ensure that heliostats would be positioned to avoid casting glint on those receptors at all times. Staff must have this information prior to issuance of the FSA in order to ensure that potential impacts are identified and can be mitigated.

PROPOSED CONDITIONS OF CERTIFICATION

TRANS-1 Roadway Use Permits and Regulations

The project owner shall comply with limitations imposed by the Department of Transportation (Caltrans) District 8 and other relevant jurisdictions, including the City of Blythe and the County of Riverside, on vehicle sizes and weights, driver licensing, and truck routes. In addition, the project owner or its contractor(s) shall obtain necessary transportation permits for roadway use from all relevant jurisdictions.

Verification: In the Monthly Compliance Reports (MCRs), the project owner shall report permits received during that reporting period. In addition, the project owner shall retain copies of permits and supporting documentation on-site for compliance project manager (CPM) inspection if requested.

TRANS-2 Traffic Control Plan, Heavy Haul Plan, and Parking/Staging Plan

Prior to the start of construction of the Rio Mesa SEGF, the project owner shall prepare a Traffic Control Plan (TCP) for the Rio Mesa SEGF's construction and operations traffic. The TCP shall address the movement of workers, vehicles, and materials, including arrival and departure schedules and designated workforce and delivery routes.

The project owner shall consult with the Department of Transportation (Caltrans) District 8 office, the County of Riverside, and the City of Blythe in the preparation and implementation of the Traffic Control Plan (TCP). The project owner shall submit the proposed TCP to these agencies in sufficient time for review and comment, and to the CPM for review and approval prior to the proposed start of construction and implementation of the plan.

The TCP shall include:

- A coordinated park-and-ride plan designed to transport construction workers to the project site via a van or bus service to reduce impacts to LOS. This plan must include the park-and-ride location/s and evidence that the location/s may be used for this purpose (lease agreements, etc.), the schedule for each van or bus departure to and from the site, and ways in which the park-and-ride system will be enforced (how employees will be notified, etc.).
- Provisions for redirection of construction traffic with a flag person as necessary to ensure traffic safety and minimize interruptions to non-construction related traffic flow;
- Placement of necessary signage, lighting, and traffic control devices at the project construction site and lay-down areas;
- A heavy-haul plan addressing the transport and delivery of heavy and oversized loads requiring permits from the California Department of Transportation (Caltrans), other state or federal agencies, and/or the affected local jurisdictions;
- Location and details of construction along affected roadways at night, where permitted;
- Details regarding temporary closure of travel lanes or disruptions to street segments and intersections during construction activities;
- Traffic diversion plans (in coordination with Caltrans, the County of Riverside, and the City of Blythe) to ensure access during temporary lane/road closures;
- Means of access to residential and/or commercial property located near construction work and truck traffic routes;
- Means of access for emergency vehicles to the project site;

- Advance notification to residents, businesses, emergency providers, and hospitals that would be affected when roads may be partially or completely closed;
- Routes used for construction-related trips;
- Timing of construction-related trips, with trips scheduled for off-peak hours if possible;
- Identification of safety procedures for exiting and entering the site access gate; and
- Parking/Staging Plan (PSP) for all phases of project construction and for project operation. The PSP must comply with Riverside County's parking regulations by providing sufficient on-site parking.

Verification: At least 60 calendar days prior to the start of construction, the project owner shall submit the TCP to the applicable agencies for review and comment and to the CPM for review and approval. The project owner shall also provide the CPM with a copy of the transmittal letter to the agencies requesting review and comment.

At least 30 calendar days prior to the start of construction, the project owner shall provide copies of any comment letters received from the agencies, along with any changes to the proposed development plan, to the CPM for review and approval.

TRANS- 3 Restoration of All Public Roads, Easements, Rights-of-Way, and Palo Verde Irrigation District Infrastructure

The project owner shall restore all public roads, easements, rights-of-way, and Palo Verde Irrigation District infrastructure (such as canals and drains) that have been damaged due to project-related construction activities. Restoration shall be completed in a timely manner to the infrastructure's original condition. Restoration of significant damage which could cause hazards (such as potholes, deterioration of pavement edges, or damaged signage) shall take place immediately after the damage has occurred. Restoration of any significant damage to Palo Verde Irrigation District infrastructure, such as canals or drains, shall also take place immediately after the damage has occurred.

Prior to the start of site mobilization, the project owner shall notify the relevant jurisdictions, including Caltrans District 8, the City of Blythe, the County of Riverside, and the Palo Verde Irrigation District of the proposed schedule for project construction. The purpose of this notification is to request that these jurisdictions consider postponement of any planned public right-of-way repairs or improvement activities in areas affected by project construction until construction is completed, and to coordinate any concurrent construction-related activities that cannot be postponed.

Verification: Prior to the start of site mobilization, the project owner shall photograph or videotape all affected public roads, easements, right-of-way segment(s), and intersections. The project owner shall provide the photographs or videotapes to the CPM and the affected local agencies (such as Caltrans District 8, the City of Blythe, and the County of Riverside).

If damage to public roads, easements, rights-of-way, or Palo Verde Irrigation District infrastructure occurs during construction, the project owner shall notify the CPM and the affected agency/agencies to identify the sections to be repaired. At that time, the project owner and CPM shall establish a schedule for completion and approval of the repairs. Following completion of any repairs, the project owner shall provide the CPM with letters signed by the affected agency/agencies stating their satisfaction with the repairs.

TRANS-4 Encroachment into Public Rights-of-Way

Prior to any ground disturbance, improvements, or obstruction of traffic within any public road, easement, or right-of-way, the project owner shall coordinate with all applicable jurisdictions, including Caltrans District 8, the County of Riverside, and the City of Blythe, to obtain necessary encroachment permits and comply with all applicable regulations, including applicable road standards.

Verification: At least 10 days prior to ground disturbance, improvements, or interruption of traffic in or along any public road, easement, or right-of-way, the project owner shall provide copies of all permit(s), relevant to the affected location(s), received from Caltrans or any other affected jurisdiction/s to the CPM. In addition, the project owner shall retain copies of the issued/approved permit(s) and supporting documentation in its compliance file for a minimum of 180 calendar days after the start of commercial operation.

TRANS-5 Transportation of Hazardous Materials

The project owner shall contract with licensed hazardous materials delivery and waste hauler companies in order to obtain the necessary permits and/or licenses from the California Highway Patrol, Caltrans District 8, and any relevant local jurisdictions for the transportation of hazardous materials. The project owner shall ensure compliance with all applicable regulations and implementation of the proper procedures.

Verification: In the Monthly Compliance Reports (MCRs) during construction and the Annual Reports during operation, the owner shall provide copies of all permits/licenses obtained for the transportation of hazardous materials.

At least 30 days prior to the start of construction, the project owner shall provide copies of any comment letters received from the relevant agencies , along with any resulting changes in plans for transportation of hazardous materials.

TRANS-6 All-Weather Access Roads

The 30th Avenue/Bradshaw Trail access and new secondary project access shall be improved as all-weather roads designed to allow for fire truck access during all weather and soil conditions. These accesses shall comply with the Riverside County Fire Code.

Verification: At least 60 days prior to the start of construction, the project owner shall submit the road improvement plans, along with a review letter from the Riverside County Fire Department (and BLM where applicable) to the CPM for review and approval.

TRANS-7 Obstruction Marking and Lighting

The project owner shall install obstruction marking and lighting on the two solar power towers and any construction cranes exceeding 200 feet in height. Marking and lighting shall be consistent with FAA requirements, as expressed in the following documents:

- FAA Advisory Circular 70/7460-1K Change 2, Obstruction Marking and Lighting, a med-dual system – Chapters 4, 8 (M-Dual), and 12.
- FAA Safety Alert for Operators (SAFO) 09007.

Permanent lighting consistent with all requirements shall be installed and activated within 5 days of completion of construction and prior to the start of plant operation. Lighting shall be operational 24 hours a day, 7 days a week for the life of project operation. Upgrades to the required lighting configurations, types, location, or duration shall be implemented consistent with any changes to FAA obstruction marking and lighting requirements.

Verification: At least 60 days prior to the start of construction, the project owner shall submit to the CPM for approval final design plans for the two solar power towers that depict the required air traffic obstruction marking and lighting.

Within 5 days of completion of solar power tower construction and prior to the start of plant operation, the project owner shall install and activate permanent obstruction marking and lighting consistent with FAA requirements and shall inform the CPM in writing within 10 days of installation and activation. The lighting shall be inspected and approved by the CPM (or designated inspector) within 30 days of activation.

TRANS-8 Federal Aviation Administration Notification of Construction Cranes

The project owner shall file a Form 7460-1 with the Federal Aviation Administration (FAA) regarding the use of any construction cranes exceeding 200 feet in height.

Verification: At least 90 days prior to ground disturbance, the project owner shall submit a copy of the FAA Determination of No Hazard to Navigable Airspace regarding the construction cranes to the CPM.

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APPENDIX TT1 – GLINT AND GLARE SAFETY IMPACT ASSESSMENT

Gregg Irvin

Rio Mesa Solar Electric Generating Facility

INTRODUCTION

The Rio Mesa Solar Electric Generating Facility (RMSEGF) consists of two 250-megawatt (MW) (nominal) solar concentration thermal power plants situated on the Palo Verde Mesa in Riverside County, California, 13 miles southwest of Blythe, and is located partially on private land and partially on public land administered by BLM.

Each solar plant would use heliostats (elevated mirrors, approximately 85,000 mirrors per facility) guided by a tracking system mounted on a pylon to focus the sun's rays on a solar receiver steam generator (SRSG) atop a 750-foot tall concrete solar power tower near the center of each solar field. In each solar plant, one Rankine-cycle steam turbine would receive steam from the SRSG (or solar boiler) to generate electricity. Each 250 MW plant requires about 1,850 acres (or 2.9 square miles) of land to operate. The solar field and power generation equipment would start each morning after sunrise and, unless augmented, would shut down when insolation drops below the level required keeping the turbines online.

Each of the heliostat assemblies would be composed of two mirrors, each approximately 12 feet high by 8.5 feet wide with a total reflecting surface of 204.7 square feet. Each heliostat assembly would be mounted on a single pylon, along with a computer-programmed aiming control system that directs the motion of the heliostat to track the movement of the sun.

Definition of Glint and Glare

Glare is considered as difficulty seeing in the presence of bright light such as direct or reflected sunlight or artificial light such as car headlamps at night. Glare is caused by a significant ratio of luminance between the task (that which is being looked at) and the glare source. Factors such as the angle between the task and the glare source and eye adaptation have significant impacts on the experience of glare. Glare can be generally divided into two types, discomfort glare and disability glare. Discomfort glare results in an instinctive desire to look away from a bright light source or difficulty in seeing a task. Disability glare renders the task impossible to view, such as when driving westward at sunset. Disability glare is often caused by the inter-reflection of light within the eyeball, a scattering effect, reducing the contrast between task and glare source to the point where the task cannot be resolved or distinguished.

Glint is difficulty seeing in the presence of a transient bright light source and is generally considered to be intermittent. A glint effect would be, for example, brief reflections of sky or sunlight from some of the heliostats while driving by. A glare effect is more sustained, such as might be present from the sustained reflections from the tower SRSGs. Both glint and glare effects are possible from both the redirection of sunlight by the heliostats and the reflection of solar energy off of the solar tower SRSGs. Because of the possible impact of this redirected sunlight on observers such as motorists on the adjacent highway or in aircraft overhead, these impacts are analyzed below.

METHODOLOGY AND THRESHOLDS FOR DETERMINING SIGNIFICANT IMPACTS OF GLINT AND GLARE

The Luminance of the Rio Mesa Environment

Perceived brightness depends on a variety of factors including the luminance of the global ambient, target size, viewing distance, and the relationship between the luminance of the target and background. The global ambient luminance sets the state of visual adaptation and hence the spatial and temporal processing characteristics of the human visual system. Within this context perceived brightness depends critically on the luminance relationship and sizes of the target (SRGS) and background (sky). The irradiance of the sun is enormous, on the order of 80,000 Watts (W/m^2). As such, the luminance of the sun is also enormous and is on the order of $1.6x10^9$ candelas (cd/m^2) (clear sky at noon).

Irradiance is a measure of the power incident on a surface, also called radiant flux density, and is expressed as $Watts/cm^2$. Irradiance characterize the total amount of radiation present, at all frequencies, and is the appropriate metric for the determination of retinal damage thresholds. The human visual system, however, is only sensitive to a narrow range of these frequencies described by the photopic luminous efficiency function ($V\lambda$). Luminance, on the other hand, is a photometric measure of the luminous intensity per unit area of light. Luminance indicates how much luminous power will be detected by an eye looking at source or surface from a particular angle of view. Luminance is thus an indicator of how bright the surface will appear. Luminance can be computed from an irradiance spectrum by using the photopic luminous efficiency function which describes the average visual sensitivity of the human eye to light of different wavelengths. It is a standard function established by the Commission Internationale de l'Eclairage (CIE) and is used to convert radiant energy into luminous (i.e., visible) energy.

The luminance of the sky varies considerably dependent on weather conditions and can range from 500 cd/m^2 to approximately 7,000 cd/m^2. Of the total light removed from the direct solar beam by scattering in the atmosphere (approximately 25 percent) about two-thirds ultimately reaches the earth as diffuse sky radiation.

Empirical measurements were made at the Rio Mesa site of both the solar and sky spectral irradiance distributions on 18 April 2012 under clear full sun conditions. Measurements were accomplished with a calibrated Ocean Optics spectroradiometer with a 400 μm fiber optic for light collection. Since the sun subtends a smaller angle than the acceptance numerical aperture of the fiber the sun measurements, of necessity include both sun and sky spectra combined.

The sky measurements are accurate and provided consistent measurements. Measurements taken, at elevations commensurate with the viewing conditions in which the sky would constitute the visual background for tower SRSG, yielded average values for integrated radiance of 40.33 W/m^2-sr. When the standard human luminous efficiency function is applied to these spectral measurements the computed luminance values are

6,175 cd/m^2 ± 222 cd/m^2. Figure 1 shows an example of the measured sky spectrum (normalized) over the range of human visual sensitivity (blue). Also shown is the CIE photopic luminous efficiency function, Vλ (green) depicting relative human visual sensitivity over the wavelength range of 360-830 nm.

Appendix TT1 – Glint and Glare Safety Impact Assessment - Figure 1

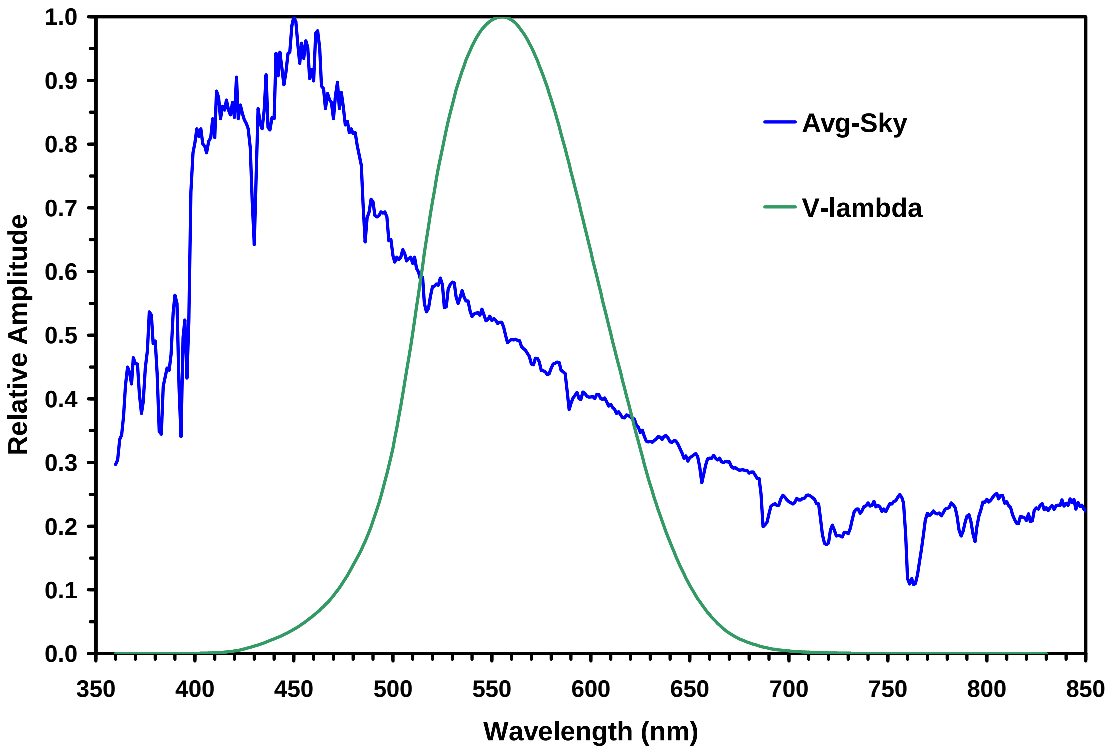

Figure 1. Normalized Sky spectral radiance (W/cm^2-sr) resulting in a luminance of 6,157 cd/m^2 (shown in blue, dominant wavelength = 478 nm, purity = 28.5). The function depicting relative human visual sensitivity, the CIE photopic luminous efficiency function, Vλ, is shown in green.

Reference Solar Spectral Irradiance: Air Mass 1.5

The photovoltaic (PV) industry, in conjunction with the American Society for Testing and Materials (ASTM) (http://www.astm.org/) and government research and development laboratories developed and defines two, and only two, standard terrestrial solar spectral irradiance distributions. The two spectra define a standard direct normal spectral irradiance and a standard total (global, hemispherical, within 2-pi steradian field of view of the tilted plane) spectral irradiance. The direct normal spectrum is the direct component contributing to the total global (hemispherical) spectrum. The current Standard Reference Spectra are both incorporated into a single document, ASTM G173-03. The applicant, Bright Source, uses the ASTM standards for their calculations of irradiance and luminance.

The ASTM G173 spectra represent terrestrial solar spectral irradiance on a surface of specified orientation under one and only one set of specified atmospheric conditions. These distributions of power (watts per square meter per nanometer of bandwidth) as a function of wavelength provide a single common reference for evaluating spectrally selective PV materials with respect to performance measured under varying natural and artificial sources of light with various spectral distributions. The conditions selected were considered to be a reasonable average for the 48 contiguous states of the United States of America (U.S.A.) over a period of one year. The tilt angle selected is approximately the average latitude for the contiguous U.S.A. The spectral irradiance of ASTM G173-03 standard reference spectra for extraterrestrial (above the atmosphere), direct normal (sun), and global normal (sun plus sky) is shown in Figure 2. The upper panel shows the full spectrum from 280 nm to 4.0 microns (the range relevant to irradiance calculations). The lower panel shows the region relevant for human vision (360-830 nm, the range relevant to luminance calculations).

Appendix TT1 – Glint and Glare Safety Impact Assessment - Figure 2

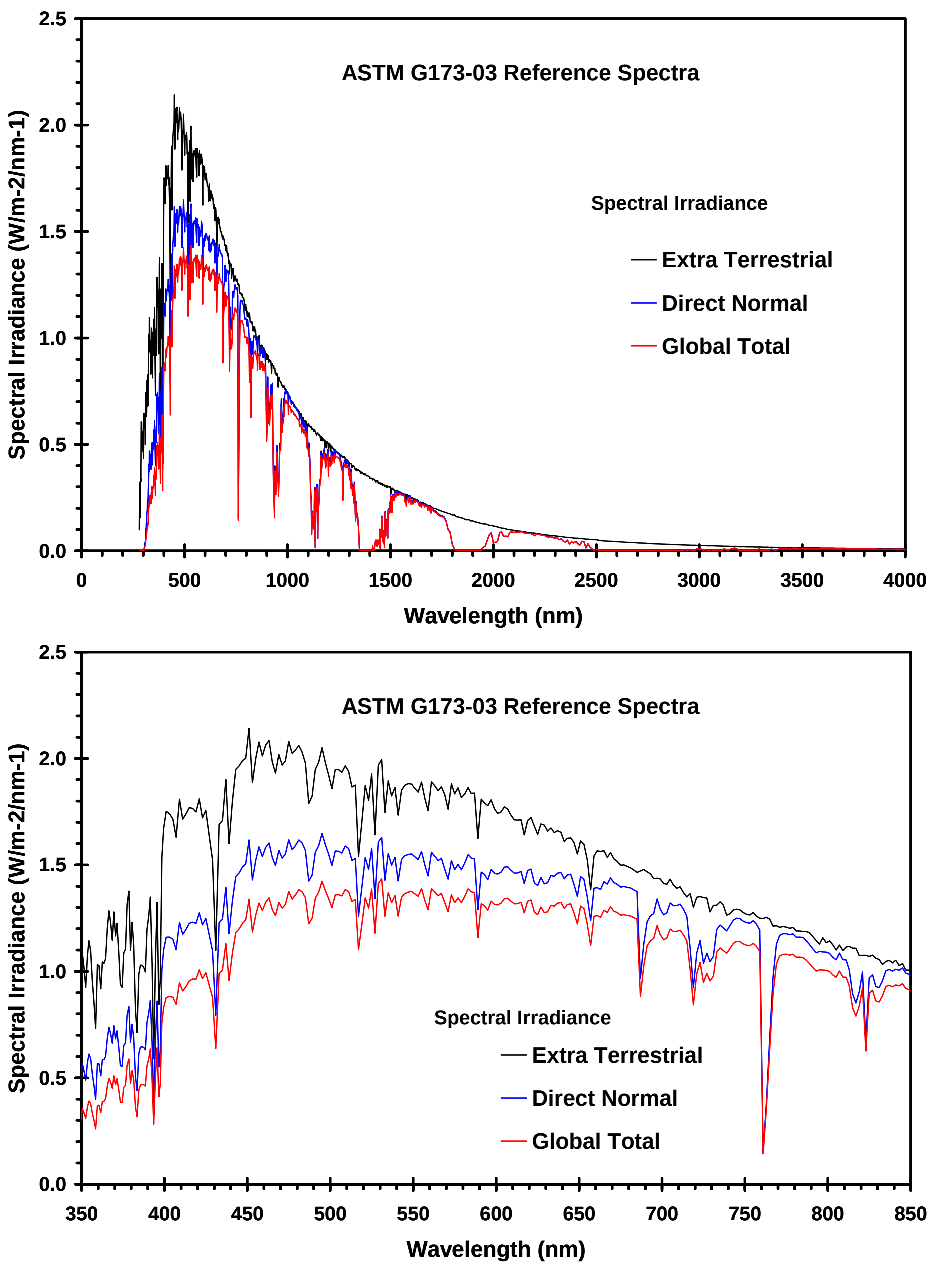

Figure 2. American Society for Testing and Materials G173-03 Reference Spectra for pre-atmospheric (extra-terrestrial), direct normal (direct solar contribution) and global normal (2-pi steradians).

As the reflectance by the heliostats and SRSG receiver have marginal effect on the solar spectrum, the ASTM G173 was used by Bright Source to compute irradiance and luminance. By taking the luminous efficiency to be that of Air Mass 1.5 standard solar spectrum, which is calculated to be 110 lum/W and using that to calculate the solar flux emanating from the SRSG (including the solid angle subtended by the SRSG), the luminance value is on the order of 544,000 cd/m^2. The table in Figure 3 shows the luminance (cd/m^2) of the Sun, the tower SRSG, and the nominal sky background (upper panel). The lower panel shows the respective luminance ratios. Note that the Sun has a luminance value (1.6 x 10^9) that is approximately 260,000 times greater than the background sky, a factor of 5.4 log units. The nominal SRSG luminance, at 544,000 cd/m^2, is between the luminance of the Sun and sky. The SRSG is 88 times more luminous (1.9 orders of magnitude) than the background sky. This is considered a significant difference in terms of the resulting perceived brightness of the tower SRSG against the background sky.

Appendix TT1 – Glint and Glare Safety Impact Assessment - Figure 3

Luminance (cd/m^2)		
Sun	1,600,000,000	
Tower SRSG	544,000	
Sky	6,175	
Luminance Ratios		Log
Sun/Sky	259,109	5.4
Sun/SRSG	2,941	3.5
SRSG/Sky	88	1.9

Figure 3. Table of nominal luminance values, in cd/m^2, and their respective ratios for the Sun, sky and tower SRSG.

Retinal Damage

The ability of light to cause injury to the retina has been shown both clinically and experimentally. Light can result in retinal damage through photothermal, photomechanical, and photochemical mechanisms. For the current project both photothermal and photochemical mechanisms are relevant.

Photothermal Retinal Damage Photothermal retinal damage occurs when the eye is exposed to sufficient light energy to heat the retina to a point where damage occurs resulting in a permanent blind spot. Since the eye is an optical focusing system the energy at the retinal surface is concentrated by as much as a factor of 100,000. The ocular impact on an observer, from either the heliostats or the SRSGs is calculated as the retinal irradiance (Er). The calculation of Er takes into consideration the size of the light emitting object (SRSG or heliostat), the intensity in W/m^2 (irradiance) at the observer location, and the vulnerability/ susceptibility of the human eye.

The level of exposure which is considered as the limit between safe and harmful is called Maximum Permissible Exposure (MPE) limit. The MPE which can be tolerated by the human eye is an industry standard and is defined by Sliney and Freasier et al[1]. The MPE is defined for two exposure condition types: momentary exposure, correlated with the human blinking instinct, and continuous exposure.

- MPE for a momentary exposure (0.15 s) is 1 W/cm^2 = 10,000 W/m^2.
- MPE for continuous exposure is 0.1 W/cm^2 = 1,000 W/m^2.

Personnel and others within the plant boundaries will not be exposed to irradiance levels that exceed the MPE. The intensity of light emitted from the SRSG is lower (by three orders of magnitude) than that of the sun (20-70 W/m^2 vs. 80,000 W/m^2). Bright Source provided modeling in which the modest attenuation by air was not included, i.e., a worst case scenario. In this case the Er received by the retina varies proportionally with distance. Under these worst case conditions, the irradiance to which an observer at 250 meters from the SRSG is exposed is not greater than 50 W/m2, and this value decreases over distance (i.e., at 400 m it is less than 20 W/m^2.)

Residents and motorists outside the plant boundaries will not be exposed to Er levels beyond the MPE. The nearest public right of way is the Bradshaw Trail in proximity to the northern plant boundary which is approximately 1.6 miles from the nearest SRSG at its closest point on the northern border of the solar facility. State Route 78 to the East is approximately 1.5 miles from the eastern plant border. The nearest residential establishment is Ripley to the northeast at approximately 6 miles. At these distances the level of retinal irradiance exposure is less than 2 percent of the MPE for continuous exposure.

In normal operation, only the area of the SRSG will receive concentrations of solar radiation. Locations on the ground and areas surrounding the footprint of the plant will not receive solar radiation concentrations above that of direct sunlight. Therefore, in normal plant operation, there is no potential for any plant sourced solar radiation exposure hazard to motorists, residents or any member of the public outside the boundary of the project.

Further, project workers within the plant boundaries will not be exposed to Er levels beyond the MPE from either the SRSGs or heliostats. The maximum level of retinal irradiance exposure for project workers is less than 6 percent of the MPE for continuous exposure.

The heliostats are designed to reflect sunlight toward the SRSG at the top of the tower and for normal operation, the heliostats will orient themselves according to their position in the field, day of the year, and time of day, in order to reflect the sun rays either on the SRSG ("tracking" orientation) or on an area (standby zone) nearby (far enough from the tower and SRSG to free them from radiation but close enough to allow the heliostats to quickly enter tracking mode, called "standby" orientation). In the standby position the heliostats reflect sunlight back into the sky where the distinct potential exists for the heliostat ‘beam’ to intercept aircraft.

The size of the site as defined according to the FAA regulations is the volume that encompasses the perimeter of the site and a height of 500 feet above the tower. This imaginary volumetric body is the control volume that the heliostat tracking system takes under consideration. In this volume the heliostats are programmed to concentrate flux in certain positions that will cause the flux leaving the imaginary control volume to scatter to a level that will cause no impact on aviation safety from a retinal damage perspective. The control system is designed so that solar flux will not exceed the momentary MPE (10 kW/m^2) outside and above of this control volume.

Staff concludes that there is no risk for photothermal retinal damage. Further, as discussed immediately below in the Photochemical Retinal Damage section, project workers will also be provided with protective eyewear to mitigate the potential for photochemical damage. Although not necessary for photothermal damage the protective sunglasses will provide an additional margin of safety for workers within the solar field.

Photochemical Retinal Damage

Photochemical damage is associated with long-duration exposure times as well as lower-wavelength (higher-energy) light exposure. While retina pigment epithelium (RPE) and the neurosensory retina are protected from light-induced exposure by the absorption profile of the surrounding ocular structures (e.g., cornea, crystalline lens, macular pigments) and through retinal photoreceptor outer segment regeneration, photic injury is still possible due to photochemical retinal light toxicity mechanisms.

Photochemical injury is both dose-dependent and cumulative in nature. The cumulative time-dependent nature is that daily exposures can build up and can last many weeks. For example, it has been estimated that the half-life (1/e, when an exposure effect has decayed to approximately 37 percent) of the cumulative dose exposure effect is on the order of 30 days. This has significant implications for observers (e.g., workers over many weeks) that spend a significant amount of time in proximity to the high luminance environment of a solar field in the presence of the additional high terrestrial ambient of the desert environment.

As retinal injury can be caused by exposure to otherwise innocuous visible light, there appears to be some critical dose or threshold at which exposure becomes injurious. The safe exposure times for common ophthalmic instruments (e.g., fundal photography) has been reported in the literature and supports the concept of a critical threshold dose necessary for injury.

The potential for photochemical retinal damage to the public (both resident and motorists) and project workers given the cumulative exposure effects of the combined terrestrial ambient and solar field/ tower exposure levels has been addressed in Data Request 145 (URS 2012b).

Staff agrees that the potential for photochemical damage to the residential and motorist public is not significant. Residents and most motorists of the area known as Ripley along South Neighborhood Boulevard will be no closer than 6 miles from the nearest SRSG. Additionally, there is no risk of photochemical damage for any local residence, even in the closest proximity to the plant and SRSGs. At these distances and because these individuals will not experience long duration exposure, there is no risk for photochemical damage. At distances outside of the plant boundaries the level of retinal irradiance exposure is less than 2 percent of the MPE for continuous exposure. Nearby the only sizeable developed residential area is the community of Blythe (population 21,950), located approximately 11 miles (at closest point) to the northeast.

When evaluating the implications of these effects on the viewer of the tower or the heliostats, it must be noted that the effect is directly related to the ambient and background light conditions. The Rio Mesa SEGF is located in a bright desert environment thereby increasing the potential chance for photochemical retinal damage. The cumulative daily exposure to workers to the ambient environment combined with the additional potential cumulative effects of heliostat and SRSG exposure puts project workers at risk for photochemical retinal damage. This is due to the cumulative effect discussed above. Thus, to ensure the safety of the workers and others within the project boundaries, personnel protection equipment (PPE), in the form of protective glasses will be provided. Protective glasses have been developed for workers engaged in intense solar field work, tower work, and intense close viewing of the SRSG.

There is precedence for the issuance of special safety glasses, for example they have been issued to the operators at Solar Energy Development Center (SEDC), and the Coalinga and Ivanpah solar thermal plants. The potential photochemical retinal hazards are calculated according to IEC 62471 standard (same as CIE S 009: 2002), titled: “Photobiological Safety of Lamps and Lamp Systems”, where the spectral values were taken from “ASTM G173-03 Reference Spectra Derived from SMARTS v. 2.9.2 (AM1.5)” and are the same as the “ISO 9845-1-1992.” Bright Source has developed appropriate PPE in the form of specialty safety glasses (sunglasses) based on these standards for the workers engaged in intense solar field work, tower work, and intense close viewing of the SRSG.

As discussed in the **Worker Safety and Fire Protection** section of this PSA, and as proposed in Conditions of Certification **WORKER SAFETY-1** and **WORKER SAFETY-2**, staff recommends that the following condition be adopted to ensure impacts to workers are less than significant:

Personnel Protection Equipment and Monitoring Plan

The project owner shall prepare a Personnel Protection Equipment and Monitoring Plan (PPEMP) that would accomplish the following:

1. Identify and acquire the appropriate Personnel Protection Equipment (PPE) based on the IEC 62471 standards in sufficient numbers to provide safety glasses for the workers engaged in solar field work, and tower work where the potential exists for heliostat solar reflective exposure or SRSG exposure during operations.

2. Establish the requirements and procedures for the donning and doffing of the PPE by workers

3. Sufficiently monitor worker use of the PPE and compliance with the PPE procedures

Verification: Within 90 days before commercial operation of any of the three Rio Mesa tower SRSG, the project owner shall submit the Personnel Protection Equipment and Monitoring Plan to the CPM for review and approval.

Glint and Glare from the Heliostats

The applicant has demonstrated through modeling that heliostat retinal irradiance and beam intensity (under worst case conditions) is eye safe. The heliostats are designed to reflect sunlight toward the SRSG at the top of the tower and are programmed such that reflectivity would never be directed toward ground level viewers located outside of the project site. Locations on the ground, areas surrounding the footprint of the plant, and the surrounding airspace would not receive solar radiation concentrations above that of direct sunlight.

However, improperly positioned or malfunctioning heliostats could potentially increase glint impacts to drivers and aircraft pilots. Therefore, staff is currently investigating the feasibility of preparing a Condition of Certification to ensure that glint impacts from the heliostats would be less than significant. This condition would require the project owner to prepare a Heliostat Operations Positioning and Monitoring Plan (HPMP) to minimize glint exposure to aircraft and other potential receptors, such as motorists, through strategic heliostat positioning, avoidance of malfunctions, and procedures for investigating and resolving any complaints from the public. Staff has provided a Data Request to the applicant asking for identification of potential receptors and methods to ensure that heliostats would be positioned to avoid reflection onto these receptors. Staff must have this information prior to issuance of the FSA in order to ensure that potential impacts are identified and can be mitigated.

The HPMP and resulting control algorithms would add any known receptors or receptor locations, such as a road or residence, to the list of forbidden areas within each heliostat's controller. This way, each heliostat individually would avoid aiming reflected sunrays at the receptor to ensure that there would be no concentration of solar radiation on it. With these procedures appropriately implemented through a Condition of Certification, the potential for glint and glare from solar radiation exposure by the reflected luminance for normal and emergency operation modes to motorists and residents should be maximally mitigated.

This safe operation of the heliostats, according to the applicant, would be achieved with the following design and precautions:

- Safe orientation as default orientation – heliostats default to the safe orientation common to the whole field in all cases of malfunctions detected by the heliostat's controller, which ensures protection in most cases of malfunctions;
- Safe path from any orientation to any other orientation – when heliostats change their orientation, they choose a "path" that avoids reflected sunrays on all unintended areas (at least the tower and power block, and other designated sensitive areas).
- Normal operation - all the sunlight is reflected either on the receiver or the "standby" areas – located near the receiver – so that no other location receives solar radiation.

- Removal of flux due to high winds and all other known scenarios – These are considered normal operation and covered by the operations mentioned above.

An additional glint and glare concern is for aircraft. Since the heliostats point skyward in their standby positions there is the distinct (if not inevitable) possibility for brief and intermittent direct exposure of the reflected sun from the heliostats to aircraft. The effect, however, for such exposures will diminish as a function of distance from the heliostat field. The heliostat mirrors although planar (flat) are tensioned in their pylon mountings when installed to produce a slight concavity. This produces a slight focusing effect to improve the amount of solar energy received at the SRGS from each heliostat.

According to the applicant, there are incremental design focal lengths at the planned RMSEGF site based on the range of the heliostat to the tower SRSG (for example at 250m, 450m and 1000m). When in the standby position this focal point will be slightly above the SRSG (since the heliostat is slightly elevated relative to the SRSG aiming point) and will diverge beyond the standby ring. This divergence, however, of the heliostat reflections is rather minor and the glint appearance of a direct solar reflection will be present up to a distance of approximately 10 miles from the mirror field. Thus, although an aircraft passing through one or more heliostat ‘beams’ at altitude above or near the heliostat field will receive a slightly divergent beam, the divergence, in and of itself, is insufficient to mitigate the effects of a direct solar reflection within a range of 10 miles. Within 10 miles of the plant and at altitudes ranging from 1.5 to 6.8 miles pilots could experience direct specular solar reflections from an individual heliostat in standby, and could experience a succession of these glint exposures dependent on the particular geometry and flight path. Such intermittent glint experienced by pilots would be considered as a discomfort producing effect rather than as a disability producing effect. In the rare event of a flight path in relative close proximity to the solar field (e.g., less than approximately 5 miles) that received successive heliostat exposures in rapid succession over an extended period of time, the pilot may experience an elevated level of discomfort. It should be noted, however, that pilots are familiar with airborne solar glint effects coming from ground-based sources (lakes, streams, ponds and additional man-made reflective surfaces) and generally adopt a strategy of not directly fixating or visually attending to glint sources.

At ranges greater than approximately 10 miles, due to the reflected beam divergence, the glint appearance would not be that of a direct solar reflection such as is commonly witnessed from a specular (mirror-like) solar reflection off a lake or pond. Rather, the reflection would tend to be more diffuse and less bright, and become more and more diffuse and dimmer as a function of increasing distance/ altitude. Further, the probability of successive glint exposures decreases with range from the heliostat field, together with an increase of the temporal spacing between exposures. This type of glint from the standby heliostats experienced by pilots would be considered a mildly discomforting glint effect.

Glint and glare from the SRSGs

During operations the tower SRSGs will produce a sustained bright source of reflected light from the heliostats. Since the SRSGs are ‘circular’ (wrapping around the tower 360 degrees) and near the tower peak they will be highly visible from most vantage points and for many miles. There is no doubt that the tower SRSGs will result in a most prominent and sustained visual signature. The issue from a Traffic and Transportation perspective is whether the SRSGs produce sufficient glare and/or excessive perceived brightness to result in disability glare and/or compromised operator performance. This is an essential question since there are essentially no realistic mitigating procedures for the tower SRSG luminance levels.

Perceived brightness, as well as glint and glare effects, depends on a variety of factors including the luminance of the global ambient, target size, viewing distance, and the relationship between the luminance of the target and background. The global ambient luminance sets the state of visual adaptation and hence the spatial and temporal processing characteristics of the human visual system. Within this context perceived brightness depends critically on the luminance relationship and sizes of the target (SRGS) and background (sky). The irradiance of the sun is enormous, on the order of 80,000 W/m^2. As such, the luminance of the sun is also enormous and is on the order of 1.6x10^9 cd/m^2 (clear sky at noon).

Calculations by the applicant as well as field spectroradiometric measurements conducted by staff have provided realistic and nominal values for the luminance of the SRSGs and the sky background during plant operations. During power generating operations the levels of retinal irradiance that would be created by the tower SRSGs have been calculated to be 68 W/m^2 in views from the north, and 53 W/m^2 in views from the south. These correspond to maximum luminance values for the SRSGs of 544,000 cd/m^2 and 424,000 cd/m^2, respectively.

The background sky within which the tower would be viewed will vary according to atmospheric and weather conditions but on a clear sunny day will be on the order of 6,175 cd/m^2. As such the SRSGs would be 88 times more luminous (544,000/6,175) than the background. Even in the high state of light adaptation produced by the daytime environment, this would appear quite bright to observers. However, the SRSGs would still be a factor of 2,941 times less luminous that the sun.

What do these values translate to in terms of perceived brightness? In the field of human visual psychophysics Stevens' Power Law[2] is used to describe the relationship between the magnitude of a physical stimulus and its perceived intensity or strength.

The general form of the law is

Appendix TT1 – Glint and Glare Safety Impact Assessment - Figure 4

$$P(I) \equiv cI^a$$

	Luminance (cd/m2)	Relative Brightness
Sun	**1,600,000,000**	**1,170**
Tower SRSG	**544,000**	**82**
Sky	**6,175**	**18**

Figure 4. Perceptual brightness as a function of the luminance of the sun, tower SRSGs and the background sky based on Stevens' Power Law with a brightness exponent of 1/3 and a constant of 1.0.

where I is the magnitude of the physical stimulus P, P(I) is the psychophysical function relating to the subjective magnitude of the sensation evoked by the stimulus, ‘a’ is an exponent that depends on the type of stimulation and ‘c’ is a proportionality constant that depends on the type of stimulation and the units used. Although Stevens’ Power Law is based on psychophysical judgments of perceived stimulus magnitude it has been shown to be generally valid for a variety of sensory domains including vibration, lightness, smell, taste, warmth, cold, pain, pressure, brightness, viscosity, duration, etc.

For perceived brightness under daylight observation conditions the brightness exponent is generally considered to be 1/3. This is a compressive function. For example, if a 25 W light bulb is exchanged for a 100 W light bulb, the perceived brightness should increase by a factor of 1.59 or 59 percent. The exponent of 1/3 for perceived brightness is valid over a wide range of stimulus conditions. This exponent provides a best estimate for perceived brightness given the general observation conditions in the solar field and the general vicinity. Figure 4 shows the predicted relative perceived brightness for the sun, SRSGs and background sky. The constant, ‘c’ in Stevens’ psychometric equation was set to 1.0 to produce a perceived brightness value of 10 for a 1,000 cd/m2 stimulus. Under these conditions and observer would rate the brightness magnitude of the background sky as 18, the brightness of the SRSGs as 82, and the brightness of the sun as 1,170. Thus, perceptually, although the SRSG is 88 times more luminous than the background sky, the perceived brightness is only 4.5 times as great (82/18). Further, the sun would be perceived as 14 times brighter than the SRSGs (1,170/82) and 64 times brighter than the sky (1,170/18). Although these perceived brightness ratios can be considered accurate, the relative brightness values themselves are completely relative and contingent on the value of 1.0 assigned to ‘c’ in Stevens’ psychometric equation.

Thus, the brightness of the SRSGs experienced by all observers would be on the order of at least a factor of four times greater than that of the background sky. This level of brightness is certainly prominent and may be distracting or discomforting but is not considered as debilitating or producing a disability glare. Additionally, these values for relative brightness are only estimates and are considered as nominal for viewing distances on the order of 1000-2000 meters where the visual size of the SRSGs are reduced to less than 0.5 degree. For greater ranges perceived brightness will remain relatively constant out to a critical size approaching the limits of visual acuity and only be reduced by atmospherics. For greater ranges perceived brightness will obey Stevens’ power law. For closer ranges within the solar field perceived brightness could increase substantially as the visual size of the SRSGs increases.

Further, at these stated luminance levels, there would be some constant level of glare. The glare would be anticipated to be moderately distracting and would produce a medium discomfort level. However, the SRSG sustained glare is insufficient to be considered as disability glare.

At a viewing distance of 2.8 miles, the tower receivers would have a visual subtense equal to that of the Sun, i.e., 1/2 deg or 30 min arc. At 8.5 miles, the receivers would have a visual subtense of 1/6 deg, 10 min arc. At this visual size, perceived brightness would begin to transition from being constant to being log linear according to Stevens’ power law.

The distance at which brightness will be proportional to distance (log linear) will be at a visual subtense of approximately 5 min arc (1/12 deg) as size begins to transition to the limits of visual acuity. This condition is met at a viewing distance of 16.9 miles. In between the 2.8 miles and 16.9 miles viewing distances the visual subtense of the receiver is changing from 30 min arc to 5 min arc, a change in area of 36 times. As such perceived brightness will be decreasing because of the changing size. It will transition between a constant and log linear. A stimulus on the order of 544,000 cd/m2 (88 times more luminous than the nominal desert sky at that location) will be significantly visually disruptive and be significant in perceived brightness for angular sizes of 10 min arc and greater. For the SRSGs, this translates to a viewing distance of 8.5 miles or less. Thus, the threshold viewing distance at which the tower receivers (under nominal power generation conditions) are considered as producing a visual glare which is both significant in perceived brightness and significant in visual disruption is 8.5 miles.It should be noted that glare is generally considered as a scattering effect in the eye, although any optical interface can also add to perceived glare, such as glasses, automotive windshields and aircraft canopies. Scattering in the human eye increases as a function of age[3]. Glare related scatter effects remain nearly constant as a function of age until 40-45 years when scatter rises exponentially and triples by the age of 60. As such any glare effects produced by the SRSGs may be more pronounced in the aging population.

Conclusions

Staff concludes that the glare effects from the tower solar receiver steam generators (SRSGs) cannot be reduced, and that the brightness of the SRSG would be clearly visible and prominent. The relatively high level of brightness and the resulting glare effects from the SRSGs would produce a distinct visual distraction effect and be significant in perceived brightness and discomfort/disruption glare effects for a nominal viewing distance of 8.5 miles. However, these glare effects are not considered as sufficient to be visually debilitating in producing disability glare and thus would not cause a safety hazard from a ground-based or airborne (e.g., driving a vehicle, flying a plane) operator control perspective.

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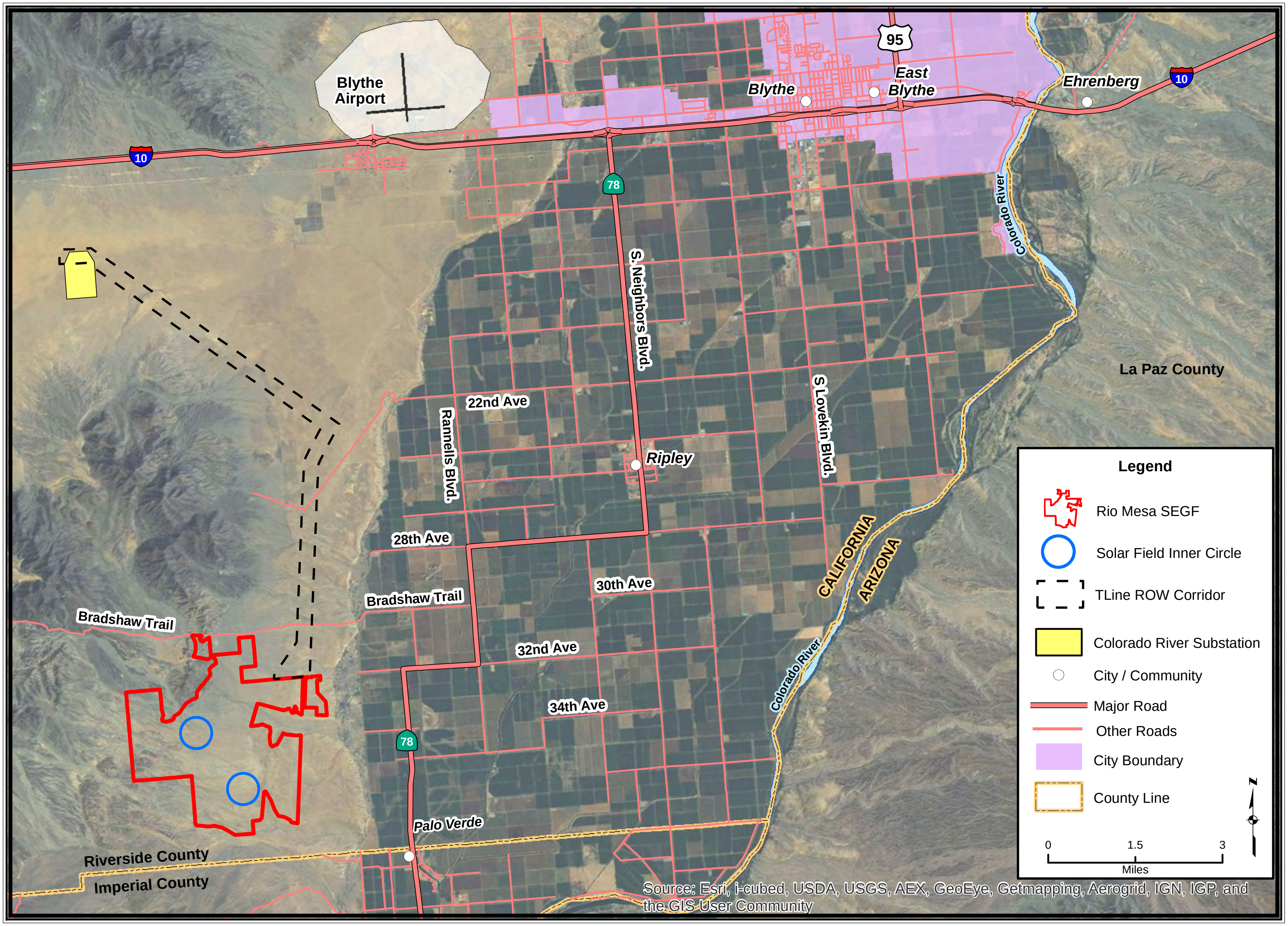
TRAFFIC AND TRANSPORTATION - FIGURE 1

Rio Mesa Solar Electric Generating Facility - Local Setting



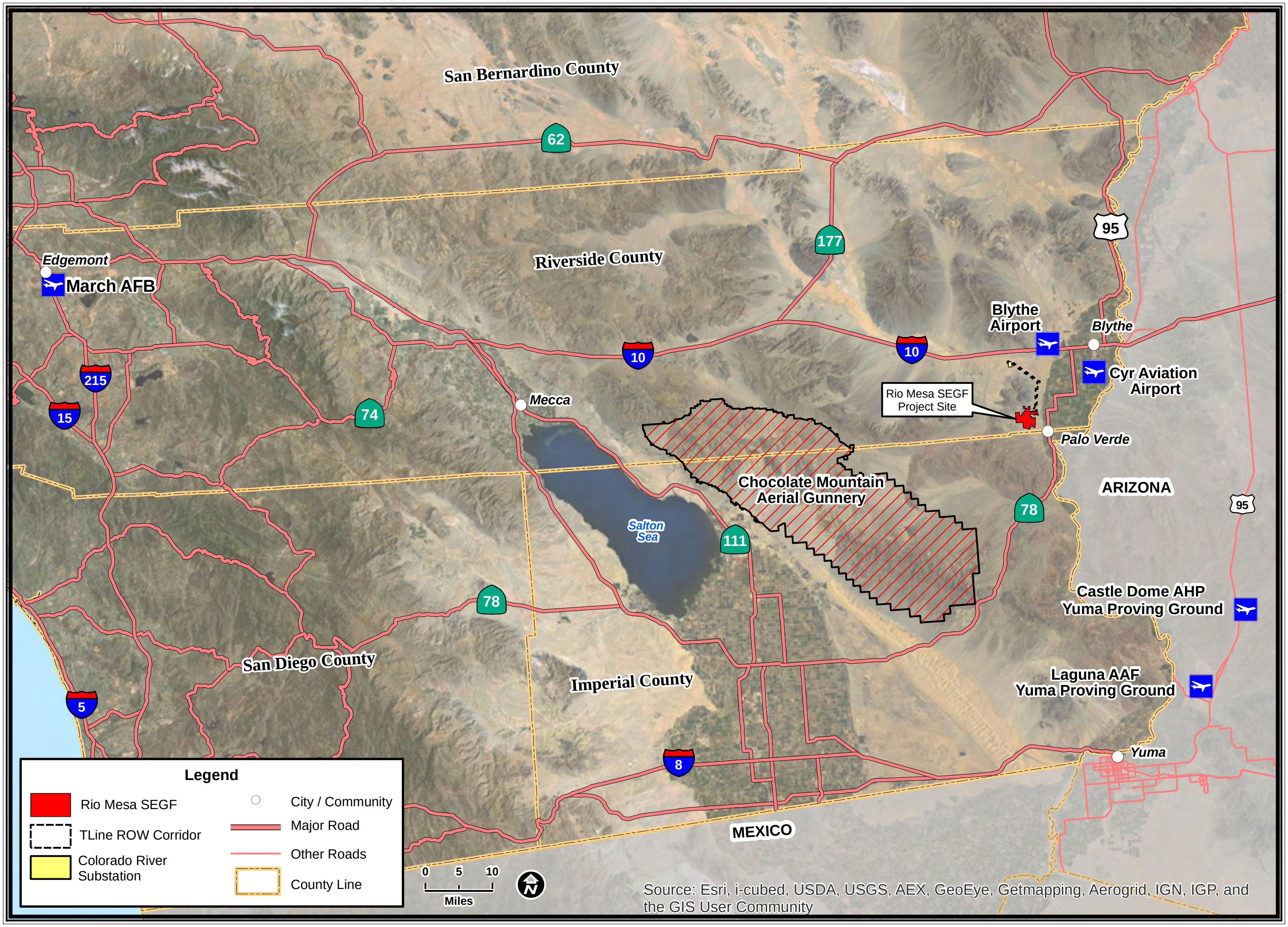
TRAFFIC AND TRANSPORTATION

CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: URS - ESRI, Riverside County

TRAFFIC AND TRANSPORTATION - FIGURE 2

Rio Mesa Solar Electric Generating Facility - Aviation



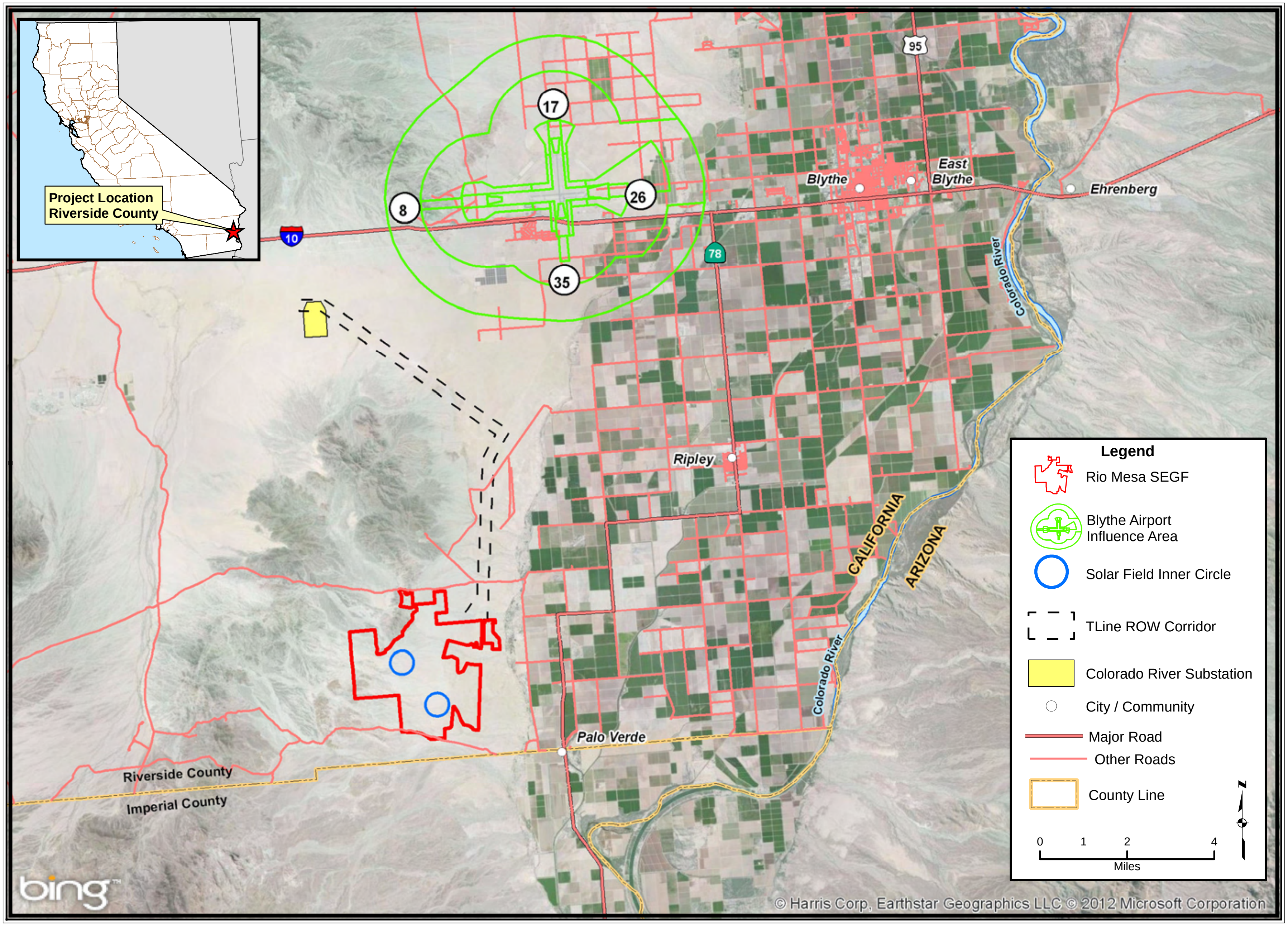
TRAFFIC AND TRANSPORTATION

CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: URS - ESRI, DOT

TRAFFIC AND TRANSPORTATION - FIGURE 3

Rio Mesa Solar Electric Generating Facility - Blythe Airport Influence Area



CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: URS - Bing, Multinet 2010, Riverside County Airport Land Use Commission.

TRANSMISSION LINE SAFETY AND NUISANCE

Obed Odoemelam, Ph.D.

SUMMARY OF CONCLUSIONS

The California Energy Commission staff concludes that the proposed design, routing, and operational plan for Rio Mesa Solar Electric Generating Facility's (Rio Mesa SEGF's) transmission line would be adequate to maintain its field and nonfield impacts below levels of significance. The applicant has in this regard identified and intends to implement the mitigation measures necessary to minimize the potential for any aviation hazard to area aircraft while managing the generated electric and magnetic fields to the extent the California Utilities Commission considers (a) adequate in light of the available effects information and (b) necessary to minimize the potential for nuisance and hazardous shocks. Staff's recommended Condition of Certification, **TLSN-1** would ensure the mitigation related to design while **TLSN-3** would minimize the potential for nuisance shocks along the proposed route. **TLSN-2's** requirements for measuring the generated fields would be necessary to assess the efficacy of the applicant's proposed field management measures.

INTRODUCTION

The purpose of this analysis is to assess the proposed Rio Mesa SEGF transmission line design, routing, and operational plan to determine whether the related field and non-field impacts would constitute a significant environmental hazard in the area around the route. All related health and safety laws, ordinances, regulations, and standards (LORS) are currently aimed at minimizing these impacts. 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.

The following federal, state and local, LORS apply to the control of the field and nonfield impacts of electric power lines in California. Staff's analysis examines the project's compliance with these requirements.

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 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	
Riverside County General Plan, Chapter 7, p.N-11	Establishes noise standards for the different land uses in the county.
Riverside County Ordinance 847.	Establishes exterior noise standards for receptors based on land use.
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.
CPUC GO 128. Rules for Construction of Underground Electric Supply and Communications Systems.	Applies to the design construction of underground transmission lines. Specifically establishes requirements and minimum standards to be used for the underground installation AC power and communication circuits.
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.

Applicable LORS	Description
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	
CPUC GO-131-D, "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.

SETTING

As noted in the **Project Description** section, the proposed Rio Mesa SEGF site would be located in eastern Riverside County California approximately 3,805 acres of land leased from the Metropolitan Water District (MWD) of Southern California. The site is approximately 13 miles southwest of Blythe, California with the project itself consisting of two solar plants: the southern solar plant (Rio Mesa I occupying 1,828 acres), and the northern solar plant (Rio Mesa II occupying 1,977acres). There would be a shared area of 19.5 acres between the two plants to accommodate a combined administrative, control, warehouse, and a maintenance building complex together with evaporative ponds, groundwater wells, a water treatment plant and a common on-site switchyard. As more fully discussed by the applicant (BS 2011a, p. 3-1), the generated power would be transmitted to Southern California Edison's (SCE's) electric power grid from each plant's power block, first to the common on-site Rio Mesa Switchyard, and then through a 220-kV line that would be built as part of the project to run approximately 10 miles to the new SCE Colorado River Substation.

The project site is located in the vicinity of area transmission lines of a total of approximately 8 miles and respectively rated at 161kV, 220 kV, and 500 kV. The proposed line would however not be close enough for any overlap of its fields and fields from these existing lines

(BS 2011a, p. 3-6). The route would traverse public land under the jurisdiction of the Bureau of Land Management (BLM) from whom a right-of-way permit would be required.

The surrounding area is open, undisturbed desert land with relatively sparse vegetation and no nearby residences. The absence of residences in the immediate line vicinity means that there would not be the types of residential field exposure at the root of the health concern of recent years. That would leave only the potential short-term worker exposures or exposure to the ordinary individual crossing over the line. BLM will conduct its own environmental review to ensure compliance with the related requirements in the National Environmental Policy Act (NEPA). Each plant's line would begin at the power block as an underground line and extend through the heliostat field to emerge at the common on-site Rio Mesa SEGF switchyard from which the connection would be made with the new Colorado River Substation through the project's single-circuit overhead 220-kV line.

PROJECT DESCRIPTION

The environmental impacts of the proposed connecting line are best assessed separately as impacts from the on-site underground sections and impacts from the 10-mile segment from the common on-site switchyard to the new SCE Colorado River Substation.

The on-site underground segment for each plant would be placed in a polyethylene casing as it extends along a path between the power block and the on-site Rio Mesa Switchyard. The placement and burial would be according to SCE safety and reliability guidelines for similar underground lines. The proposed 220-kV overhead connecting segment would also be designed, built and operated by the applicant according to SCE's guidelines. The applicant provided information on the physical dimensions of the typical support structure as related to electric and magnetic field management and potential obstruction to area aircraft (BS 2012v, p. 3-10 and Figure 3.3-2 (rev)). The height would be between 85 feet and 120 feet as typical of such SCE lines. The noted implementation of SCE's guidelines is in keeping with current CPUC policy requiring each new or upgraded line to be designed, constructed and operated according to the guidelines of the area's major utility which in this case is SCE. Specifications in these guidelines ensure safety, efficiency, reliability and maintainability for underground and overhead lines (BS 2012v).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHODS AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

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.

DIRECT IMPACTS AND MITIGATION

Aviation Safety

Any potential hazard to area aircraft would relate to the potential for collision in the navigable airspace. The related requirements in **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. These regulations require FAA notification in cases of structures over 200 feet from the ground. Notification is also required if the structure were to be below 200 feet in height but 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 (3.98 miles) from the runway, with no obstructing structures for whom the ratio of distance from runway to height is greater than 100:1. 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 extending 5,000 feet.

As noted by the applicant, the proposed Rio Mesa SEGF and related facilities are approximately 4.7 miles from the Blythe Municipal Airport which has two runways of 5,800 feet and 6,543 feet (BS 2011a, pp. 3-4 and 3-18). The proposed line would be approximately 25,000 feet from the closest point from either runway meaning that its structures would not pose an aviation hazard according to FAA's distance and dimension-related criteria. There are no airports within 20,000 feet and no heliports within 5000 feet leading staff to agree with the applicant (BS 1211a, p. 5.3-18) that the proposed project line would not pose an aviation hazard to both area helicopters and fixed-wing aircraft.

Interference with Radio-Frequency Communication

Transmission line-related radio-frequency interference is one of the indirect effects of overhead line operation and is produced by the physical interactions of line electric fields. Since electric fields cannot penetrate the soil and most materials, the discussed electric field effects would not occur around the underground segments. These electric field-related interferences are 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 overhead 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 and related complaints is therefore unlikely for Rio Mesa SEGF because the responsible fields would be reduced using field-reducing SCE designs with the line located in generally uninhabited areas. Staff does not recommend conditions of certification related to radio-frequency impacts.

Audible Noise

The noise-reducing designs for low-intensity electric fields 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. As also with radio-frequency impacts, audible noise 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 around an overhead line can be assessed from estimates of the field strengths expected during operation. Such noise is more likely to be 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. Given the applicant's intended use of SCE's noise-reducing design, staff does not expect the proposed line 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. Since the proposed line corridor would traverse a desert environment without combustible materials at high enough levels, staff does not anticipate a fire hazard during operations and does not recommend a related condition of certification. Furthermore, the applicant will implement specific fire prevention, fighting and protection measures established as effective for similar lines (BS 2011a, pp. 3-18 and 3-19).

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 or underground 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- and GO-128-related measures against direct contact with the energized line (BS 2011a, pp. 3-18 and 3-19) would serve to minimize the risk of hazardous shocks for both the underground and overhead segments. 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 would be responsible in all cases for ensuring compliance with these grounding-related practices within the rights-of-way through implementation of staff' recommended Condition of Certification, **TLSN-3**.

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 a health 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 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

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 area's main utility, which in this case is SCE. 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 and required by staff for all permitted lines. 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 most new lines in California are currently required by the CPUC to be designed according to the EMF-reducing guidelines of the main 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 lines 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 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 lines, 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 are the short-term exposures of plant workers, regulatory inspectors, maintenance personnel, visitors, or individuals in the vicinity of the lines. These types of exposures are short term and well understood as not significantly related to the health concern. Staff uses their measured intensities to (a) compare the effective application of control measures on lines of similar voltage and current-carrying capacities and (b) to assess the similarity in worker or other short-term exposures around similar lines.

Industry'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 exposure from power lines is 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 lines to ensure the field strength minimization currently required by the CPUC in light of the concern over EMF exposure and health.

As discussed by the applicant (BS 2011a, pp. 3-16 and 3-17), the field reduction measures to be applied to any overhead segments 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.

The strengths of the line fields along the proposed route would depend on the effectiveness of the field-reducing measures incorporated into their designs for the overhead segment. These fields should be of the same intensity as SCE lines of the same construction, voltage and current-carrying capacity. The requirements in Condition of Certification **TLSN-2** for field strength measurements are intended to validate the applicant's assumed minimization efficiency for the overhead line. For the underground segment, undergrounding by itself would yield the magnetic fields of the lowest intensity possible (without affecting safety, reliability, and efficiency) since undergrounding allows for the closest conductor spacing and field strength cancellation possible). The only related requirements for this project would be for undergrounding according to requirements of CPUC's GO-128, and compliance with standard industry and SCE standards and practices. Only the magnetic field would be involved since only magnetic fields can penetrate the soil and most materials to reach the area above the line. Since there would be no long-term residential exposure as previously noted, the field strength measurements in **TLSN-2** would allow for direct comparison with short-term human exposure levels around SCE lines of the same voltage and current-carrying capacity.

CUMULATIVE IMPACTS AND MITIGATION

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 transmission line would be designed and erected according to applicable field-reducing SCE guidelines as currently required by the CPUC, 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 would be assessed from the results of the field strength measurements specified in Condition of Certification **TLSN-2**.

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. As also noted, the utility in this case is SCE. Since the proposed line 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**.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff received no public or agency comments on the transmission line nuisance and safety aspects of the proposed Rio Mesa SEGF.

CONCLUSIONS

Staff does not expect the proposed Rio Mesa SEGF transmission line to pose an aviation hazard according to current FAA criteria, and therefore, does not consider it necessary to recommend location changes or further mitigation on the basis of a potential hazard to area aviation.

The potential for nuisance shocks would be adequately minimized through the field-reducing and grounding requirements in **TLSN-3**). 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 (minimized through requirements in **TLSN-1**) would include compliance with the height and clearance requirements of PUC's General Order 95 and General Order 128 in the case of the underground section. Compliance with Title 14, California Code of Regulations, section 1250, (as also required by **TLSN-1**) would minimize the potential for fire hazards, while the use of low-corona line designs, 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 Rio Mesa SEGF 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 proposal to design, build and operate the according to SCE guidelines 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 general 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 can be used for comparison with similar SCE lines. The measurement requirements in **TLSN-2** would provide the information necessary to assess the applicant's field reduction efficiency while comparing the generated fields with fields from similar SCE lines. Similarity with such existing lines constitutes compliance with current CPUC policy of field strength management.

Since the proposed project line would be operated to minimize the health, safety, and nuisance impacts of concern to staff and would be located away from areas of human habitation, staff considers the proposed design, maintenance, and construction plan as complying with the applicable laws. The conditions of certification proposed below, are intended to ensure implementation of the necessary mitigation measures.

Staff reviewed the **Socioeconomics Figure 1**, which shows the area's environmental justice population (see the **Socioeconomics** and **Executive Summary** sections of this PSA for further discussion of environmental justice) as not greater than fifty percent within a six-mile buffer of the proposed Rio Mesa SEGF meaning that there would not be a disproportionate **Transmission Line Safety and Nuisance** impact resulting from construction and operation of the proposed project on an environmental justice population.

PROPOSED CONDITIONS OF CERTIFICATION

TLSN-1 The project owner shall construct the proposed 220-kV transmission line according to the requirements of California Public Utility Commission's GO-95, GO-52, GO-131-D, Title 8, and Group 2, High Voltage Electrical Safety Orders, sections 2700 through 2974 of the California Code of Regulations, GO-128 (in the case of the underground segment), and SCE's EMF-reduction guidelines.

Verification: At least 30 days before starting construction of the line and related facilities, the project owner shall submit to the Compliance Project Manager (CPM) a letter signed by a California registered electrical engineer affirming that the line 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 line's electric and magnetic fields at the points of maximum intensity along its route. 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 not later than six months after the start of operations.

Verification: The project owner shall file copies of the post-energization measurements with the CPM within 60 days after completion of the measurements.

TLSN-3 The project owner shall ensure that all permanent metallic objects within the line's right-of-way are grounded according to industry standards.

Verification: At least 30 days before the line is energized, the project owner shall transmit to the CPM a letter confirming compliance with this condition.

REFERENCES

BS 2011a-BrightSource Energy/J. Woolard (tn 62584). Application for Certification Volumes 1&2 for the Rio Mesa Solar Electric generating Facility: Submitted to the California Energy Commission on October 14, 2011.

BS 2012v- Bright Source/T. Stewart (tn 66292). Applicant's Environmental Enhancement Proposal dated July 23, 2012. Submitted to CEC Dockets Unit on July 23, 2012.

(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.

SCE 2004 (Sothern California Edison). EMF Design Guidelines for Electrical Facilities. EMF Research & Education, Irwindale, California. September.

VISUAL RESOURCES

William Kanemoto and Gregg Irvin Ph.D.

SUMMARY OF CONCLUSIONS

Energy Commission staff have analyzed visual resource-related information pertaining to the Rio Mesa Solar Electric Generating Facility (Rio Mesa SEGF), and concluded that the proposed project would cause substantial adverse visual impacts according to the California Environmental Quality Act (CEQA) Guidelines. Staff concludes that the proposed project, after implementing all staff-recommended conditions of certification, would still have significant and unavoidable adverse direct visual impacts. Examples of these significant visual effects are provided by analysis of several Key Observation Points.

The project in combination with existing and foreseeable future projects within the immediate project viewshed could contribute to significant unavoidable cumulative visual impacts. Project impacts, in combination with existing and foreseeable future solar and other development projects within the I-10 corridor in Riverside County, could contribute to a perceived sense of cumulative industrialization of the open, undeveloped desert landscape of the eastern Chuckwalla Valley and Palo Verde Mesa, and impact views of scenic resources as experienced by I-10 motorists, local residents, and recreational visitors within the Rio Mesa SEGF viewshed. Within the southern California desert as a region, anticipated cumulative operational impacts of past and foreseeable future region-wide projects are considered cumulatively considerable, potentially significant and unmitigable considering the substantial decline in the overall number and extent of scenically intact, undisturbed desert landscapes, and a substantially more urbanized, industrial character in the overall southern California desert landscape.

Finally, the project would not be consistent with several applicable policies of the Riverside County General Plan.

If the Energy Commission approves the project, staff recommends that all of staff's proposed conditions of certification be adopted in order to minimize impacts to the greatest extent feasible.

INTRODUCTION

Visual resources consist of the viewable natural and built features of the environment. In this section staff evaluates the impacts on visual resources resulting from the construction and operation of the Rio Mesa SEGF. Staff bases its evaluation on criteria of the California Environmental Quality Act (CEQA) Guidelines, Aesthetics, to determine if the project would:

1. Comprise a significant impact under CEQA.

2. Comply with applicable federal, state, and local laws, ordinances, regulations, and standards (LORS) pertaining to aesthetics and preservation and protection of sensitive visual resources.

To provide a consistent framework for this analysis, a standard visual assessment methodology developed by the California Energy Commission staff and applied to numerous siting cases in the past was employed in this study. A description of this methodology is provided in **Appendix VR-1,** as well as in the discussion below.

EXISTING PROJECT VISUAL SETTING

REGIONAL SETTING

The project is located within the Colorado Desert, a sub-region of the Sonoran Desert, at the boundary of an ecological transition zone between the Mojave Desert to the north, and the Colorado Desert to the south. The Colorado Desert is a distinct bioregion distinguished from the Mojave to the north by elevation and characteristic vegetation types. It is situated primarily below 1,000 feet above mean sea level (amsl) in contrast to the high desert of the Mojave to the north.

The Colorado Desert is typified by creosote and bursage scrub vegetation, often mixed with yucca and cholla cactus, sandy soil grasslands and, especially farther to the south, ocotillo cactus, ironwood, and palo verde trees. Like other parts of the basin and range physiographic province of which it is a part, the area is characterized by periodic low, steep, barren mountain ranges with jagged peaks and sloping alluvial fans or bajadas at their feet, alternating with arid, level, sparsely vegetated open valleys in between offering expansive, panoramic views. Dark browns and garnets are the dominant mountain hues, although blues and purples prevail as viewing distance increases. In contrast, lighter brown and tan soils dominate the desert floor, sparsely dotted with the grey-green of low-growing creosote bush and golden bursage scrub vegetation.

PROJECT SITE AND VICINITY

Locally, the project site is situated within the Palo Verde Mesa, a broad, level, arid, largely undeveloped valley bounded to the west by the Mule Mountains; to the north by the McCoy and Big Maria Mountains; to the south by the Palo Verde Mountains; and to the east by the Palo Verde Valley, an adjoining low-lying, level area distinguished not by topography but by its extensive agricultural lands irrigated by the Colorado River to the east. **Visual Resources Figure 1** – **Project Visual Setting**, depicts the broad existing setting of the proposed Rio Mesa SEGF project as described below.

As depicted in the figure, the project site is located on approximately 3,805 acres (approximately 6 square miles) of leased lands in Riverside County, adjoining the border of Imperial County at the project's southern boundary. Except for the proposed project site and scattered in-holdings, the Palo Verde Mesa consists of U. S. Bureau of

Land Management (BLM) lands within the Palm Springs and El Centro Field Offices of the California Desert District. The project site is thus bounded on three sides (north, west, and south) by BLM lands, designated Multiple-Use Class (MUC) Limited under the California Desert Conservation Area (CDCA) Plan. Approximately one mile north of the site, the proposed project transmission gen-tie line would traverse CDCA MUC Moderate lands to its terminus at the proposed Colorado River Substation roughly 1.5 miles south of Interstate 10 (I-10), 7 miles northwest of the project site. The BLM lands in the study area have recently been assigned Visual Resource Inventory (VRI) classes, reflecting BLM's assessment of their scenic quality and visual sensitivity (BLM, 2010a; 2010b). Visual Resource Management (VRM) Classes, which determine BLM's visual management objectives for these lands, have not yet been assigned in this area.

Visual Resources Figure 2 – **Project Site**, depicts a panoramic view of the site as seen from the Bradshaw Trail at the Western Area Power Administration (WAPA) right-of-way, looking into the southwest quadrant of the view. Within the project site and vicinity, the generally level terrain of Palo Verde Mesa is punctuated with intermittent low, rolling topography of seasonal washes. Very sparse Colorado Desert creosote scrub cover predominates, interspersed with barren areas of desert pavement. Taller ironwood and palo verde trees, both noted for their colorful seasonal blooms, occur intermittently within the mesa, concentrated mainly in washes. The low, rugged, dark-colored slopes of the Mule Mountains (high point, el. 1800 feet) rise immediately west of the project site (roughly el. 325 to 500 feet). Lighter-colored scarring of the abandoned Hodge Mine, a recreational destination on the mountains' east-facing slope, is readily visible from nearby portions of the Palo Verde Valley and from Bradshaw Trail. Relatively small-scale wood transmission poles of the WAPA transmission right-of-way run north-south near the eastern project boundary. The Palo Verde Mountains rise less than three miles to the south of the site (Palo Verde Peak, el. 1794 feet).

I-10 bisects the mesa from east to west approximately 8-1/2 miles north of the project boundary, then enters the Palo Verde Valley a short distance east of the Blythe Airport. The Blythe Airport and nearby residential community of Mesa Verde adjoin the highway within the mesa.

Approximately 0.6 mile to the east of the project site, the Palo Verde Mesa adjoins the Palo Verde Valley, comprising flat, low-lying irrigated private lands of Riverside and Imperial counties west of the Colorado River. Low-growing green fields, primarily cotton and hay, characterize the landscape of the valley, which is otherwise defined by the low ridges of mountain ranges at the horizon in each direction. The town of Blythe (2010 pop. 20,817) and other smaller settlements, including the towns of Palo Verde (pop. 171) and Ripley (pop. 692), are located within the Palo Verde Valley (BS 2011a, p. 5.10-13). These irrigated agricultural lands terminate abruptly roughly 0.6 mile east of the Rio Mesa SEGF site's easternmost boundary, where the irrigated lands are bounded by an existing canal and the slight topographic rise of the edge of the mesa.

To the southwest of the project site in Imperial County, the Palo Verde Valley transitions into the Cibola Valley and Cibola National Wildlife Refuge (Ciboloa NWR), comprising the floodplain of the Colorado River in that reach of the river, roughly 6 miles southwest of the project site. While both represent reaches of the Colorado floodplain, visual character and quality differ substantially because the Cibola NWR remains in a natural state in contrast to the cultivated Palo Verde Valley. **Visual Resources Figures 3a through 3d – Project Vicinity Character Photos**, depict photographs of the visual setting within the project viewshed.

As described previously, the project site is surrounded on three sides by BLM lands. Land uses within these BLM lands with potential visual sensitivity are numerous and include the Palo Verde Mountains Wilderness Area (WA), located under 4 miles to the south and southwest of the project site; the Mule Mountains Long-Term Visitor Area (LTVA) and associated open off-highway vehicle (OHV) trails and campgrounds, located to the west of the Mule Mountains; the Mule Mountains Area of Critical of Environmental Concern (ACEC), located northwest of the project; and the Bradshaw Trail, a BLM-designated Back-Country Byway, which adjoins portions of the project site's northern boundary. All of these are administered by the BLM. Hodge, Roosevelt, and Opal Hill Mines, Clapp Spring Palm Oasis (located within the Palo Verde Mountains WA), and the Mule Mount ACEC are nearby points of interest and OHV or hiking destinations within the project viewshed on BLM lands.

PROJECT VIEWSHED

A project's viewshed is the overall area within which it could be visible, i.e., its sphere of influence or area of potential effect. A characteristic feature of this desert landscape is the potential for prominent structures to be visible over great distances, due to the large open areas of level topography and the absence of intervening landscape features to block views. As discussed in greater detail in the analysis of impacts, below, glare from the project solar receivers atop the two towers is expected to be the project's most wide-ranging visual effect, acting as a source of nuisance glare to background distances of up to 17 miles, and as a source of significant glare impact within a radius of 8.5 miles. Prominent glare effects are thus likely to extend for a far greater distance than visual effects from the sight of the towers, transmission towers, or other structures alone. **Visual Resources Figure 4 - Solar Receiver Tower Viewshed,** thus depicts the area in which illumination from the solar receivers would be visible, projected to a distance of approximately 20 miles. Within that, a radius of 8.5 miles from the solar receivers has been delineated.

As indicated in the viewshed mapping, the project would affect both private lands within the Palo Verde Valley, and public lands within the Palo Verde Mesa, Mule Mountains, and Palo Verde Mountains WA. Although the reach of the viewshed is limited by the Mule Mountains to the west, the viewshed includes portions of the Palo Verde Mountains WA, the Bradshaw Trail, Mule Mountains LTVA, and other visitor destinations on BLM lands with potentially sensitive recreational viewers, as well as most of the Cibola NWR.

PROJECT VISUAL DESCRIPTION

POWER PLANT

The following description is taken from the AFC project description and applicant data responses. **Visual Resources Figure 5** depicts the proposed project layout. **Visual Resources Figure 6** depicts architectural elevations of the proposed power blocks. **Visual Resources Figure 7** depicts the proposed solar collector mirror units. **Visual Resources Figure 8** depicts the proposed generation tie line poles.

The proposed project would include an overall project footprint of approximately 2.9 square miles (1,850 acres), plus an approximately 9.9-mile-long single-circuit 230-kV generator tie-line. The project would consist of two solar concentrating power plants and shared common area.

Each power plant would include approximately 85,000 individual heliostats arranged in a circular pattern. As depicted in **Visual Resources Figure 7,** each heliostat would be an independent unit mounted on a single pylon, shown as approximately 17 feet wide and 13 feet maximum height from the ground, on 7-foot-tall pylons. A concrete solar receiver tower consisting of a 750-foot-tall concrete tower, approximately 145-foot-tall cylindrical solar receiver, and 10-foot lightning rod (overall height of 760 feet) would be located within each of the two mirror fields. Finishes are not specified.

Various other structures include a steam generation building, pump support and maintenance area, water treatment system including evaporation ponds, an on-site switchyard, and an air-cooled condenser, as depicted in **Visual Resources Figure 6**. Of these, the air cooled condenser is the largest structure after the solar towers, with a height of 120 feet. Finishes and colors are not specified.

TRANSMISSION LINES

A 9.9-mile interconnecting 220 kV gen-tie line would connect the Rio Mesa SEGF generating facility to the power grid at a new SCE Colorado River Substation (CRS) located 9.7 miles northwest of the project site and approximately 1.5 miles south of I-10. The line would run from the project switchyard, located in the common area in the northeastern portion of the site, to parallel an existing Western Area Power Administration (WAPA) 161 kV transmission corridor running roughly north-south along the project’s eastern boundary, then northward for roughly 4.5 miles to the east-west SCE Palo Verde-Devers 500 kV transmission corridor. The gen-tie line would then turn north-westward to parallel the SCE line for approximately 5 miles to the CRS. The proposed gen-tie route is located within BLM lands designated MUC M under the CDCA Plan.

NATURAL GAS PIPELINE

The natural gas pipeline would be underground and not visible on the project site or vicinity. The gas supply would connect to the TransCanada Gas Transmission North Baja pipeline, which runs adjacent to the eastern edge of the proposed solar fields, paralleling the WAPA electrical transmission corridor. A 150 ft x 150 ft gas metering station with lighting and communication equipment would be required at the pipeline.

WATER SUPPLY AND DISCHARGE

Water for human consumption and facility use would be pumped from several onsite wells within the common area and stored in four water tanks: to store a two-day reserve of process water, a mirror wash tank in the power block area, a service/firewater storage tank in the power block area, and a firewater storage tank in the common area. Sizes of the tanks have not been specified. In addition, the wastewater treatment system would include two evaporation ponds and a wastewater treatment tank located in the common area,

CONSTRUCTION LAYDOWN AND STAGING AREA

Construction laydown and parking would take place in and around the common area. A 103-acre laydown area is depicted in project layout plans immediately outside of the main project boundary to the east, approximately 1.4 miles west of the terminus of 32nd Avenue. Construction access is proposed via an improved Bradshaw Trail extension of 30th Avenue, and from a secondary access road located immediately north of and parallel to 34th Avenue.

PLANT NIGHT LIGHTING

Night lighting would be required at the power blocks and common area. Paved plant access roads would have ground-based lighting (URS 2012b, Data Response 148). Otherwise, perimeter fences, roadways, and solar fields would not be lit. Mirror-washing operations would use portable, vehicle-mounted lights. The project owner will develop a detailed temporary construction lighting plan to be submitted prior to start of construction.

The project would employ a dual medium-intensity lighting system per Federal Aviation Administration (FAA) Advisory Circular AC 70/7460-1K, Obstruction Marking and Lighting. This dual lighting system includes red lights for nighttime and medium-intensity flashing white lights for daytime and twilight use. Four sets of lights would be installed at both 250’ and 500’, and one set would be installed at the height of the lightning antenna (760’). The lights at the 250’ and 500’ levels would be installed at opposite sides of the towers, such that at least two sets would be visible at any given time. Lights on both towers would be synchronized.

Due to the height of the towers, the FAA may require either high-intensity flashing white lights or non-luminous marking in addition to medium-intensity flashing white lights. In such a case, the project owner would propose increasing the lighting system to high-intensity flashing lights, rather than adding non-luminous marking, which could potentially result in significant adverse impacts to visual resources. However, as discussed under Impacts, D. Light and Glare, high-intensity lights, if required, would be used at daytime and twilight. During daytime operation, both FAA lighting and non-luminous marking would tend to be visually obscured by the much greater brightness of SRSG glare.

INTERCONNECTION SUBSTATION

The project gen-tie line would connect to a new 77-acre SCE Colorado River interconnection substation on the SCE Devers-Palo Verde transmission corridor, approximately 1.5 miles south of Highway I-10 and 9.7 miles northwest of the project site.

LAWS, ORDINANCES REGULATIONS, AND STANDARDS

Staff also evaluates the project to determine compliance with federal, state and local laws, ordinances, regulations and standards (LORS). **Visual Resources Table 2** lists relevant LORS pertaining to aesthetics or the preservation and protection of sensitive visual resources, and presents a discussion of project conformance with them. **Visual Resources Table 2** may be found at the end of the section, following the discussion of project impacts and mitigation under CEQA, under Compliance with Applicable LORS.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section includes information about the following:

1. Method and threshold for determining significance
2. Direct/indirect/induced impacts and mitigation
3. Cumulative impacts and mitigation

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

To determine whether there is a potentially significant visual resources impact generated by a project, Energy Commission staff reviews the project using the 2011 CEQA Guidelines, Appendix G Environmental Checklist, pertaining to “Aesthetics.” The checklist questions include the following:

A. Would the project have a substantial adverse effect on a scenic vista?

B. Would the project substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?

C. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

D. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Staff evaluates both the existing visible physical environmental setting, and theanticipated visual change introduced by the proposed project to the view, from representative, fixed vantage points known as “Key Observation Points” (KOPs). KOPs are selected to be representative of the most characteristic and critical viewing groups and locations from which the project would be seen. The likelihood of a visual impact exceeding Criterion C of the CEQA Guidelines, above, is determined in this analysis by two fundamental factors: the susceptibility of the setting to impact as a result of its existing characteristics (reflected in its current level of visual quality, the potential visibility of the project, and the sensitivity to scenic values of its viewers); and the degree of visual change anticipated as a result of the project. These two factors are summarized respectively as *visual sensitivity* (of the setting), and *visual change* (due to the project). Briefly, KOPs with high visual sensitivity, that experience high levels of visual change from a project, are more likely to experience significant adverse impacts. KOPs with low sensitivity or low levels of visual change are less likely to experience adverse impacts. **Visual Resources Appendix VR-1** provides information about the process used to evaluate each KOP. Staff’s analysis of the project’s effect on each KOP is presented under the Operation Impacts and Mitigation section of this analysis.

The BLM will prepare the federal environmental review under the National Environmental Policy Act (NEPA) of Rio Mesa SEGF project impacts to lands under its jurisdiction in a separate document. For purposes of this CEQA assessment, BLM VRI mapping is provided for informational and contextual purposes, particularly because many of the potentially significant impacts of the project would affect key view locations on BLM lands. This analysis, however, analyzes those impacts using staff’s customary visual assessment methodology and discusses their significance in the context of CEQA. Additional discussion is also provided briefly to describe how these impacts relate to the BLM’s assigned VRI Classes and Visual Resource Management (VRM) assessment method. However, those discussions are not intended to present conclusions under NEPA or the BLM VRM method. The inventory classes depicted fall into one of four categories:

- Class I: This category applies only to special-designation areas, including Wilderness Areas. The visual management objective of this class is to preserve the existing character of the landscape and the level of change allowed within boundaries of the Class I area should be very low. Class I is not determined by visual inventory but by management designation.

- Class II: This class is the highest visual inventory category, and implies a relatively high level of scenic quality and viewer sensitivity. If adopted as a management class, the management objective (i.e., allowable level of visual change) is to retain the existing character of the landscape and level of change to the landscape must be low;
- Class III: This class represents a moderate scenic quality and viewer sensitivity level. If adopted as a management class, the management objective is to partially retain the existing character of the landscape and the level of change can be moderate;
- Class IV: This class represents a low scenic quality and viewer sensitivity level. If adopted as a management class, the management objective allows activities that require major modification of the landscape and the degree of change can be high.

Visual Resources Figure 9, Key Observation Points (KOPs), shows the locations of the 6 KOPs provided by the applicant in the AFC. In addition, supplemental KOPs have been added by staff to provide additional context and analysis in each of the key setting areas. The supplemental KOPs do not include simulations. However, viewing conditions from each of these supplemental KOPs are essentially similar to the related AFC simulations, and therefore impacts are easily understood by reference to the related AFC simulations. That is, visual magnitude and prominence of the project from each supplemental KOP may be readily inferred from the AFC KOP simulations, taken from similar distances and locations.

KOPs are organized below by landscape units, the broad contiguous areas sharing common visual and viewer characteristics which together make up the project landscape setting. BLM VRI mapping in the project vicinity is also depicted for informational purposes.

AFC KOP numbering has been retained to facilitate reference to the AFC, but the order of presentation has been changed to follow the structure of this analysis. Visual Resources Table 1 provides a summary of visual sensitivity, visual change, and impact significance for each KOP.

Palo Verde Valley

Sensitive viewers in the Palo Verde Valley include residents in and around the towns of Palo Verde and Ripley; and motorists on State Route (SR) 78.

- AFC KOP 1 – View from nearest residence to project (Town of Palo Verde)

- Staff KOP 1B – View from Palo Verde residences

- AFC KOP 4 – View from 34th Avenue/SR 78

- Staff KOP 7A – View from SR 78 at Ripley

- Staff KOP 7B – View from Marlowe Park, Ripley

I-10 Corridor

The I-10 corridor crosses both the Palo Verde Mesa and Valley, but KOPs are grouped together here due to the high concentration of viewers and common viewing conditions. Sensitive viewers in the I-10 corridor include motorists on the highway; residents of the community of Mesa Verde, just south of the Blythe Airport; and portions of the Blythe Airport.

- AFC KOP 3 – View from I-10 Looking south (9.9 miles)

- Staff KOP 3B – View from Mesa Verde residences

- AFC KOP 6 – View from I-10 at SR 78

BLM Lands (Palo Verde Mesa, Mule Mountains)

Sensitive viewers within BLM lands include recreationists of various types including motorists on the Bradshaw Trail, visitors to the Mule Mountains LTVA and Palo Verde Mountains WA, hikers and OHV drivers on the area's open trails.

- AFC KOP 2 – View from Bradshaw Trail within Palo Verde Valley (30th Avenue)

- Staff KOP 2B – View from Bradshaw Trail at WAPA right-of-Way

- Staff KOP 8 – Simulated view from Roosevelt Mine

Cibola NWR/Colorado River

Recreational use of the NWR is high. Cibola NWR estimates typical average visitation to be approximately 45,000/year, virtually all of whom are attracted at least in part by the outstanding scenic qualities of the river and refuge. Visual sensitivity of the NER is thus considered to be high.

- AFC KOP 5 – View from Cibola NWR

- Staff KOP 5B – View from campsite, Cibola NWR

DIRECT/INDIRECT IMPACTS AND MITIGATION

Information about direct and indirect impacts and proposed mitigation is included in this section and grouped according to the questions found in the CEQA Environmental Checklist, A through D below.

A. SCENIC VISTAS

"Would the project have a substantial adverse effect on a scenic vista?"

For the purposes of this analysis, a *scenic vista* is defined as a designated scenic vista (identified in public planning documents); a view of high scenic quality perceived through and along a corridor or opening; or from a designated scenic area. Staff has conducted site visits to the project area and researched national, state and local scenic vista designations in the vicinity of the project area.

Yes. The project would adjoin the easternmost portions of the Bradshaw Trail, a BLM-designated Back-Country Byway. Back-Country Byways are a part of the National Scenic Byways program, a nationwide federal program for recognition of roads with outstanding scenic, cultural and historic significance. As such, the entire Bradshaw Trail is considered here as a scenic vista. The extreme brightness of glare from the project's two solar receivers would be seen from the Bradshaw Trail at distances of as little as 1.7 miles. At this distance, staff has determined that the receivers would appear to viewers as very bright and prominent. While not physically dangerous, this level of brightness would strongly impair the recreational use of the portion of the trail within the solar receivers' viewshed, making viewing in the direction of the towers to the south highly uncomfortable.

Views within the Mule Mountains LTVA east of the mountains would also be adversely affected. According to GIS viewshed projections conducted by staff, a 5-mile section of Wiley's Well Road beginning just south of Wiley's Well Campground and including the Coon Hollow Campground, could be exposed to receiver glare at distances of roughly 5 to 6 miles, well within the radius of very bright, significant glare impacts identified by staff (please refer to **Visual Resources Figure 4, Solar Receiver Viewshed)**. Glare impacts are discussed further under CEQA Criterion D., Light and Glare, and in the **Traffic and Transportation section, Appendix TT1 – Glint and Glare Safety Impact Assessment**.

Nearly the entirety of the Palo Verde Mountains WA would be exposed to solar receiver glare at distances of between 4 to 10 miles. Those areas within roughly 8.5 miles of the solar receivers would be considered to experience significant glare impacts during normal daytime project operation, as discussed under Criterion D below. While not the sole criterion for designation of wilderness areas, preservation of scenic values is a key concern underlying the Wilderness Act (P.L.88-577 (16 U.S. C. 1131-1136)). Views within the WA would experience substantial adverse glare effects.

B. SCENIC RESOURCES

"Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway corridor?"

For the purpose of this analysis, *scenic resources* include a unique water feature (waterfall, transitional water, part of a stream or river, estuary); a unique physical geological terrain feature (rock masses, outcroppings, layers or spires); a tree having a unique/historical importance to a community (a tree linked to a famous event or person, an ancient, old growth tree); historic building; or other scenically important physical features, particularly if located within a designated federal scenic byway or state scenic corridor. Staff has conducted site visits to the project area and researched national, state and local scenic resource designations in the vicinity of the project area.

Yes. Although the project would not physically impinge on the Bradshaw Trail or any noteworthy scenic features, it would completely dominate the trail's scenic corridor, i.e., the landscape visible from the trail, within the segment that falls within the solar receivers' area of visibility. The landscape of the Palo Verde Mesa south of the trail, including views of the Palo Verde Mountains and portions of the Mule Mountains, would be rendered substantially largely unviewable due to the intensity of solar receiver glare seen at distances of as little as 1.7 miles.

C. VISUAL CHARACTER OR QUALITY

"Would the project substantially degrade the existing visual character or quality of the site and its surroundings?"

As discussed above, Criterion C is typically determined by staff's visual sensitivity/visual change assessment methodology, applied through analysis of representative KOPs throughout the project viewshed. However, due to the unusual character of the proposed project, visual impact conclusions under Criterion C revolve primarily around predicted effects of glare from the solar receivers, whose effects would be much stronger and extend much farther than those from visual change and contrast from project structures themselves. The reader should thus refer also to the discussion of Criterion D., Light and Glare, and to the detailed analysis in **Traffic and Transportation section, Appendix TT1 – Glint and Glare Safety Impact Assessment.**

Yes. The project would substantially degrade the visual character and quality of the site and its surroundings as seen from several KOPs, as described below.

The visual aspects evaluated according to Criterion C. are organized into two categories: 1) construction impacts and 2) operational impacts.

Construction Impacts and Mitigation

Per the AFC, construction would take place over 36 months. Construction laydown and parking would take place in and around the project common area. A 103-acre laydown area is depicted in project layout plans immediately outside of the main project boundary to the east, approximately 1.4 miles west of the terminus of 32nd Avenue. Because they are slightly higher than viewpoints within the Palo Verde Valley, and partly screened by the eastern edge of the Palo Verde Mesa, the ground surface of the laydown area and project site would be screened to viewers in the valley. As such, substantial impacts would not be anticipated to residents, motorists and other viewers within the Palo Verde Valley. Views of site grading and laydown would be more visible from nearest portions of the Bradshaw Trail, but would be foreshortened and visually subordinate due to distance and the very level terrain.

Visual impacts of site grading would be more evident from higher elevation viewpoints, such as the Roosevelt Mine, higher elevation portions of the Bradshaw Trail, and higher viewpoints within the Palo Verde Mountains. Grading impacts would be similar in extent to the completed project itself, and somewhat less in terms of degree of visual contrast and change, and would be replaced by impacts of the heliostats and power plant themselves, analyzed previously. In effect site grading would represent the onset of project impacts at a slightly earlier date, and would immediately be superseded by the more severe project impacts themselves. Consequently, site grading impacts are considered here as a part of the project impacts, discussed in the following section.

Construction access is proposed via an improved Bradshaw Trail extension from 30th Avenue, and from a secondary access road located immediately north and parallel of 34th Avenue. However, the laydown site would be located almost a mile south of the Bradshaw Trail. At that distance, material and equipment storage would appear inconspicuous. Grading in portions of the project site nearest the trail (roughly 50 feet at the nearest point) would present a visual disturbance, affecting roughly 1-1/2 miles of the trail nearest the site. Truck traffic accessing the site during construction could represent a visual disturbance to residents along the route, primarily in the town of Ripley. However, truck traffic as such is not considered a highly unusual or disturbing visual feature and, because it would be temporary, is considered less than significant.

Nighttime construction and security lighting would have the potential to produce glare or off-site light trespass. However, because there are no sensitive receptors in the immediate vicinity of the site or laydown area, substantial impacts from lighting are not anticipated. Such temporary lighting would have the potential to affect the area’s exceptionally dark skies, which could be disturbing to some residents of the area, as well as campers in the Mule Mountains LTVA. However, because campsites of the LTVA are located between 4 and 5 miles away, these effects would be limited in degree and less than significant. Such night light pollution effects would be limited further with recommended Condition of Certification **VIS-4**, Construction Lighting. As the power towers are constructed, aviation safety lighting would need to be operational as the towers reach each successive level of lighting required by the FAA. In addition, cranes used in the project construction would also require aviation safety lighting. Such lighting would impinge on the area’s dark skies, and be perceived as disturbing by both residents and campers. However, because the nearest residents would view this effect at a distance of over three miles, and campers in the LTVA at a distance of nearly 6 miles, this impact would be somewhat mitigated by distance and is considered less than significant.

Overall, staff concludes that the project's proposed construction activities as described above would not substantially degrade the existing visual character or quality of the site and its surroundings as experienced by key sensitive viewer groups. Some construction-related impacts, such as grading, tower construction, and FAA lighting, can be considered as the onset of long-term project impacts at a slightly earlier date, since they would not cease with construction, but continue during operation. Such impacts are treated under Operational Impacts, below.

Operational Impacts and Mitigation

As discussed previously, six KOPs were identified in the AFC and are analyzed in this section. These are supplemented by several additional staff KOPs. The KOPs are organized in the following discussion by broad landscape setting units. These areas represent the large sub-areas of the setting with common scenic and viewer characteristics, as described above in the Project Visual Setting. These areas are: the Palo Verde Valley; the Palo Verde Mesa and Mule Mountains; the I-10 Corridor; and the Cibola National Wildlife Refuge/Colorado River.

Palo Verde Valley KOPs

- AFC KOP 1 (Visual Resources Figure 10a, 10b) View from nearest residence to project, looking northwest

- Staff KOP 1B (Visual Resources Figure 11) View from residences, town of Palo Verde, looking northwest

- AFC KOP 4 (Visual Resources Figures 12a, 12b, 12c, 12d, 12e, 12f) - View from 34th Avenue/SR 78 looking west

AFC KOP 1 is taken from the nearest residence to the project site, and is also representative of the most vulnerable viewing group within the Palo Verde Valley, the residents of the adjacent town of Palo Verde (pop. 171) in Imperial County. KOP 1 is located approximately 1.6 miles from the project boundary, and 2.6 miles from the nearest solar tower.

Staff KOP 1B provides additional perspective on the typical view and exposure of residents in the town of Palo Verde. KOP 1B is taken from Alley Way on the western edge of the town, facing the site at a distance of 2 miles to the project boundary, and 3 miles to the nearest solar tower.

AFC KOP 4 is taken approximately 2.3 miles north of KOP 1. It most closely resembles KOP 1B in terms of position and distance to the project. Like KOP 1B, KOP 4 is roughly 2 miles to the project boundary, and 3 miles to the nearest solar tower.

The discussion that follows addresses the viewing conditions in this southwest portion of the Palo Verde Valley, and applies to KOPs 1, 1B, and 4.

Visual Sensitivity

As depicted in the existing conditions photograph from AFC KOP 1, the Mule Mountains and ground plane of the Palo Verde Mesa are partly obscured from this viewpoint by a low rise in the terrain roughly a half mile to the west, just beyond the canal (Hodge Drain) that marks the limit of the irrigated Palo Verde Valley. This abrupt rise, scarcely 50 feet above the adjoining valley topography in most areas, marks the facing edge of the Palo Verde Mesa, which then rises gradually in a level plain westward to the foot of the Mule Mountains. This blocking effect of the mesa edge decreases with distance, so that from SR 78, at a distance of 1 mile or less from the mesa, the Mule Mountains are readily visible at the horizon to the west. In this respect, AFC KOP 1 is somewhat atypical, in that the masking effect of the mesa's edge applies mainly within roughly ½-mile of the mesa. Staff KOP 1B, and AFC KOP 4, both located approximately 1 mile from the mesa edge, are more typical of views from SR 78 and the vicinity of Palo Verde.

Visual Quality: Visual quality of these typical views from the westernmost portions of the Palo Verde Valley are moderate. From AFC KOP 1 the slightly elevated edge of the mesa blocks a portion of the view to the Mule Mountains, but this effect is less pronounced from the town and SR 78, as suggested in KOPs 1B and 4. While distinctive and visually intact, the Mule and Palo Verde Mountains are low, relatively subtle features of the landscape, lacking dramatic scale, height or extent from within the valley. They contribute to defining the local landscape and add variety and interest but lack truly vivid scale. The intervening visual foreground consists of level, irrigated agricultural fields, which are somewhat distinctive and vivid by their color and texture, but are unremarkable, man-made, and commonplace.

Viewer Concern: Viewer concern in this area is considered moderately high. The principal viewer group consists of residents, who are generally considered to have high viewer concern, though this is moderated by the small number with direct views toward the project site. In addition, a substantial number of viewers in the vicinity of the town include visitors to the Cibola NWR, located a short distance to the south on SR 78. Such recreationists would have a high level of concern for scenic quality.

Viewer Exposure: Viewer numbers are considered moderate due to the limited number of residences (estimated 20 – 30) in the town of Palo Verde (pop. 171) and vicinity with direct views of the project site. Views to the site from most residences in the town are obscured by intervening structures or landscaping. Similarly, traffic levels are in a range (ADT 2,250) customarily considered by staff to represent moderate viewer exposure (Google Earth, 2004 data). However, residents with views would experience these on a permanent basis.

Visibility of the project site from AFC KOP 1 is partly screened by the mesa edge described above. Because of this rise in topography, the heliostat fields and other project features of lower height would not generally be visible from KOP 1. However, the mesa edge would have less screening effect from Staff KOP 1B, KOP 4, and other viewpoints in and around Palo Verde and SR 78. In addition, the mesa would have no screening effect on the 750-foot-tall solar towers. In relation to the towers, project visibility would be high. This fact would be heightened further by the proximity of viewers in Palo Verde and the western portion of the valley to the towers. In this area, typical distance to the towers is roughly 3 miles, well within the zone of severe glare effects, as discussed in detail under Criterion D, below. Because the solar towers are the features of foremost concern in this case, viewer exposure is considered moderately high.

Overall visual sensitivity in this portion of the viewshed is thus considered to be moderately high.

Visual Change

Visual Resources Figures 10a and **10b** depict a simulation of the proposed Rio Mesa SEGF project from AFC KOP 1, at a distance of approximately 1.6 miles from the site boundary looking northwest. As depicted in the simulation, from KOP 1 the heliostat field and all project features other than the solar towers would be largely screened by the intervening terrain of the Palo Verde Mesa edge. However, as suggested in **Visual Resources Figures 12a** through **12f,** (AFC KOP 4), from most viewpoints in and around SR 78 in this area of the valley, the lower project features, including heliostats, transmission towers and lines, power blocks and air-cooled condenser, etc., would also be partly visible. View conditions from Staff KOP 1B **(Visual Resources Figure 11)** would be essentially similar to KOP 4.

Staff Note on Visual Simulations

Through field reconnaissance and analysis of photographs taken by staff at the locations of simulation photographs presented in the AFC, staff concluded that the large-scale, single-frame simulations in the AFC represent somewhat magnified, telephoto views. As a result, the visual impression of project scale and dominance in the simulations may be somewhat greater than what would be experienced in reality. Staff's estimation of project contrast and dominance of the project in this analysis is thus based on the simulations in light of observations in the field and comparisons to other field photography taken by staff.

Visual Contrast: As depicted in the simulation of AFC KOP 1 (**Visual Resources Figure 10b)**, form contrast of the towers alone would be strong at this distance, as their vertical form would contrast strongly with the predominant horizontal lines of the existing landscape, and break the ridgeline of the Mule Mountains in the background. The 750-foot-tall towers would still appear massive at this distance (under 3 miles). For purposes of comparison, the solar towers would be the third-tallest structures in San Francisco, with a luminous receiver area of approximately 12 stories in height. As described above, from the vicinity of SR 78, lower project features such as the air-cooling unit, transmission towers, and even portions of the heliostat field would also be visible, adding a further industrial character to views. Views from Staff KOP 1B would be essentially similar to AFC KOP 4. In these KOPs and the majority of KOPs analyzed in this study, the solar towers would be seen predominantly against the backdrop of the sky. Even in cases where the towers would be seen penetrating the ridgeline of the Mule Mountains, a large portion of the towers would be seen against the sky. For that reason, the light, untreated color of the concrete solar towers would tend to reduce contrast against the light backdrop of the sky, so long as they have a sufficiently rough surface as to avoid reflective glare. In general, a light, non-reflective color would therefore be preferable to a darker color from most key sensitive viewpoints.

However, as discussed in detail farther below, form and color contrast of the towers would be rendered almost irrelevant due to the extreme brightness of the solar receivers, which at this distance would be so bright that viewers would avoid looking directly at the towers. As discussed below under Criterion D, Light and Glare, at this distance (approximately 2.7 miles from the nearest tower) the receivers would appear roughly as large in magnitude within the viewer’s field of vision (subtended visual angle) as the sun, and would be so bright that viewers would avert their gaze. At this distance the visual effect could thus be subjectively similar to two additional suns in the sky. Although the level of brightness would not cause physical harm to viewers’ vision, it would cause substantial discomfort, would cause viewers to avert their gaze, and would cause disruption of the experience of the landscape. The level of project contrast due to glare would thus be very high.

Visual Dominance: At this distance the solar receiver towers would exert strong scale dominance, as the only comparable vertical element within the immediate field of view in a setting characterized by flat, horizontal topography. The brightness of the solar receivers, however, would be the dominating visual element of the landscape, exerting strong dominance and strongly attracting attention. They could not be ignored, and would cause discomfort in views toward the project (northwest quadrant of the view). Visual dominance would thus also be high.

View Blockage: Glare from the solar receivers would make views in the direction of the Mule Mountains distinctly uncomfortable. In effect, the receivers would thus effectively block views of the Mule Mountains from this general area by causing viewers to avert their gaze. View blockage is thus considered high.

From viewpoints in the southwest Palo Verde Valley, overall visual change is thus considered high. The project would demand attention, could not be overlooked, and would be dominant in the landscape. In the context of the setting’s moderately high visual sensitivity, this high level of visual change would represent a significant adverse impact.

Mitigation

To minimize form and color contrast of the project features, staff recommends Condition of Certification **VIS-1**, **Surface Treatment of Project Structures and Buildings**. Condition of Certification **VIS-1** recommends color treatment of all large-scale structures in the power block and common areas, and heliostat backs to minimize color contrast and blend with the background of the valley floor and mountains. With this measure, color contrast of project features could be reduced considerably. However, visual change would remain high due to glare, and impacts would remain significant.

Significant glare impacts of the solar receivers cannot truly be mitigated. However, if the project should be approved, staff strongly recommends Condition of Certification **VIS-2**, **Off-Site Landscape Screening**, to be applied at affected parks, residences and other sensitive view locations within an 8.5 mile radius. This measure could reduce the exposure of residents to intense discomfort glare in and around their homes, although it could not help when they travel away from the screened locations.

Haloing Effect

Under certain high humidity and dusty conditions, where airborne dust or water concentrations reach certain levels, the Rio Mesa SEGF project would, in addition to contrast from structures and strong glare of solar receivers, also exhibit a haloing or 'tee-pee' effect, that is, a marked visual pattern formed by light rays of the heliostats reflecting off of airborne dust or water particles. This effect could be quite dramatic, forming a conical pattern of reflected light between the heliostat field and solar receivers of very large scale, appreciably increasing the visual contrast, scale and dominance of the project. This phenomenon is anticipated to be more frequent in the morning and evening, and when the sun is low over the horizon. It would be an occasional, transient occurrence that would periodically extend the range of strong visual contrast and viewer distraction. This visual pattern would not be of the extreme levels of brightness of the solar receivers, would not cause discomfort to viewers even at relatively close distances, and could be seen by some viewers as interesting due to its highly legible, unified conical form. However, any visual interest from these effects would generally be overridden by the discomfort that observers, especially within nearest distance zones (under 8.5 miles), would experience from brightness of glare from the solar receivers themselves. When 'tee-pee' phenomena result from heliostats in stow or standby condition, the receivers would not glow brightly because the energy would be diverted to stow positions circling the towers. The level of brightness under these conditions would not represent high discomfort to viewers. These situations would also be occasional, transient, and less frequent than the normal operating conditions discussed above.

- AFC KOP 6 (Visual Resources Figure 13) – View from SR 78 at I-10

- Staff KOP 7A (Visual Resources Figure 14) - View from SR 78 near the town of Ripley, looking southwest

- Staff KOP 7B (Visual Resources Figure 15) - View from Jack E. Marlowe Park, Ripley, looking southwest

AFC KOP 6 **(Visual Resources Figure 13)** is taken from SR 78 near I-10 at a distance of approximately 10.5 miles from the project site, and 12.5 miles to the nearest solar tower. Staff KOPs 7A and 7B **(Visual Resources Figures 14 and 15)** are taken from the town of Ripley (pop. 692) in Riverside County, located approximately 6.5 miles from the project site, and 8.5 miles from the nearest solar tower. These KOPs are representative of views from the Riverside County portion of the Palo Verde Valley, particularly the residents of Ripley. Because of the highly uniform level terrain and agricultural land use throughout the Palo Verde Valley, the visual setting of these viewpoints in the Riverside County portions of the valley is much the same as described for KOPs 1, 1B, and 4, above. The primary difference is the somewhat greater distance to the project site.

Visual Sensitivity

Visual Quality: Visual quality from these KOPs are substantially similar to KOPs 1, 1B, and 4, above. The Mule Mountains can be seen clearly, rising from the flat mesa approximately 6 to 7 miles to the west. While a defining feature of the landscape, the mountains lack dramatic height or scale at this distance. The visual foreground consists of flat, low-growing cotton, hay, and fallow agricultural fields of moderate visual interest, but lacking variety or vivid features. Visual quality is thus considered moderate.

Viewer Concern: Viewer concern of motorists on SR 78 is considered moderate. Much travel on the road is oriented toward work or other day-to-day activities and not primarily scenery-oriented, although a proportion of motorists includes visitors to the Bradshaw Trail and Cibola NWR who would have high concern for scenic values.

Unlike the town of Palo Verde, viewing conditions in the slightly larger town of Ripley are such that a large proportion of the town has relatively open views toward the project site. Residents with views of the site would have high viewer concern. The Jack E. Marlowe Park in Ripley also faces the site, as depicted in **Visual Resources Figure 15.** Park users would have moderately high viewer concern. Viewer concern of residents is thus considered moderately high within the town of Ripley.

Viewer Exposure: As noted, residential viewer numbers are considered relatively high. Traffic levels are moderately low (ADT 2,000). While visitor numbers at Jack E. Marlowe Park are not known, these were estimated to be in a moderately high range (over 100/day) due to a high concentration of adjacent residents, and a variety of recreational facilities. Residential views are generally long-term. Views of park users are moderate in duration, but recurring.

Visibility from Ripley and other viewpoints on this portion of SR 78 would typically be considered limited due to distance to the project site. However, the analysis of visibility is altered by the unique range and intensity of glare effects of the 750-foot-high solar receivers, which would be visible throughout the area. The town of Ripley is approximately 8.5 miles from both solar receivers, which coincides with the limit identified by staff as the radius of potentially significant glare impacts. Because KOPs 7a and 7B lie at the margin of the radius of significant effect, exposure is considered moderately high. KOP 6 and other areas north of Ripley would fall outside of that 8.5-mile radius. Exposure in that area is thus moderate.

Overall visual sensitivity from Ripley is thus considered to be moderately high, and from KOP 6 and areas north of Ripley, moderate.

Visual Change

Visual Resources Figures 13a and **13b** depict a simulation of the proposed Rio Mesa SEGF project from KOP 6 at a distance of approximately 10.5 miles from the project site and 12.5 miles to the nearest solar tower. KOP 6 represents the AFC KOP most resembling viewing conditions from Ripley and the Riverside County portions of SR 78. Effects from KOPs 7A and 7B would thus be similar to those depicted in the simulation of KOP 6, but slightly more prominent due to the somewhat shorter distance to the site.

Visual Contrast: From these KOPs, form contrast of the towers would be moderate. Their vertical form would contrast with the predominantly horizontal lines of the setting, drawing the eye, but their magnitude in the overall field of view would be moderate or even subordinate to other features in the view. Taller power block features, including the air-cooling condensers, would also be visible and present subordinate levels of form contrast. If the concern were the project structures alone, project contrast at this distance would be moderate or subordinate.

However as described previously, in KOPs 6, 7A and 7B, the brightness of the solar receivers would be sufficiently intense as to render other aspects of visual contrast largely irrelevant. For most of SR 78, and particularly from the town of Ripley southward, the receivers would be visible at distances of under 8.5 miles and would be perceived as extremely bright light sources demanding attention and causing visual discomfort when in the field of view. As such, visual contrast of the project from KOPs 7A and 7B is considered high due to glare.

KOP 6, at a distance of 12.5 miles from the solar towers, lies outside the range of significant glare impact identified by staff. Thus, contrast from this KOP and other viewpoints north of Ripley is considered moderate.

Visual Dominance: Within a range of approximately 8.5 miles, the solar receivers would dominate the visual environment and would cause discomfort in views in the direction of the towers. Dominance is thus considered high within that distance range, and moderate outside of it.

View Blockage: At these distances, glare from the solar receivers would cause some level of discomfort to viewers looking toward the Mule Mountains. These effects would be greater within the 8.5-mile zone of pronounced glare effects, declining beyond that distance. Overall, view blockage from the effect of glare is thus considered moderately high from KOPs 7A and 7B, and moderate from KOP 6.

From KOPs 7A and 7B, overall visual change is thus considered high. The project would demand attention, could not be overlooked, and would be dominant in the landscape. In the context of moderately high visual sensitivity in the town of Ripley, this would represent a significant adverse impact.

From KOP 6 and other locations outside of the 8.5-mile distance zone from the solar towers, overall visual change would be moderate, and impacts less than significant.

Mitigation

To minimize form and color contrast of the project features, staff recommends Condition of Certification **VIS-1**, **Surface Treatment of Project Structures and Buildings**.

Glare impacts from the solar receivers within the 8.5-mile zone of pronounced glare effects are considered by staff to be largely unmitigable. However, if the project is approved, staff recommends Condition of Certification **VIS-2**, **Off-Site Landscape Screening**, to be applied at Marlowe Park in Ripley, and at residential sites as described in the condition of certification. This measure could greatly reduce or, with maturity of landscape plantings, eliminate potentially substantial adverse effects on the recreational use of Jack E. Marlowe Park, and partially mitigate impacts to residents in their homes.

I-10 KOPs

- AFC KOP 3 (Visual Resources Figure 16) – View from I-10 Looking South

- Staff KOP 3B (Visual Resources Figure 17) – View from Mesa Verde Residences

AFC KOP 3 **(Visual Resources Figure 16)** is representative of views from I-10, and is taken approximately 2 miles west of the Blythe Airport, at a distance of slightly over 8 miles from the Rio Mesa SEGF project boundary, and 10 miles from the nearest solar tower. This location marks both the nearest viewpoint to the project from I-10, and the western limit of project visibility as seen from I-10. West of this point, the project would be screened from I-10 viewers by the Mule Mountains. From this point, visibility of the project would extend eastward into Arizona.

Staff KOP 3B **(Visual Resources Figure 17)** is taken from the settlement of Mesa Verde (pop. 1,023), adjoining the highway southwest of the Blythe Airport, approximately 2.3 miles east of KOP 3. The nearest residents are slightly over 8 miles from the Rio Mesa SEGF project boundary, and 10 miles from the nearest solar tower. Though representative of two distinct viewer groups, the views are very similar. Both KOPs 3 and 3B are addressed in the following discussion.

Visual Sensitivity

Visual Quality: As depicted in the existing conditions photograph from KOPs 3 and 3B, the Mule Mountains' highest peaks are prominently visible at middle-ground distance of 3-1/2 miles. The Palo Verde Mountains are also visible at the horizon to the south across the level Palo Verde Mesa. The rocky slopes, jagged skyline and purple coloration accentuate the sense of vast space of the predominantly open, level, largely undisturbed valley floor, and contribute the primary scenic feature in views to the south. Transmission corridors, including small-scale wooden poles in the highway foreground, and the Devers-Palo Verde corridor at a distance of 3 miles or more, are visible but subordinate in the view, which remains scenically intact. Visual quality from both KOPs is moderately high.

Viewer Concern: Motorists would have moderate levels of viewer concern. The area is not currently a designated scenic route nor is the area in or near a popular scenic destination. The Riverside County Palo Verde Area Plan (Policies PVVAP 10.1 and 10.2) calls for the County to seek State Scenic Highway status for I-10 within the plan area in the future, including the roughly 14-mile segment that would be affected by views of the Rio Mesa SEGF project (Riverside County 2008). However, the highway segment is not currently designated as a County scenic route, and is not currently on the list of eligible state scenic highways, a prerequisite to scenic highway nomination. Viewer concern from KOP 3 is thus moderate.

KOP 3B is taken from Blythe Way at the southern edge of the town of Mesa Verde, just south of I-10 and the Blythe Airport. The community contains between 200 and 300 homes, including a substantial number with open views toward the project site to the south. Residents are normally assumed to have a relatively high level of viewer concern. Viewer concern from KOP 3B is moderately high.

Viewer Exposure: Viewer exposure is considered moderate, due primarily to distance. The project would be viewed from this nearest location on I-10 at a distance of approximately 8-1/2 miles from the project boundary and 10 miles from the nearest solar receiver. Average daily traffic numbers in this segment of I-10 are high: 22,500 (westbound) and 23,800 (eastbound) (BS 2011a). Westbound motorists would be exposed to views of the solar towers from the state line and beyond, approximately 15 miles. This represents a view duration of roughly 15 minutes at 60 miles per hour, a relatively long period of exposure for motorists. As discussed in greater detail in **Traffic**

and Transportation section, Appendix TT1 – Glint and Glare Safety Impact Assessment, it is anticipated that the solar towers would appear visible and bright within that range of viewing distance. Similarly, the number of residences that would have continuous long-term views of the project is moderately high (between 50 and 100). However, from these KOPs, visibility of project structures would be greatly limited by distance. The glare effects of the solar receivers, in contrast, would be readily visible and bright at this distance, and would attract attention, substantially raising the level of visibility. However, both KOPs 3 and 3B lie outside of the 8.5-mile radius identified by staff as the area of likely significant glare impact. Thus, though the glare of the receivers would be visible at this distance, overall viewer exposure due to distance is considered moderate.

Overall visual sensitivity from I-10 and Mesa Verde is thus considered to be moderate.

Visual Change

Visual Contrast: **Visual Resources Figures 15a and 15b** depict a simulation of the proposed Rio Mesa SEGF project from AFC KOP 3 on I-10 at a distance of 8 miles from the project, and 10 miles from the nearest solar receiver. As suggested in the simulation of KOP 3, at this distance physical structures of the project other than the solar towers would be indistinct, and even the solar towers would remain visually subordinate. As also indicated in the KOP photos, the existing Devers-Palo Verde transmission line is indistinct due to distance. Because the proposed gen-tie line would parallel that existing line, it would also appear indistinct due to distance from I-10 viewpoints. In this simulation, only one solar tower is visible. However, a short distance to the east of this location, both towers would be visible and remain visible to the state border. With respect to the physical structures alone, contrast would be moderately low from KOPs 3 and 3B.

KOPs 3 and 3B also lie outside of the 8.5-mile radius identified by staff as the area of likely significant glare impact. At this distance the glare of the solar receivers would appear bright. As discussed in detail in **Traffic and Transportation section, Appendix TT1 – Glint and Glare Safety Impact Assessment,** the luminance of the solar receivers would remain nearly constant to a distance of approximately 17 miles, though their subjective brightness would decrease over that distance as the objects decrease in apparent size. Accounting for anticipated glare, visual contrast would thus be moderate. This level of contrast would be markedly increased during occurrences of conspicuous ‘haloing’ due to reflection of project light rays off concentrations of ambient dust or water vapor. These occurrences are assumed to be occasional and/or short-term.

Visual Dominance: Similarly, although the physical project structures, including the solar towers, would have low visual dominance at this distance, their glare would exert moderate dominance, attracting attention due to their conspicuous brightness. This level of dominance would be markedly increased during occurrences of conspicuous ‘haloing’ due to reflection of dust or water vapor.

View Blockage: At this distance, the moderate level of glare from the solar receivers is not expected to cause viewers to avert their gaze or otherwise block views of the Mule Mountains. View blockage is thus considered low.

From KOPs 3 and 3B, overall visual change is thus considered moderate. In the context of the setting’s moderate visual sensitivity, this would be a less than significant impact.

BLM KOPs (Palo Verde Mesa, Mule Mountains)

- AFC KOP 2 (Visual Resources Figure 17a, 17b, 17c, 17d) – View from Bradshaw Trail

- Staff KOP 2B – (Visual Resources Figure 18) - View from Bradshaw Trail at WAPA Right-of-Way

AFC KOP 2 **(Visual Resources Figures 17a through 17d)** is taken from 30th Avenue in its westernmost section near the Hodge Canal and the beginning of Palo Verde Mesa. 30th Avenue represents the easternmost portion of the Bradshaw Trail, outside of BLM lands and roughly one mile west of SR 78. Although taken from the Bradshaw Trail, the KOP is more representative of viewpoints within the western portion of the Palo Verde Valley, and is similar to KOPs 1 and 4. It is located approximately 2 miles north of KOP 4, approximately 1 mile from the mesa edge. KOP 2 is slightly over 4 miles from both solar towers, and approximately 2.3 miles from the nearest project boundary. In this sense it is not representative of potential effects to the Bradshaw Trail within BLM lands, where viewing distance to the project boundary would range from approximately 50 feet to less than 1.4 miles for a roughly 5-mile long segment between the mesa edge and the foot of the Mule Mountains. However, it is perhaps the most representative simulation of views from the Bradshaw Trail, and is discussed here as representing potential effects to the Bradshaw Trail.

Staff KOP 2B **(Visual Resources Figure 19)** depicts a panoramic view of the project site from the Bradshaw Trail at the WAPA transmission line right-of-way, which demarks the project’s eastern boundary, looking into the southwest quadrant of the view. This viewpoint is representative of views of the project from the trail within the mesa. The nearest project boundary would be approximately 0.9 mile to the south, adjoining the WAPA ROW. Portions of the project boundary 0.9 mile west of this point would be located within 300 feet of the trail.

Visual Sensitivity

Visual Quality: In AFC KOP 2, the mesa edge is clearly visible, rising roughly 50 feet above the valley floor. The Mule Mountains can be seen clearly, rising from the flat mesa approximately 3 to 4 miles to the west. As indicated in this view and in KOP 2B from within the mesa, the project site is located against a background of the lower portions of the Mule Mountains, and the more distant Palo Verde Mountains at the horizon to the south. This quadrant of the view is thus less vivid than views to the northwest, in the direction of the taller nearby peaks of the Mule Mountains. Vegetation is predominantly sparse creosote scrub. Thus, though highly intact, the landscape lacks variety and vivid features. Visual quality is considered moderate.

Viewer Concern: Because the Bradshaw Trail is a designated BLM Backcountry Byway and receives substantial recreational use, viewer concern is considered high.

Viewer Exposure: Viewer exposure from all parts of the Bradshaw Trail within the project viewshed is high. The trail represents the nearest viewpoint to the project, and also the viewpoint with highest viewer concern. Views are essentially unobstructed and seen at foreground and near-middle-ground distance. For a segment of the trail over 6 miles in length, the solar towers would be visible from the trail at distances of under 3.5 miles, and as little as 1.7 miles. Traffic counts for the Bradshaw Trail are not available, but use levels are believed by BLM to be moderate to moderately high. Although trail use numbers are not available, annual visitation in the nearby Mule Mountains LTVA was recently 8,800 visitor-days/year, and the trail is used by LTVA visitors as both an access and a route to other nearby destinations (abandoned mines, Palo Verde Wilderness) (Fincher, 2012). This number of visitor-days falls within the moderate range of both road and trail use under the BLM VRM framework.

Overall visual sensitivity from KOPs 2 and 2B (Bradshaw Trail) is thus considered to be high.

Visual Change

Visual Resources Figures 17a through **17d** depict simulations of the proposed Rio Mesa SEGF project from KOP 2, at a distance of approximately 2 miles from the site boundary, and 4 miles to both solar towers, looking southwest. The panorama at the bottom of the figure depicts a view of the entire western quadrant.

Visual Contrast: As noted, KOP 2 is somewhat more distant from the project than typical views from the Bradshaw Trail such as Staff KOP 2B. Nevertheless, the simulations provide a sense of the visual magnitude and prominence anticipated in views from the Bradshaw Trail. From KOP 2B, solar towers would be 2.2 and 2.3 miles from the viewpoint, rather than 4 miles as depicted in the simulations and would thus be more prominent. From both KOPs 2 and 2B, however, form contrast of the towers would be strong, their massive vertical form contrasting strongly with the predominantly horizontal lines of the setting. Although only one tower is shown in KOP 2 due to the photography framing, both towers would be clearly visible from this point of view. In addition, the power block, transmission towers, and heliostat field would also be visible, contrasting in form, color and texture with the setting. At its nearest point, the heliostats would be seen as little as 50 feet from viewers on the Bradshaw Trail, thus presenting high form contrast. For over 5 miles of the trail, the heliostat fields would be visible at distances of under 1 mile, presenting substantial form and color contrast.

In addition, the proposed gen-tie transmission line, which would parallel the existing, small-scale WAPA line from approximately 1 mile south of Bradshaw Trail northward, would be substantially larger than the existing line and represent a moderately strong level of contrast when viewed at close distances, such as from nearby viewpoints on the Bradshaw Trail.

As described previously above, however, brightness of the solar receivers would be so intense from the Bradshaw Trail as to render other aspects of visual contrast largely irrelevant. For a 6-mile segment of the trail nearest the project, the towers would be visible at distances of 3.5 miles to as little as 1.7 miles. At 3.5 miles, the solar receivers would each be of similar visual magnitude (subtended angle of view) to the sun. At 1.7 miles, they would appear larger. Even more than at KOP 1, the level of contrast due to glare would thus be extremely high.

Visual Dominance: The solar receivers would dominate the visual environment, could not be ignored, and would cause considerable discomfort in views in the direction of the towers. However, because the project is located south of the trail, views northward, including views toward Mule Mountain and the tallest peaks of the range would remain intact and undisturbed. Consequently the project would completely dominate views to the south, but have little effect on views to the north. It would, however, be impossible to navigate the trail without views of the project, and difficult to do so while avoiding all views of the solar towers. Viewers would feel the need to avert their eyes from the south, encouraging viewing to the north. The bright towers would be difficult or impossible to ignore. Dominance is thus considered moderately high.

View Blockage: Glare from the solar receivers would render views southward largely unviewable. Because the project is located south of the trail, as viewers on the trail came closer to the project, the towers would also be seen to the south. Thus, views northward and away from the project, including views toward the tallest peaks of the Mule Mountains would remain intact and undisturbed. View blockage is thus considered moderate.

From KOPs 2 and 2B, overall visual change is considered very high. The project would demand attention, could not be overlooked, and would be dominant in the landscape. In the context of the Bradshaw Trail's high visual sensitivity, this high level of visual change would represent a significant adverse impact.

- Staff KOP 8 – (Visual Resources Figure 19) - Simulated view from Roosevelt Mine

Staff KOP 8 depicts a simulated view of the project from Roosevelt Mine, an OHV recreational destination located approximately 0.6 mile north of Bradshaw Trail in the Mule Mountains, and accessed via the Bradshaw Trail. This view is representative of elevated recreational viewpoints within the Mule and Palo Verde Mountains. The simulation, although graphically crude, was produced in Google Earth and is dimensionally accurate. The view has been cropped to capture a 40-degree (‘normal’) field of view, roughly equivalent to the view of a 50 mm SLR lens. The white area represents the overall project boundaries. Although the perspective is quite different, the view is of the Palo Verde Mesa as described previously and overall visual sensitivity is assumed to be similar to that described under KOPs 2 and 2B. Visual quality from KOP 8 is likely to be somewhat higher than from the mesa floor due to the elevated position and visual variety of the Mule Mountain foothills in the foreground. Viewer concern is assumed to be high, visual exposure moderately high, and overall visual sensitivity, as at KOPs 2 and 2B, would thus be high.

Visual Change

Visual Contrast: As suggested by the simulation of KOP 8, project contrast would be high. Form, color and texture contrast of the heliostat fields would be high. Form contrast of the tall solar towers would also be high. However, as discussed previously, these factors would be subordinate to the high levels of glare from the solar receivers. The solar receivers would be approximately 3.2 and 4.5 miles from this KOP. At these distances, luminance and perceived brightness would be very high, causing viewers to avert their gaze.

Visual Dominance: As from KOPs 2 and 2B, the solar receivers would dominate the visual environment, could not be ignored, and would cause considerable discomfort in views in the direction of the towers. Dominance would be high.

View Blockage: Because the solar receivers would cause viewers to avert their gaze, the portion of the view including the solar towers would be effectively blocked. Views to the north and west would thus not be affected. View blockage is considered moderate.

Overall, visual change from KOP 8 and similar destinations on the east face of the Mule Mountains is considered to be high. In the context of the Bradshaw Trail’s high visual sensitivity, this high level of visual change would represent a significant adverse impact.

Palo Verde Wilderness Area

Although slightly more distant than the Mule Mountains, elevated viewpoints in the Palo Verde Wilderness Area would experience views similar to that depicted in KOP 8. Views of the heliostat field would be less pronounced because of increased distance and correspondingly flatter angles of view. However, virtually all of the Palo Verde Wilderness falls within the viewshed of the project solar receivers, and much of the wilderness area falls within the 8.5 mile zone of potentially significant glare impact. Even accounting for possible inaccuracies in the GIS viewshed projections, it is clear that significant glare impacts would be anticipated within a substantial portion of the Palo Verde Wilderness Area.

BLM Visual Resource Inventory of the Project Viewshed

As described previously, the project site is surrounded to the north, west, and south by federal lands administered by BLM. These areas were recently mapped for their Visual Resource Inventory (VRI) Class ratings (BLM 2010a, 2010b). This VRI mapping is depicted in **Visual Resources Figure 9** for informational purposes.

As depicted in **Visual Resources Figure 9, Key Observation Positions,** the portions of the Palo Verde Mesa adjoining the project site boundaries are classified as VRI Class III, corresponding broadly to moderate visual sensitivity under staff's assessment method. The Mule Mountains, the area of the Mule Mountains LTVA, and portions of the Palo Verde Mesa beginning approximately 2 miles north of the project site (and through which the proposed gen-tie line would run) are VRI Class II, corresponding broadly to high visual sensitivity under staff's assessment method. The allowable level of visual contrast for actions within VRM Class III areas is moderate; the allowable level of visual contrast for actions within VRM Class II areas is low. The Palo Verde Mountains WA is VRI Class I, by definition. Class I signifies very high visual sensitivity; no visual change is allowed for actions within such areas.

Visual management objectives for BLM lands are not determined by VRI Classes, but by Visual Resource Management (VRM) Classes. The VRI Classes, however, are the expression of the level of scenic value and sensitivity accorded an area by BLM. In the present case, when BLM conducts NEPA environmental review of the Rio Mesa SEGF project, it will adopt Interim Visual Resource Management Classes (IVRM Classes) which will serve as the baseline for evaluation of the project's visual impacts. These may or may not be the same as the VRI Classes, because VRM Classes reflect other, non-visual priorities of the applicable adopted resource management plan.

Cibola NWR/Colorado River

- AFC KOP 5 (Visual Resources Figures 18a, 18b) - View from Cibola NWR

- Staff KOP 5B – View from Campsite, Cibola NWR

AFC KOP 5 is taken from a point near the northern boundary of the Cibola National Wildlife Refuge (Cibola NWR), located 4.6 miles to the southeast of the project boundary, and 5.6 miles to the nearest solar tower. Staff KOP 5B is a similar view taken very near KOP 5, depicting an alternative view that includes characteristic views of the Colorado River and surrounding riparian woodland setting.

Visual Sensitivity

Visual Quality: Visual quality from within the Cibola NWR is high. Dramatic views of the Mule, McCoy, and Palo Verde Mountains are visible at the horizon in views to the northwest from access roads within the refuge. Within the river floodplain, views are highly vivid, including expanses of the Colorado River and extensive adjoining riparian woodlands.

Viewer Concern: Viewer concern is high. Annual visitation at Cibola NWR is approximately 45,000 visitors, consisting of a wide range of visitor types including hunters, winter 'snowbirds,' wildlife photographers, fishermen, and other recreationists, particularly during winter season (Oldham, 2012). Given the recreational/wildlife and scenery orientation of these visitors, viewer concern is considered to be high. KOP 5 and 5B are also similar to views from Palo Verde County Park, another recreational site off of SR 78 roughly 1.75 miles northwest of the wildlife refuge.

Viewer Exposure: As suggested in the simulations, views from the Cibola NWR would expose views of both solar towers, heliostat fields, and other project features. Towers/receivers would be prominently visible at a distance of 5.6 and 6.8 miles respectively from these KOPs. The northern portions of the refuge would fall well within the range of significant glare impact in which the solar receivers would appear prominent and extremely bright. The refuge as a whole falls within the solar receivers' viewshed. Thus, glare impacts elsewhere in the refuge would be mediated mainly by distance, and would appear bright in northward views throughout much of the refuge. Because the solar towers are the features of foremost concern in this case, viewer exposure is considered high.

Overall visual sensitivity from the Cibola NWR is thus considered to be high.

Visual Change

Visual Resources Figures 20a and 20b depict a simulation of the proposed Rio Mesa SEGF project from KOP 5, Cibola NWR, at a distance of approximately 4.6 miles from the site boundary, and 5.8 miles to the nearest solar tower, looking northwest from within the refuge. Staff KOP 5B depicts a similar view toward the site, depicting a campsite on the Colorado River.

Visual Contrast: As indicated in the simulations, the solar towers and taller features of the power block would appear prominent, presenting moderately strong form contrast. As noted previously, the simulations present a slightly magnified field of view, so that project features appear somewhat more prominent than they would at the site. Nevertheless, form and texture contrast would clearly be strong. The towers would penetrate the ridgeline of the mountains in the background. As depicted in the simulations, the heliostat fields would also be partly visible, and exhibit some diffuse reflection of the sky under some conditions, presenting color and texture contrast somewhat similar to a lake surface. As discussed previously however, form and color contrast would tend to be rendered irrelevant in comparison to the brightness of the glare of the solar receivers. At a distance of 5.8 miles to the nearest tower, the KOPs would be well within the 8.5 mile zone of significant glare impacts. Contrast due to glare would thus be high.

Visual Dominance: As described previously, glare from the solar receivers would exert strong visual dominance to a distance of at least 8.5 miles. The brightness of the receivers could not be ignored, and would cause discomfort in views toward the project (northwest quadrant of the view). Visual dominance would thus be high.

View Blockage: Glare from the solar receivers would make views toward those portions of the Mule Mountains near the solar receivers uncomfortable. The receivers would thus effectively block views of the Mule Mountains in those portions of the view in which the receivers are seen. View blockage would be moderate.

From KOPs 5 and 5B in the Cibola NWR, overall visual change is considered high. In the context of the NWR's high visual sensitivity, this would represent a significant adverse impact.

Visual Resources Table 1
KOP Ratings: Visual Sensitivity/Visual Change and Impact Significance under CEQA Criterion C.

KOP No.	VISUAL SENSITIVITY (Existing Condition)						
	Visual Quality	Viewer Concern	Viewer Exposure				Overall Visual Sensitivity
			Visibility	No. of Viewers	Duration of View	Overall Viewer Exposure	
	Palo Verde Valley						
1 Palo Verde	Moderate	Moderately High	High	Moderately Low	Moderate	High (to Solar Receivers)	Moderately High
1B Palo Verde	Moderate	Moderately High	High	Moderately Low	Moderate	High (to Solar Receivers)	Moderately High
4 SR 78	Moderate	Moderately High	High	Moderately Low	Moderate	High (to Solar Receivers)	Moderately High
6 SR 78	Moderate	Moderate	High (Solar Receivers)	Moderately Low	Moderate-High	Moderate (to Solar Receivers)	Moderate
7A Ripley (Residents)	Moderate	Moderately High	High (Solar Receivers)	Moderate	High	Moderately High (to Solar Receivers)	Moderately High

KOP No.	VISUAL SENSITIVITY (Existing Condition)						
	Visual Quality	Viewer Concern	Viewer Exposure				Overall Visual Sensitivity
			Visibility	No. of Viewers	Duration of View	Overall Viewer Exposure	
7B Ripley (Marlowe Park)	Moderate	High	High (Solar Receivers)	Moderately High	Moderate	Moderately High (to Solar Receivers)	Moderately High
	I-10 Corridor						
3 (I-10)	Moderately High	Moderate	Moderate	High	Moderately High	Moderate	Moderate
3B (Mesa Verde)	Moderately High	Moderately High	Moderate	Moderately High	High	Moderate	Moderate
	BLM KOPs (Palo Verde Mesa, Mule Mountains)						
2 (Bradshaw)	Moderate	High	High	Moderately High	Moderately High	High	High
2B (Bradshaw)	Moderate	High	High	Moderately High	Moderately High	High	High
8 (Mule Mts., Palo Verde Mts. WA)	Moderate	High	High	Moderate	Moderately High	Moderately High	High
	Cibola NWR/Colorado River						
5 (NWR)	High	High	High	High	High	High	High
5B (NWR)	High	High	High	High	High	High	High

KOP No.	VISUAL CHANGE (Project Effect)			
	Contrast	Dominance	View Blockage	Overall Visual Change
	Palo Verde Valley			
1 Palo Verde	High	High	High	High
1B Palo Verde	High	High	High	High
4 SR 78	High	High	High	High
6 SR 78	Moderate	Moderate	Moderately High	Moderate

KOP No.	VISUAL CHANGE (Project Effect)			
	Contrast	Dominance	View Blockage	Overall Visual Change
7A Ripley (Residents)	High	High	Moderate	High
7B Ripley (Park)	High	High	Moderate	High
	I-10 Corridor			
3 (I-10)	Moderate	Moderate	Low	Moderate
3B (Mesa Verde)	Moderate	Moderate	Low	Moderate
BLM KOPs (Palo Verde Mesa, Mule Mountains)				
2 (Bradshaw)	High	Moderately High	Moderate	High
2B (Bradshaw)	High	Moderately High	Moderate	High
8 (Mule Mts., Palo Verde Mts. WA)	High	High	Moderate	High
Cibola NWR/Colorado River				
5 (NWR)	High	High	Moderate	High
5B (NWR)	High	High	Moderate	High

KOP No.	KOP VISUAL IMPACT SIGNIFICANCE DETERMINATION – (CEQA Criterion C)			
	Overall Visual Sensitivity	**Overall Visual Change**	**Visual Impact Significance**	**Mitigation (See Staff Proposed KOP Visual Mitigation Measures)**
1 Palo Verde	Moderately High	High	Significant	VIS-1, -2, -3, -4 Significant and unavoidable
1B Palo Verde	Moderately High	High	Significant	VIS-1, -2, -3, -4 Significant and unavoidable
4 SR 78	Moderately High	High	Significant	VIS-1, -2, -3, -4 Significant and unavoidable

KOP No.	KOP VISUAL IMPACT SIGNIFICANCE DETERMINATION – (CEQA Criterion C)			
	Overall Visual Sensitivity	**Overall Visual Change**	**Visual Impact Significance**	**Mitigation (See Staff Proposed KOP Visual Mitigation Measures)**
6 SR 78	Moderate	Moderate	Less than significant	VIS-1, -3, -4 Less than significant
7A Ripley (Residents)	Moderately High	High	Significant	VIS-1, -2, -3, -4 Significant and unavoidable
7B Ripley (Marlowe Park)	Moderately High	High	Significant	VIS-1, -2, -3, -4 Less than significant
3 (I-10)	Moderate	Moderate	Less than significant	VIS-1, -3, -4 Less than significant
3B (Mesa Verde)	Moderate	Moderate	Less than significant	VIS-1, -3, -4 Less than significant
2 (Bradshaw Trail)	High	High	Significant	VIS-1, -2, -3, -4 Significant and unavoidable
2B (Bradshaw Trail)	High	High	Significant	VIS-1, -2, -3, -4 Significant and unavoidable
8 (Mule Mts., Palo Verde Mts. WA)	High	High	Significant	VIS-1, -2, -3, -4 Significant and unavoidable
5 (NWR)	High	High	Significant	VIS-1, -2, -3, -4 Significant and unavoidable
5B (NWR)	High	High	Significant	VIS-1, -2, -3, -4 Significant and unavoidable

D. LIGHT AND GLARE

"Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?"

For purposes of this analysis, the potential for significant glare impacts have relied on detailed technical studies of the anticipated luminance properties of the solar receivers conducted by staff. These studies are found in the **Traffic and Transportation section, Appendix TT1 – Glint and Glare Safety Impact Assessment**.

Glare is considered as difficulty seeing in the presence of bright light such as direct or reflected sunlight or artificial light such as car headlamps at night. Glare is caused by a significant ratio of luminance between the task (that which is being looked at) and the glare source. Glare can be generally divided into two types, **discomfort** glare and **disability** glare. Discomfort glare results in an instinctive desire to look away from a bright light source or difficulty in seeing a task. Disability glare renders the task impossible to view, such as when driving westward at sunset. Staff concluded that a viewer within 8.5 miles of the solar receiver steam generators (SRSGs) looking directly at the SRSGs would experience significant discomfort glare. However, this glare would not be a disability glare, and therefore would not significantly affect drivers' and pilots' abilities to operate their vehicles and planes.

Facility Surfaces:

No. Surfaces of the facilities of the Rio Mesa SEGF project (excluding the solar receivers and the mirrored surfaces of the heliostats, which are discussed below) have the potential to introduce reflected glare into the visual environment. With the effective implementation of staff-recommended Condition of Certification **VIS-1**, the project would use colors and finishes on surfaces that do not cause excessive glare and would be in harmony with the project's desert environment (with the exception of the heliostat mirrors and SRGSs, discussed below). Implementation of staff-recommended Condition of Certification **VIS-2** would reduce the visibility of project structures at the ground level and minimize the potential for adverse visual impacts from reflected glare.

Heliostats:

Staff is currently investigating the feasibility of preparing a condition of certification to ensure that glint impacts would be less than significant. This condition would require the project owner to prepare a Heliostat Operations Positioning and Monitoring Plan (HPMP) to minimize glint exposure to aircraft and other potential receptors, such as motorists, through strategic heliostat positioning, avoidance of malfunctions, and procedures for investigating and resolving any complaints from the public, as discussed in the **Traffic and Transportation** section of this PSA. Staff has filed a Data Request to the applicant asking for identification of potential receptors and methods to ensure that heliostats would be positioned to avoid reflection onto these receptors. Staff must have this information prior to issuance of the FSA in order to ensure that potential impacts are identified and can be mitigated.

Solar Power Towers/SRSGs:

Yes. Energy Commission staff has determined that the visual impact of the SRSGs solar reflections will have a significant and unavoidable impact. See the **Traffic and Transportation section, Appendix TT1 – Glint and Glare Safety Impact Assessment** for a detailed analysis of the visual impacts of the SRSGs.

The principal anticipated project visual impact would result from glare of the SRSGs. As discussed in detail in the **Traffic and Transportation section, Appendix TT1 – Glint and Glare Safety Impact Assessment**, the SRSGs would comprise 130-foot-tall structures at the tops of the two 750-foot tall solar towers. The SRSGs would collect reflected energy from the project heliostat fields, resulting in extremely high temperatures and generation of bright illumination. As a result, the SRSGs would become intensely bright light sources, calculated by staff to have luminance on the order of 544,000 candelas (cd/m2). This level of luminance would be 88 times more luminous than the desert sky and be perceived as intensely bright to considerable distances. Noting that no such light source of spatial extent and luminance has been known to exist previously and therefore extensive data are nonexistent, staff estimates that the SRSGs would appear very bright to a distance of approximately 17 miles, and would constitute a significantly disruptive source of discomfort glare to viewing distances of approximately 8.5 miles. At that distance the SRSGs would have a visual size of 1/6 degree (10 min arc), approximately 1/3 the size of the sun (1/2 degree or 30 min arc). At 2.8 miles, the SRSGs would have the same visual size as the sun. Although the SRSGs would not be as bright as the sun, which is capable of causing physical damage to the eyes, the SRSGs would be exceptionally bright and be nearly constant in perceived brightness out to the 8.5 mile viewing distance. Beyond this distance perceived brightness would progressively decrease until perceived brightness becomes proportional to distance (log linear, Stevens' Power Law) at a visual subtense of approximately 5 min arc (1/12 deg) as size begins to transition to the limits of visual acuity. This condition is met at a viewing distance of 16.9 miles.

Up to this viewing distance of approximately 8.5 miles from the SRSGs, the glare from this level of brightness, being produced by a spatially extended source of 544,000 cd/m^2 under nominal power generation conditions, is considered as significant in producing discomfort glare and visual disruption effects. Within this 8.5 mile radius, SRSG glare has also been considered to constitute strong contrast in the analysis of impacts under CEQA Criterion C.

Beyond an 8.5 mile viewing distance the SRSGs are still considered as a bright source in the visual field but are considered as a less than significant source of glare, and hence visual disruption effects. Importantly, the perceived brightness and glare effects from the SRSGs are not considered as visually disabling at any viewing distance.

Although these glare impacts would be largely unavoidable and unmitigable, if the project is approved staff recommends Condition of Certification **VIS-2, Off-Site Landscape Screening**, to be applied at specified high-sensitivity locations in order to screen SRSG glare. With this measure, site-specific glare impacts could be reduced, although impacts could not be reduced for all exposed locations and sensitive receptors, and impacts would remain significant within a radius of approximately 8.5 miles.

FAA Safety Lighting:

Night lighting would be required at the power blocks and common area. Paved plant access roads would have ground-based lighting (URS 2012b, Data Response 148). Otherwise, perimeter fences, roadways, and solar fields would not be lit. Mirror-washing operations would use portable, vehicle-mounted lights. The project owner would develop a detailed temporary construction lighting plan to be submitted prior to start of construction. With Condition of Certification **VIS-4**, **Construction Lighting**, effects of construction lighting would be less than significant.

The project would employ a dual medium-intensity lighting system per FAA Advisory Circular AC 70/7460-1K, Obstruction Marking and Lighting. This dual lighting system includes red lights for nighttime and medium-intensity flashing white lights for daytime and twilight use. Four sets of lights will be installed at both 250’ and 500’, and one set will be installed at the height of the lightning antenna (760’). The lights at the 250’ and 500’ levels will be installed at opposite sides of the towers, such that at least two sets will be visible at any given time. Lights on both towers will be synchronized.

Due to the height of the towers, FAA may require either high-intensity flashing white lights or non-luminous marking in addition to medium-intensity flashing white lights for daytime and twilight use. In such a case, the applicant proposes to increase the lighting system to high-intensity flashing lights, rather than adding non-luminous marking. However, staff observes that during daytime operation, both high-intensity FAA lighting and non-luminous marking would tend to be visually obscured by the much greater brightness of SRSG glare. Since views in the direction of the solar towers during daytime would tend to cause viewers to avert their gaze, both the safety lighting and tower marking would be of less importance than the brighter SRSG glare.

Night Lighting:

No, with recommended conditions. Nighttime light pollution could result from project operational lighting, and from FAA warning lighting required on the solar towers. With effective implementation of light trespass mitigation measures as described in staff-recommended Condition of Certification **VIS-3**, the project’s off-site operation-related lighting impacts, excluding FAA safety lighting, would be less than significant. Condition of Certification **VIS-3** requires a comprehensive lighting plan be submitted to the relevant county for review and comment and to the Energy Commission compliance project manager (CPM) for review and approval. Staff recommends Condition of Certification **VIS-3** to ensure full compliance and verification of night lighting measures.

The addition of the aviation safety lighting would alter the nighttime appearance of the project area and would be visible in the night sky due to the height of the towers and the number of lights required by the towers’ size. The brightest FAA-required lighting, of medium- or high-intensity white flashing lights, would apply during the day and twilight. At night, these would be replaced by less bright, non-flashing red safety lighting.

Nighttime light pollution impacts would be of particular concern to visitors to the Palo Verde WA and the Mule Mountains LTVA. The pristine, completely unlit night sky is a part of the attraction of virtually all WAs within the California Desert, and is often cited as a valued attraction of the desert for campers (IDSA, 2010). However, staff concluded that night light pollution effects of the project, including night-time FAA lighting, with appropriate mitigation measures as described in staff-recommended Condition of Certification **VIS-3**, would not be substantial beyond background distances of roughly 4 or 5 miles. Both the WA and LTVA lie outside of this estimated radius of substantial night lighting effect. The Palo Verde WA lies over 4 miles from the towers and power block. Both Coon Hollow and Wiley's Well Campgrounds in the LTVA are located over 6 miles from the solar towers. Therefore, campers within the WA and LTVA could be affected by project night lighting, but to a relatively limited degree. This, together with the fact that the number of visitors to the WA is believed to be low, leads staff to the conclusion that night lighting impacts to visitors in the WA and LTVA would be less-than-significant.

Project lighting effects would potentially be more pronounced to viewers nearer than 4 miles. No camping sites are located within that distance, so such viewers would be limited to residents in Palo Verde and other nearby western portions of the Palo Verde Valley, and to motorists on SR 78. With Condition of Certification **VIS-3**, off-site effects of bright operational lighting of the power block would be substantially mitigated. Therefore, the primary nighttime lighting effect to such residents would result from required red FAA nighttime safety lighting. This would be visible in residents' night sky views, which would no longer have a pristine, unlit character and become more urban. The safety lighting would not, however, represent a very bright or highly distracting light source. It was assumed that residents in the area with concern for pristine, completely unlit night skies would seek that experience in more remote recreational locations such as the WA and LTVA, since existing street lighting, car headlights, and other ambient lighting in the town and residential areas already already intrude into the experience of dark skies. Impacts to such residents were thus considered less-than-significant.

CUMULATIVE IMPACTS AND MITIGATION

As defined in Section 15355 of the CEQA Guidelines (California Code of Regulations, Title 14), a cumulative impact is created as a result of the combination of the project under consideration together with past, present, and reasonably foreseeable future projects causing related impacts. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time. In other words, while any one project may not create a significant impact to visual resources, the combination of the new project with all existing or planned projects in an area may create significant impacts.

Cumulative impacts to visual resources would occur where project facilities occupy the same field of view as other built facilities or impacted landscapes, contributing to an adverse change in the visible landscape character due to their combined presence. In some cases, a cumulative impact could also occur if the visual quality or landscape character of a localized area (Palo Verde Mesa or I-10 corridor) or larger region (California Desert District), as a whole, is diminished by the proliferation of visible projects, even if the changes are not within the same field of view as existing (or future) structures or facilities. The result is a perceived cumulative industrialization of the existing landscape as a whole.

Cumulative impacts could occur if implementation of the Rio Mesa SEGF would combine with those of other local or regional projects. The Rio Mesa SEGF is potentially associated with two types of cumulative impact:

1. cumulative impacts within the immediate project viewshed (local projects visible simultaneously with the Rio Mesa SEGF), essentially comprising existing and foreseeable future projects on Palo Verde Mesa and the nearby stretches of I-10; and

2. cumulative impacts of existing and foreseeable future solar, renewable and other energy and development projects within the I-10 corridor (beyond the local viewshed) or other broad basin of the project's affected landscape type, or within the California Desert District as a whole (regional projects).

CUMULATIVE VISUAL IMPACTS WITHIN THE PROJECT VIEWSHED

Staff considered existing and foreseeable projects as listed in **Table 1**, and further depicted in **Figure 1** of the **Executive Summary** section. Based on their descriptions and locations, some of the listed projects have the potential to be visible within the same viewshed as the Rio Mesa SEGF, that is they could be simultaneously visible with the proposed project from the same viewpoints on I-10 or other locations. In general some of the listed projects would have the potential to cumulatively contribute to an increasing transformation of the existing visual corridor of I-10 in the project vicinity (eastern Chuckwalla Valley, Palo Verde Mesa, Palo Verde Valley). This segment of I-10, while affected by existing projects such as the Blythe Energy gas-fired power plant and associated 230 kV power lines, remains scenically relatively intact. Views from I-10 toward the Mule Mountains, such as KOP 3, retain largely intact foreground views of the Palo Verde Mesa and eastern Chuckwalla Valley. Existing power infrastructure including the Palo Verde 1 power line remain visually subordinate, and quality of views remains moderately high. While most projects listed would likely be individually less than significant in their effect on I-10 views, their combined effect could well represent a cumulatively significant level of adverse visual change. With build-out of this list of projects along the I-10 corridor, the visual corridor would become increasingly dominated by power infrastructure, including transmission lines, substations, and the spatially extensive power projects.

Because of their low vertical profile, solar trough and PV projects would tend to recede from view with sufficient setback distance from viewers in this level topographic environment. This mitigating factor would not apply however to views from elevated viewpoints such as the McCoy and Mule Mountains. Of particular concern to staff would be projects such as the McCoy Soleil solar tower project which, depending on exact location, layout and scale could, together with the Rio Mesa SEGF, expose the I-10 corridor and other viewpoints to multiple sources of bright SRSG glare, visible from the same locations. On one hand, because of the great range of their significant glare impacts, multiple solar tower/SRSG projects in the same viewsheds could be a cumulative concern due to the increased extent and intensity of glare. On the other hand, perhaps concentrating such projects in the same areas would be preferable to adversely impacting many very large viewsheds.

At least two of the foreseeable projects, the Desert Quartzite and Palo Verde Mesa projects, are shown to be located within the Palo Verde Mesa. In combination with the Rio Mesa SEGF these would likely dominate most or all of the landscape within the Palo Verde Mesa, with potentially detrimental cumulative visual effects on the BLM lands within the Palo Verde Mesa.

Consequently, staff concludes that the proposed project in combination with existing and foreseeable future projects within the project viewshed could cause significant unavoidable cumulative visual impacts. Project impacts, in combination with existing and foreseeable future solar and other development projects within the I-10 corridor in Riverside County, including the Chuckwalla Valley and Palo Verde Mesa, would contribute to a perceived sense of industrialization of the open, undeveloped desert landscape and impact views of scenic resources in the Palo Verde Mesa and Chuckwalla Valley viewsheds, having the potential to be significant and unavoidable.

REGIONAL CUMULATIVE VISUAL IMPACTS

The analysis of cumulative impacts is not necessarily restricted to the immediate viewshed of a project, and the need for cumulative analysis over a broad geographic area may often be determined by the affected resource itself. In this case the affected resource is the unique and highly valued landscape type of which the project site forms a small part – the landscape of the southern California and Sonoran Desert. The Sonoran Desert and California Desert Conservation Area (CDCA) within which the Rio Mesa SEGF is located are a unique and highly valued scenic resource of national importance, as reflected by the presence of three national parks and numerous Wilderness Areas within the CDCA boundaries. This regional cumulative analysis is not based upon a specific list of foreseeable projects. However, based on information currently available to staff, it appears highly likely that if even a small proportion of the total number of applications for renewable development in the CDCA are developed, there may 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, the Rio Mesa SEGF would make a cumulatively considerable contribution to a potentially significant region-wide, cumulative impact to the CDCA landscape, viewed as a whole.

COMPLIANCE WITH APPLICABLE LORS

Staff has reviewed applicable laws, ordinances, regulations and standards and the project's consistency with those LORS. Staff concludes that, even with conditions, the project is not in conformance with all applicable LORS, as summarized below.

VISUAL RESOURCES Table 2
Compliance with Applicable Laws, Ordinances, Regulations, and Standards

Applicable LORS	Policy and Strategy Description	Consistency Determination
Federal		
BLM		
Federal Land Policy and Management Act of 1976 (FLPMA)	FLPMA is the statute under which the BLM manages lands in its jurisdiction. Under FLPMA, BLM prepares Resource Management Plans (RMP) determining how those lands and their resources, including visual resources, are to be managed.	See discussios of CDCA Plan and VRM, following.
The California Desert Conservation Area (CDCA) Plan	The CDCA Plan represents the Resource Management Plan (RMP) for the area required under FLPMA. BLM lands surrounding the project site are MUC Class L. Portions of BLM lands surrounding the proposed gen-tie corridor are MUC Class M.	Consistency with CDCA multiple use classes (MUC) will be determined by BLM during preparation of NEPA documentation of the project by BLM.
Visual Resource Management (VRM) System	VRM is the system used by BLM to assess and manage visual resources of lands under its jurisdiction. Visual Resource Inventory (VRI) mapping was recently completed for BLM lands in the project study area and are depicted in **Visual Resources Figure 9**. However, Visual Resource Management Classes have not yet been assigned to the area. BLM determination of visual resource	Consistency with VRM Class management objectives will be determined by BLM during preparation of NEPA documentation of the project by BLM.

Applicable LORS	Policy and Strategy Description	Consistency Determination
	conformance with the CDCA Plan will require BLM assignment of VRM Classes.	
Wilderness Act 0f 1964	The Wilderness Act establishes a federal system of designated wilderness areas to "be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness …" The Palo Verde Mountains Wilderness Area (WA) lies within the project viewshed at a distance of approximately 3 miles to the south of the project boundary, and is managed by BLM.	Consistency with management objectives for the Palo Verde Mountains WA will be determined by BLM during preparation of NEPA documentation of the project by BLM. However, staff notes that the proposed project would have strong visual effects on users of the WA during daylight hours due to glare. The wilderness designation of the Palo Verde Mountains WA is noted in this study as a formal indication of recognized scenic value and sensitivity.
National Scenic Byways Program	The National Scenic Byways (NSB) Program was established under the Intermodal Surface Transportation Efficiency Act of 1991, and reauthorized in 1998 under the Transportation Equity Act for the 21st Century to formally designate and support roads identified for their outstanding scenic, as well as historic, natural and recreational qualities. The Bradshaw Trail is a designated Back-Country Byway. Back-Country Byways are the BLM portion of this program. The program is primarily promotional, and does not impose specific management status or requirements to designated roads, but may provide funding for byway development and maintenance.	The Scenic Byway status of the Bradshaw Trail is noted in this study as a formal indication of recognized scenic value and sensitivity.
STATE		
State Scenic Highway Program (CA. Streets and Highways Code, Section 260 et seq.)	The State Scenic Highway Program promotes protection of designated state scenic highways through certification and adoption of local scenic corridor protection programs that conform with requirements of the	**Yes.** There are no designated or currently eligible State scenic highway segments in the project viewshed. To become eligible, a route must be added to a list of eligible routes by the state legislature.

Applicable LORS	Policy and Strategy Description	Consistency Determination
	state program. To be designated, routes must first be included in the list of eligible routes by the state legislature.	
LOCAL		
Riverside County General Plan - Land Use Element	Policy LU 6.4. - Retain and enhance the integrity of existing residential employment, agricultural, and open space areas by protecting them from encroachment of land uses that would result in impacts from noise, noxious fumes, glare, shadowing, and traffic.	**No.** County residential, agricultural, and open space areas in the project viewshed would be strongly impacted from effects of bright glare.
	Policy LU 8.1. Provide for permanent preservation of open space lands that contain important natural resources, hazards, water features, watercourses, and scenic and recreational values.	**No.** Areas with recognized scenic and recreational values, including the Bradshaw Trail, Palo Verde Mountains Wilderness Area, and Cibola National Wildlife Refuge would experience a decline in those values due to bright glare. The affected areas cited, however, are not located on county lands, but within federal jurisdiction.
	Policy LU 13.1. Preserve and protect outstanding scenic vistas and visual features for the enjoyment of the traveling public.	**No.** The eastern portions of the Bradshaw Trail would be strongly impacted by glare. Scenic portions of the Bradshaw Trail are located entirely on lands within federal jurisdiction.
	Policy LU 24.8. Require that industrial development be designed to consider their surroundings and visually enhance, not degrade, the character of the surrounding area.	**No.** The landscape setting of the Rio Mesa SEGF has a mostly natural character. The project would be a visually dominant and highly intrusive feature that would degrade the scenic qualities of its surroundings.
- Open Space Element	Policy OS 21.1. Identify and conserve the skylines, view corridors, and outstanding scenic vistas within Riverside County.	**No.** The skyline of the Mule Mountains as viewed from roadways and towns within the Palo Verde Valley would be broken and impaired by the physical form and bright glare of the proposed solar towers.
Riverside County - Palo Verde Area Plan	Policy 10.1. Protect the scenic highways in the Palo Verde Valley planning area from change that would diminish the aesthetic value of adjacent properties in accordance with the Scenic Corridors sections of the General Plan Land Use, Multipurpose Open Space, and	**Yes.** I-10 within the plan area is a County eligible (not designated) scenic corridor. However, the highway and adjoining communities of Mesa Verde and Blythe lie outside of the zone in which this study identifies significant

Applicable LORS	Policy and Strategy Description	Consistency Determination
	Circulation Elements.	visual or glare impacts.
	Policy 10.2. Encourage the designation of Interstate 10 and US Highway 95 as eligible and subsequently Official Scenic Highways in accordance with the Caltrans Scenic Highway Program.	**Yes.** I-10 has not been added by the state legislature to the list of eligible state scenic highways. The County cannot apply for designated state scenic highway status if the route is not listed as eligible under the Streets and Highways code.
Imperial County General Plan	The Conservation and Open Space Element, and the Circulation-Scenic Highways Element contain broad goals and objectives for protection of scenic resources. However, no implementation programs or policies have been developed to date. Scenic Highway Program/Landscaping Policy 9.b recommends creation of a Scenic Highway Advisory Committee to review and revise a scenic highway program, but such a program has not yet been implemented.	No policies applicable to the proposed project were identified.

CONCLUSIONS

Staff concludes that even with mitigation from recommended Conditions of Certification **VIS-1**, **VIS-2**, **VIS-3**, **VIS-4,** the construction and operation of the Rio Mesa Solar Electric Generating Facility would result in significant and unavoidable aesthetic impacts according to the California Environmental Quality Act (CEQA) Guidelines.

Staff has reviewed **Socioeconomics Figure 1** showing the environmental justice population is less than 50 percent within a six-mile radius of the proposed Rio Mesa SEGF, and notes that the **Socioeconomic** section of this document concludes that the minority population in the six-mile project buffer is not meaningfully greater than the minority population in the general population in the local area or Riverside County. Staff concludes that the project would not have adverse visual impacts on an environmental justice population.

ADDITIONAL INFORMATION STAFF REQUIRES FROM THE APPLICANT IN ORDER TO COMPLETE THE FSA

The applicant is required to identify potential heliostat glint receptors and present proposed methods to ensure that heliostats would be positioned to avoid casting glint on those receptors at all times. Staff must have this information prior to issuance of the

FSA in order to ensure that potential impacts are identified and can be mitigated. This request was made in a recent formal data request and is further discussed in the **Traffic and Transportation** section of this PSA.

PROPOSED 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 by blending with the landscape or by providing architectural interest; b) their colors and finishes do not create excessive glare; in particular, that the finish of the solar towers does not cause high reflectivity, resulting in potential glare; and c) their colors and finishes are consistent with local policies and ordinances. Surface color treatment shall include painting or tinting of stacks, dry cooling structures, tanks, heliostat structures and other features in earth tone colors and values to blend in with the surrounding mountains and desert vegetation. Colors shall be chosen from BLM's Standard Environmental Colors and pre-tested in the field. Any transmission line poles and conductors associated with the project hall be non-specular and non-reflective, and the insulators shall be non-reflective and non-refractive. 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, including the photographic results of field testing;

b) a list of each major project structure, building, tank, pipe, wall, and fencing, specifying the color(s) and finish proposed for each. Colors must be identified by vendor, name, finish and number; or according to a universal designation system;

c) one set of 11" x 17" color photo simulations at life size scale of the treatment proposed for use on project structures, including structures treated during manufacture, from representative points of view, Key Observation Point 1 (Visual Resources Figure 10b of the Staff Assessment) or color-rendered elevation drawings on 18" x 24" minimum sheet size;

d) color samples on color card or painted steel;

e) a specific schedule for completion of the treatment; and

f) 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 the CPM. Subsequent modifications to the treatment plan are prohibited without CPM approval.

<u>Verification:</u> 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 the CPM for review and approval and simultaneously to Riverside and Imperial counties for review and comment. If the CPM determines that the plan requires revision, the project owner shall provide to the CPM a plan with the specified revision(s) for review and approval by the CPM before any treatment is applied. Any modifications to the treatment plan must be submitted to the CPM for review and approval.

Prior to the start of commercial operation, the project owner shall notify the CPM that surface treatment of all listed structures and buildings has been completed and is ready for inspection and shall submit one set of electronic color photographs from the same key observation point identified in (c) 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.

Off-Site Landscape Screening: Palo Verde Valley Tree Plantings

VIS-2 The project owner shall plant trees on the western boundary of Marlowe Park, Ripley; and on properties of any residential property owner within 8.5 miles of either solar tower who indicates an interest in having them and ultimately agrees to having them. The intent is to plant the trees in locations that will screen views looking toward the solar power towers from the residences on the property and from the property's primary outdoor living areas.

The project owner shall meet the following requirements:

a) The project owner shall notify managers of Marlowe Park in Ripley, and residents within an 8.5 mile radius of either solar tower of the opportunity to obtain landscape screening as described in this condition. This letter should explain its purpose and state that the property owner/resident has a specific timeframe within which to respond and ultimately agree.

b) The project owner shall employ a professional arborist to identify a list of species that are well adapted to the local conditions and which have characteristics that provide effective screening of views. Selected plants shall avoid invasive exotic species as i[1]ndentified by the USDA and Invasive Species Council of California (ISCC). [1, 2]

c) The arborist shall work with residents to select up to eight trees from this list of species and will assist the residents in indentifying appropriate locations for their installation. The project owner will take responsibility for purchasing and installing the trees, which shall be the equivalent of a 15-gallon standard nursery size.

d) Tree planting is a one-time opportunity for property owners in the Palo Verde Valley. Once installed, irrigation and maintenance of the trees will be the responsibility of the property owner and the project owner shall have no further responsibility.

Verification: Within 120 days of beginning construction, the project owner shall contact property owners in the Palo Verde Valley within 8.5 miles of either solar tower, including managers of Marlowe Park, Ripley, and the CPM, by registered mail to notify them of the tree planting program. The project owner shall provide in the Monthly Compliance Report (MCR) a summary of the program, including the following:

a.) parcel numbers of property owners contacted, and map with property owners/residents to be contacted;

b.) actions taken to ensure property owners fully understand the program, including draft of letter(s) to be sent to property owners, for review and approval of the CPM;

c.) list of installations by parcel number;

d.) quantity and species installed on each parcel;

e.) documentation of any property owner who declined to participate by parcel number;

f.) a signed affidavit from project owner or designee; and

g.) copies and records of all communication with managers of Marlowe Park, Ripley.

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 such that:

a) lamps and reflectors are not visible from beyond the project site, including any off-site security buffer areas;

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[1] NRCS Invasive Species Policy, Invasive Species Executive Order 13112, Invasive and Noxious Weeds, California State Listed Noxious Weeds.

[2] The California Invasive Species List, Presented on April 21, 2010 by the California Invasive Species Advisory Committee (CISAC) to the Invasive Species Council of California (ISCC).[1]

b) lighting does not cause excessive reflected glare;

c) direct lighting does not illuminate the nighttime sky;

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 the CPM for review and approval and simultaneously to Riverside and/or Imperial County as applicable 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;

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; and

g.) statement of conformance with all federal, state and local statutes and regulations related to dark skies or glare, including, but not limited to, the Riverside and Imperial County General Plans and related ordinances.

Verification: At least 90 days prior to ordering any permanent exterior lighting, the project owner shall contact 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 the CPM for review and approval and simultaneously to Riverside and Imperial Counties for review and comment a lighting mitigation plan. If the CPM determines that the plan requires revision, the project owner shall provide to the CPM a revised plan for review and approval by the CPM. The submittal shall include 3 printed sets of full-size plans (not to exceed 24” x 36”), 3 sets of 11” x 17” reductions and a digital copy in PDF format. The project owner shall not order any exterior lighting until receiving CPM approval of the lighting mitigation plan.

Prior to commercial operation, the project owner shall notify the CPM that the lighting has been completed and is ready for inspection. If after inspection the CPM notifies 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 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 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 the CPM within 48 hours after completing implementation of the proposal. A copy of the complaint resolution form report shall be submitted to the CPM within 30 days.

Construction Lighting

VIS-4 The project owner shall ensure that lighting for construction of the power plant is deployed in a manner that minimizes potential night lighting impacts, as follows:

a) all lighting shall be of minimum necessary brightness consistent with worker safety and security;

b) all fixed position lighting shall be shielded or hooded, to the extent feasible given safety and security concerns, and directed downward toward the area to be illuminated to prevent direct illumination of the night sky and direct light trespass (direct light extending outside the boundaries of the power plant site or the site of construction of ancillary facilities, including any security related boundaries); and

c) wherever feasible, safe and not needed for security, lighting shall be kept off when not in use.

<u>**Verification:**</u> owner shall notify and the CPM that the lighting is ready for inspection. If the CPM requires modifications to the lighting, within 15 days of receiving that notification the project owner shall implement the necessary modifications and notify the CPM that the modifications have been completed.

Within 48 hours of receiving a lighting complaint, the project owner shall provide the CPM with a complaint resolution form report as specified in the General Conditions section including a proposal to resolve the complaint, and a schedule for implementation. The project owner shall notify the CPM within 48 hours after completing implementation of the proposal. A copy of the complaint resolution form report shall be included in the subsequent Monthly Compliance Report following complaint resolution.

REFERENCES

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BLM, 2010b. Visual Resource Inventory, El Centro Field Office.

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County of Imperial, 1993 (as amended). General Plan

County of Riverside, 2008. General Plan

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International Dark Sky Association (IDSA), 2010. Organization web site, http://www.darksky.org

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Oldham, M., Manager, Cibola NWR. Personal communication, August 24, 2012.

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APPENDIX VR-1

ENERGY COMMISSION VISUAL RESOURCE ANALYSIS EVALUATION CRITERIA

Energy Commission staff conducts a visual resource analysis according to Appendix G, “Environmental Checklist Form—Aesthetics,” California Environmental Quality Act (CEQA). The CEQA analysis requires that commission staff make a determination of impact ranging from “Adverse and Significant” to “Not Significant.”

Staff’s analysis is based on Key Observation Points or KOPs. KOPs are photographs of locations within the project area that are highly visible to the public—for example, travel routes; recreational and residential areas; and bodies of water as well as other scenic and historic resources.

Those photographs are taken to indicate existing conditions without the project and then modified to include a simulation of the project. Consequently, staff has a visual representation of the viewshed before and after a project is introduced and makes its analysis accordingly. Information about that analytical process follows.

Visual Resource Analysis Without Project

When analyzing KOPs of existing conditions without the project, staff considers the following conditions: visual quality, viewer concern, visibility, number of viewers, duration of view. Those conditions are then factored into an overall rating of viewer exposure and viewer sensitivity. Information about each condition and rating follows.

Visual Quality

An expression of the visual impression or appeal of a given landscape and the associated public value attributed to the resource. Visual quality is rated from *high* to *low*. A high rating is generally reserved for landscapes viewers might describe as picture-perfect.

Landscapes rated high generally are memorable because of the way the components combine in a visual pattern. In addition, those landscapes are 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. On the contrary, landscapes rated *low* are often dominated by visually discordant human alterations.

Viewer Concern

Viewer concern represents the reaction of a viewer to visible changes in the viewshed an area of land visible from a fixed vantage point. For example, viewers have a high expectation for views formally designated as a scenic area or travel corridor as well as for recreational and residential areas. Viewers generally expect that those views would be preserved. Travelers on highways and roads, including those in agricultural areas, are generally considered to have moderate viewer concerns and expectations.

However, viewers tend to have low-to-moderate viewer concern when viewing commercial buildings. And industrial uses typically have the lowest viewer concern. Regardless, the level of concern could be lower if the existing landscape contains discordant elements. In addition, 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; extent of visual screening; and topographical relationships between the object and existing homes, streets, or parks. In that sense, visibility is determined by considering any and all obstructions that may be in the sightline—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. *Number of viewers* is organized into the following categories: residential according to the number of residences; motorist according to the number of vehicles; 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 unobstructed foreground view from a large number of residences represents a high value.

Visual Sensitivity

Visual sensitivity is comprised of three elements previous listed, *visual quality*, *viewer concern*, and *viewer exposure*. Viewer sensitivity tends to be higher for homeowners or people driving for pleasure or engaged in recreational activities and lower for people driving to and from work or as part of their work.

Visual Resource Analysis with Project

Visual resource analyses with photographic simulations of the project involve the elements of contrast, dominance, view disruption, and visual change. Information about each element follows.

Contrast

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 a proposed energy facility is more visually absorbent; that is, more capable of accepting those characteristics than a landscape in which those elements are absent. Generally, visual absorption is inversely proportional to visual contrast.

Dominance

Dominance is a measure of (a) the proportion of the total field of view occupied by the field; (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 is lower in a panoramic setting than in an enclosed setting 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 *low* to *high*.

View Disruption

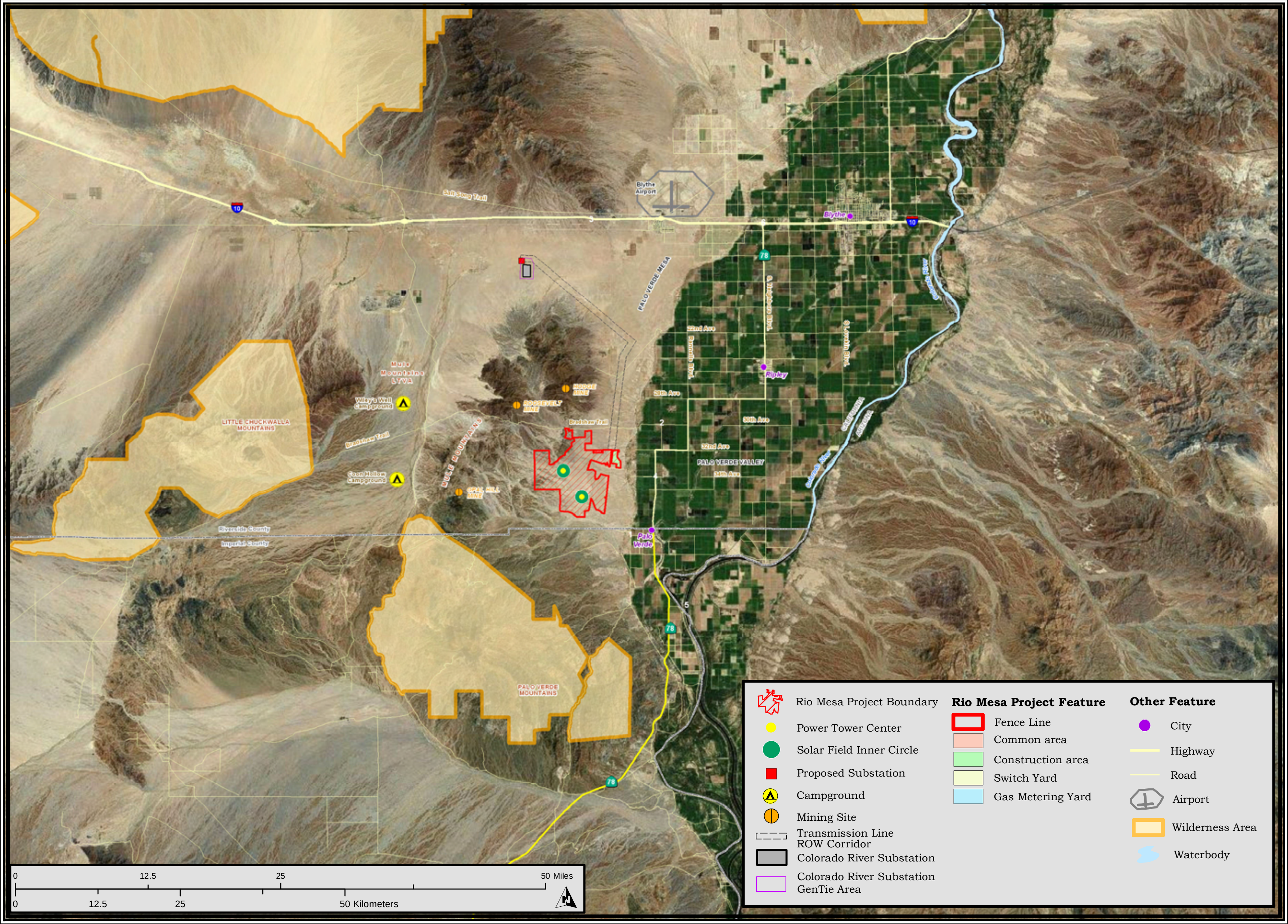
The extent to which any previously visible landscape features are blocked from view constitutes view disruption. The view is also disrupted when the continuity of the view is interrupted. When considering a project's features, higher quality landscape features can be disrupted by lower quality project features, thus resulting in adverse visual impacts. The degree of view disruption can range from *none* too *high*.

Visual Change

Visual change is a function of *contrast*, *dominance*, and *view disruption*. Generally, *contrast* and *dominance* contribute more to the degree of visual change than does *view disruption*.

VISUAL RESOURCES - FIGURE 1

Rio Mesa Solar Electric Generating Facility - Project Setting



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: URS, ESRI, BLM & Tele Atlas Data

VISUAL RESOURCES - FIGURE 2
Rio Mesa Solar Electric Generating Facility - Project Site

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: Staff Photo

VISUAL RESOURCES - FIGURE 3a

Rio Mesa Solar Electric Generating Facility - Project Vicinity Character Photos - Palo Verde Mesa

Palo Verde Mesa – View at Western Area Power Administration Right-of-Way ROW, looking south

Palo Verde Mesa – View from town of Mesa Verde

Palo Verde Mesa – View from Highway I-10

Palo Verde Mesa – View from Bradshaw Trail

SOURCE: Staff Photo

VISUAL RESOURCES - FIGURE 3b

Rio Mesa Solar Electric Generating Facility - Project Vicinity Character Photos

I-10 – Blythe Power Plant

I-10 – Blythe Power Plant Transmission Line

I-10 – View from Highway I-10 toward Site

I-10 – Town of Mesa Verde

SOURCE: Staff Photo

VISUAL RESOURCES - FIGURE 3c

Rio Mesa Solar Electric Generating Facility - Project Vicinity Character Photos - Palo Verde Valley

Palo Verde Valley – Looking toward site from SR 78

Palo Verde Valley – Looking toward site from SR 78

Town of Ripley

Town of Palo Verde

SOURCE: Staff Photo

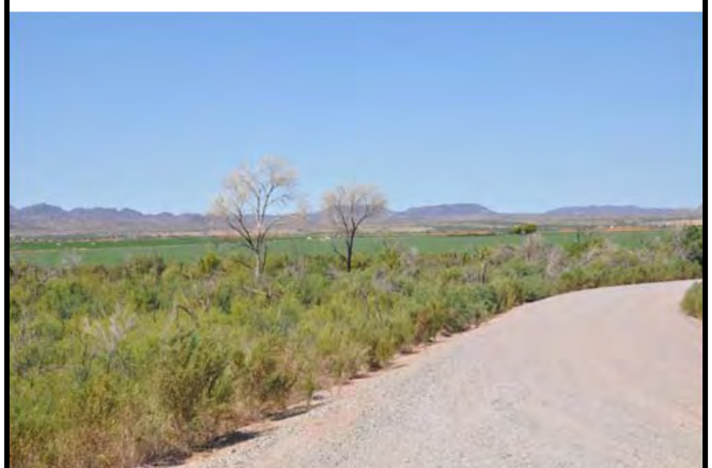
VISUAL RESOURCES - FIGURE 3d

Rio Mesa Solar Electric Generating Facility - Project Vicinity Character Photos - Cibola NWR

NWR – View looking toward site from campground

NWR – Colorado River

NWR – Looking toward Palo Verde Mountains Wilderness Area



NWR – View toward Mule Mountains over Palo Verde Valley

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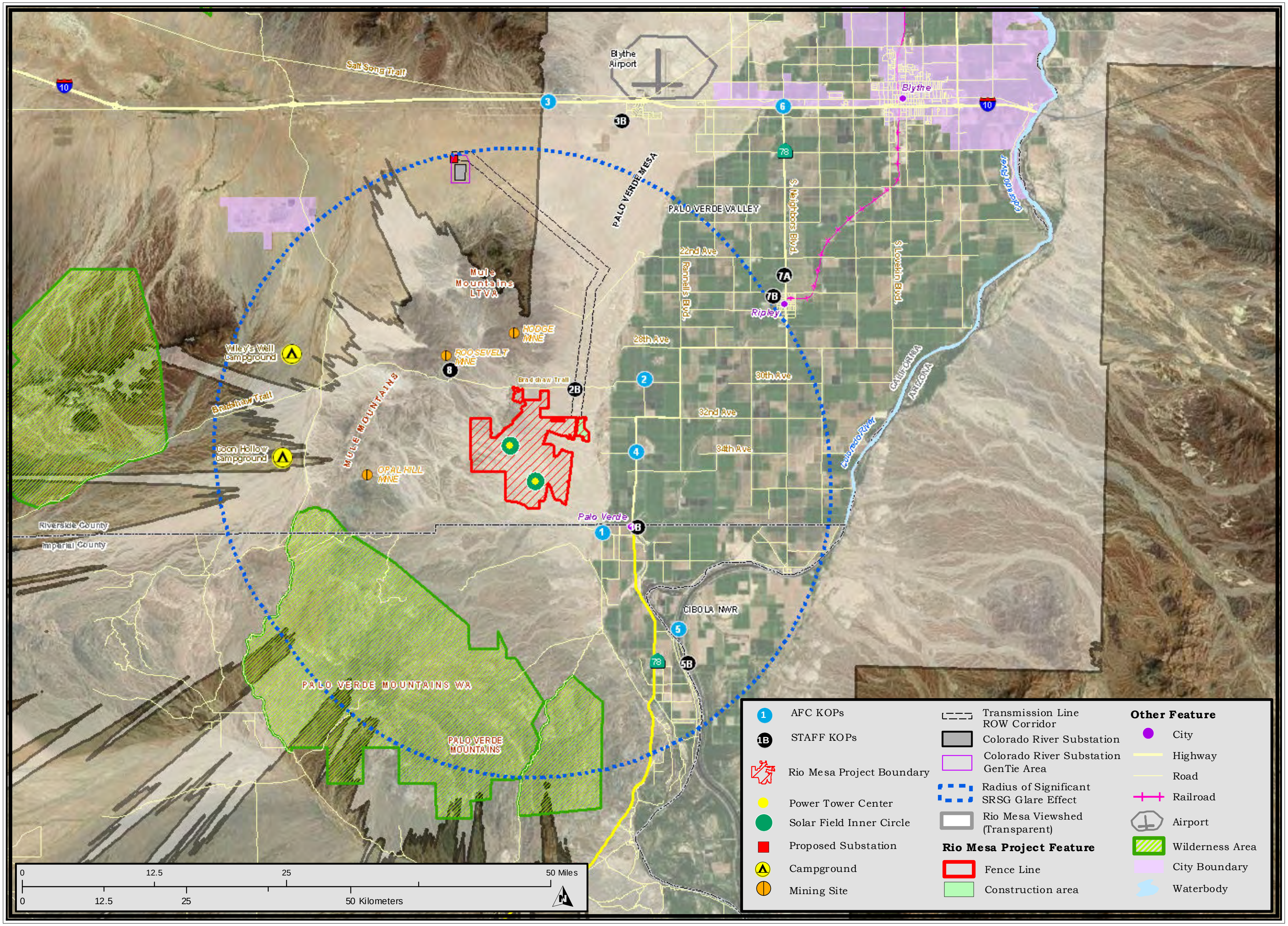
SOURCE: Staff Photo

VISUAL RESOURCES - FIGURE 4

Rio Mesa Solar Electric Generating Facility - Solar Receiver Tower Viewshed

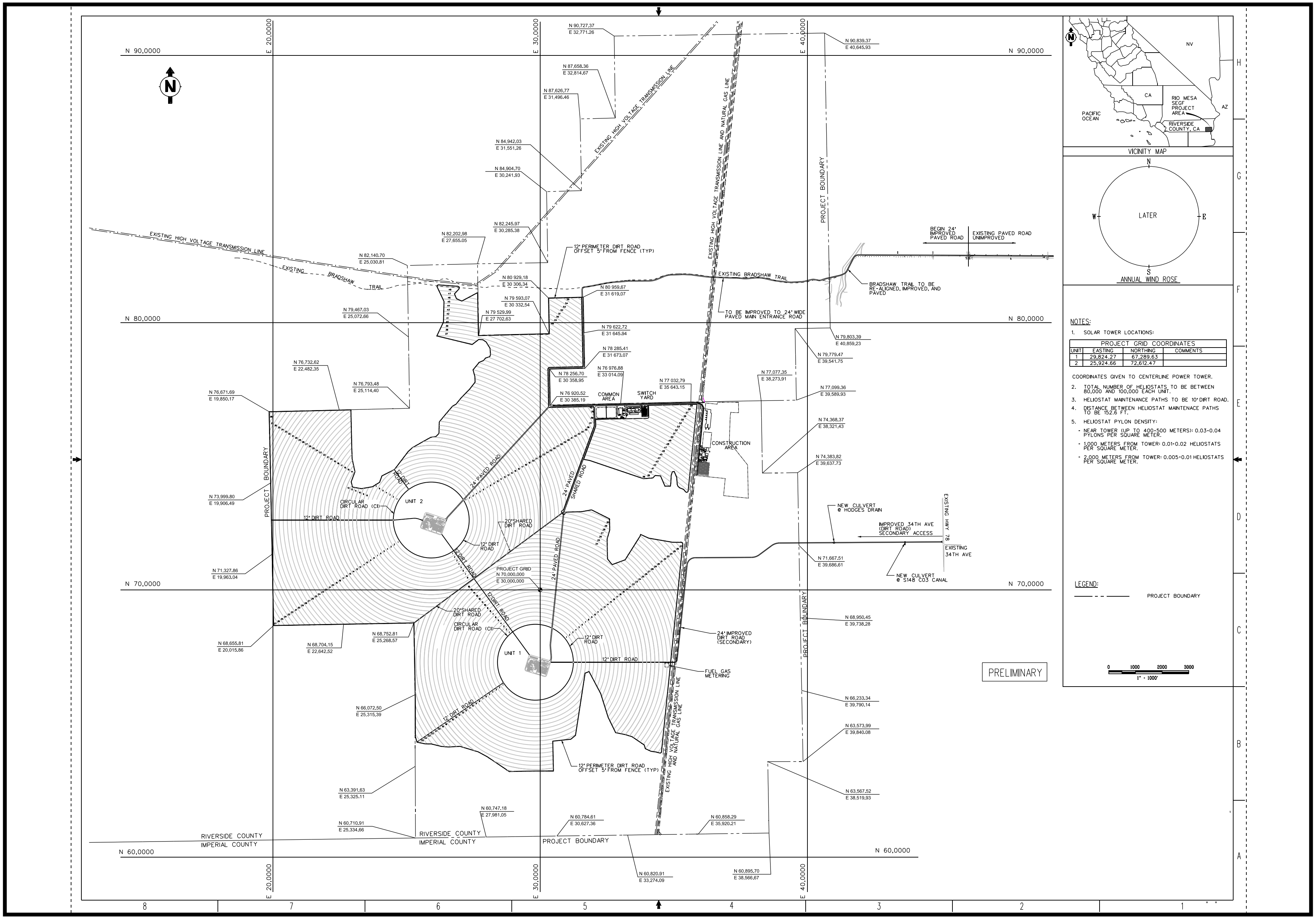


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: URS, ESRI, BLM & Tele Atlas Data

VISUAL RESOURCES - FIGURE 5

Rio Mesa Solar Electric Generating Facility - Project Layout

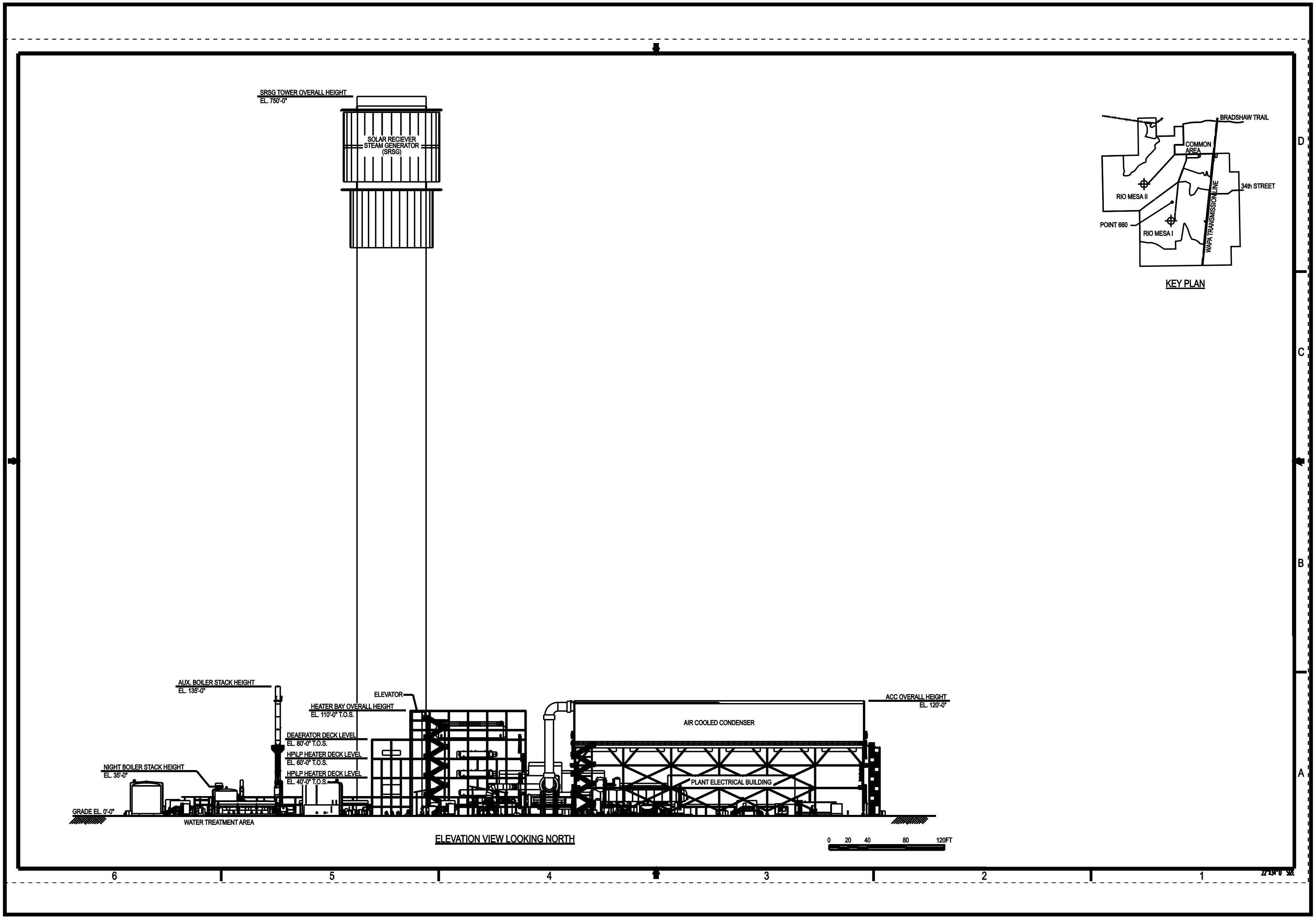


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Ammended AFC 7/23/2012, Fig. 2-5 (Rev)

VISUAL RESOURCES - FIGURE 6

Rio Mesa Solar Electric Generating Facility - Architectural Elevation of Proposed Power Block

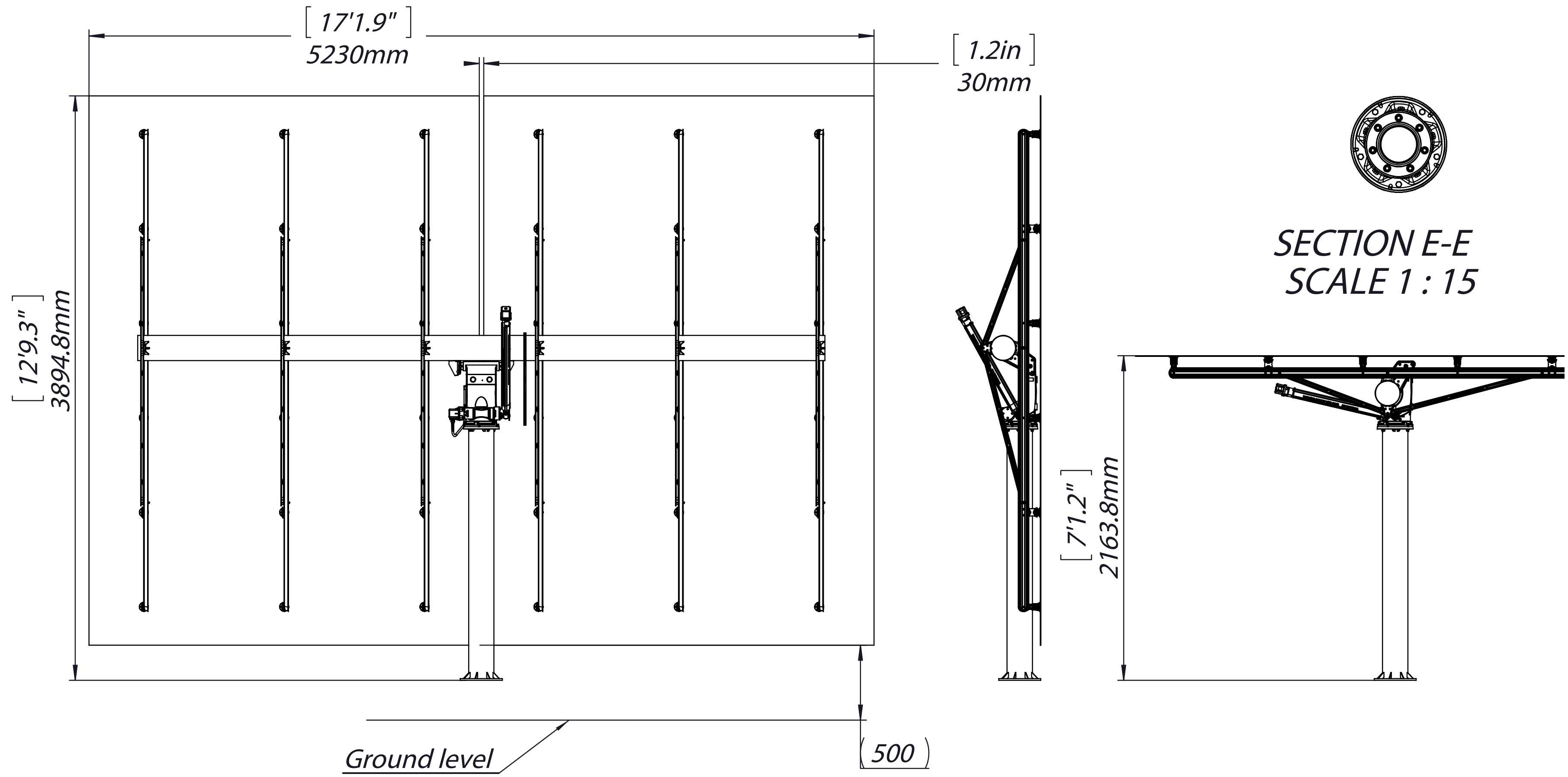


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Amended AFC 7/23/2012, Fig. DA-13 (Rev)

VISUAL RESOURCES - FIGURE 7

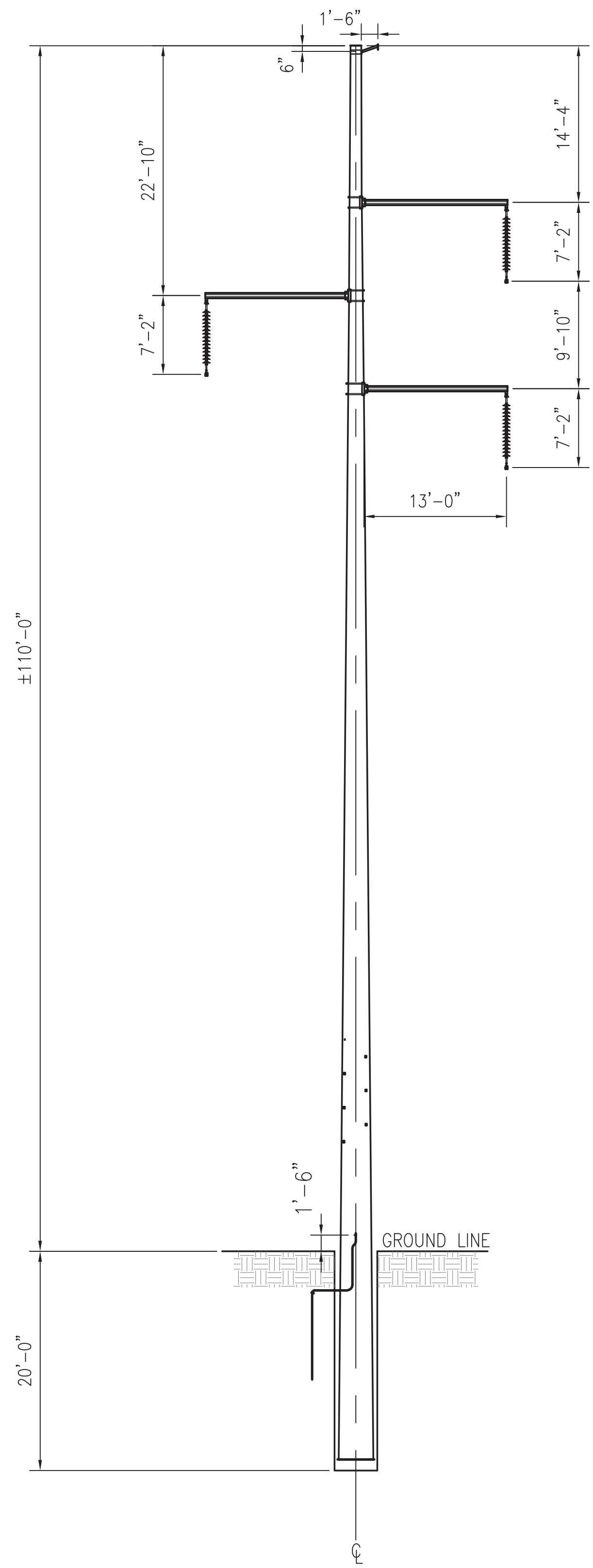
Rio Mesa Solar Electric Generating Facility - Proposed Heliostat Units



SOURCE: Supplement to the AFC, 11/18/11, Fig. 2-12

VISUAL RESOURCES - FIGURE 8

Rio Mesa Solar Electric Generating Facility - Proposed Generation Tie Line Poles

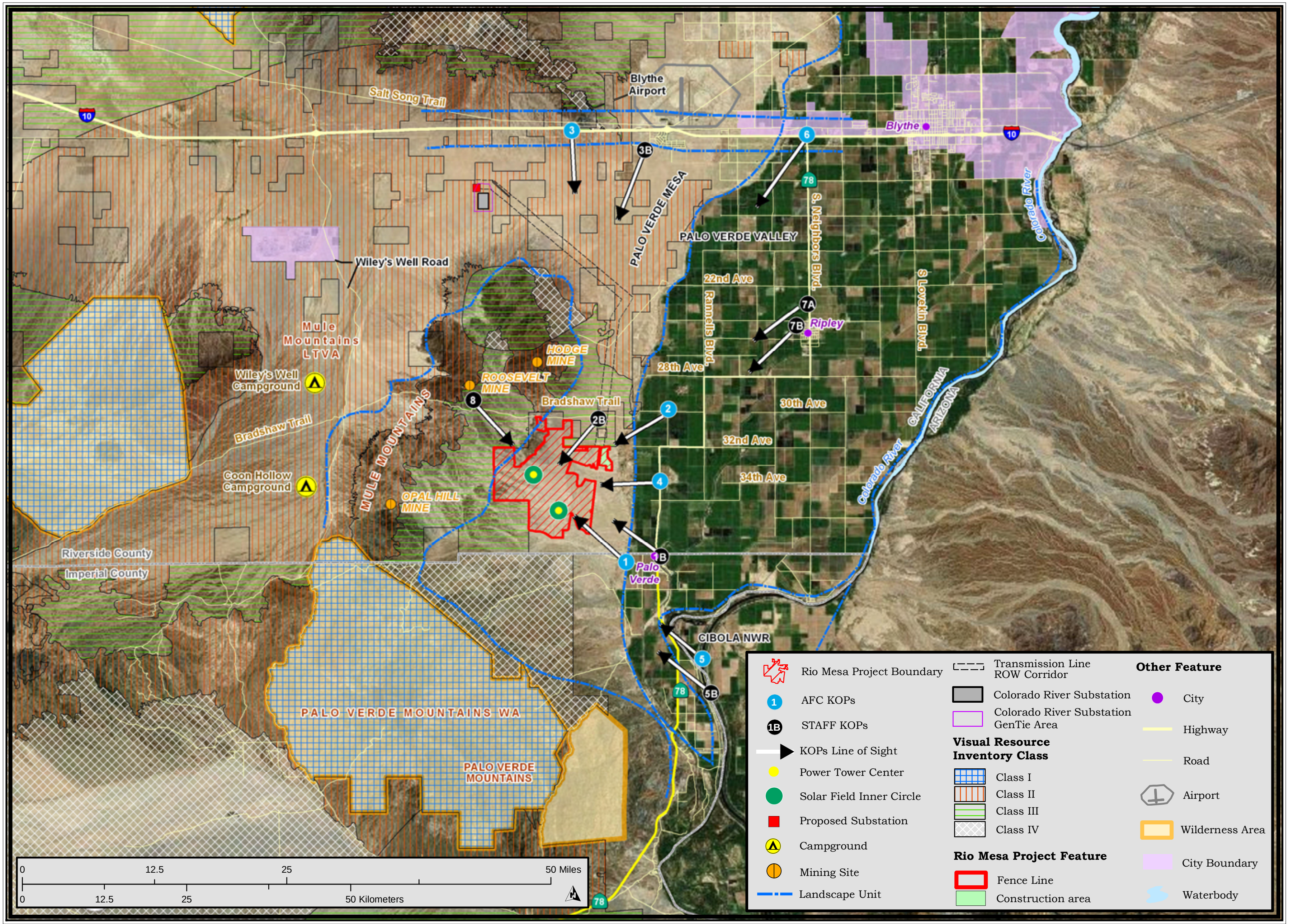


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Amended AFC 7/23/2012, Fig. 3.3-2 (Rev)

VISUAL RESOURCES - FIGURE 9

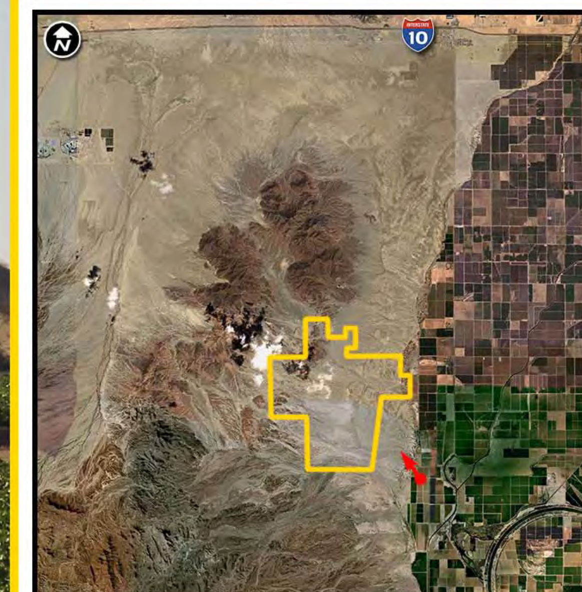
Rio Mesa Solar Electric Generating Facility - Key Observation Points (KOPs)



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: CEC Staff, URS, ESRI, BLM & Tele Atlas Data.

VISUAL RESOURCES - FIGURE 10a
Rio Mesa Solar Electric Generating Facility - AFC KOP 1 - View From Nearest Residence To Project, Looking Northwest (Existing Conditions)



Key Observation Point

Photograph Information

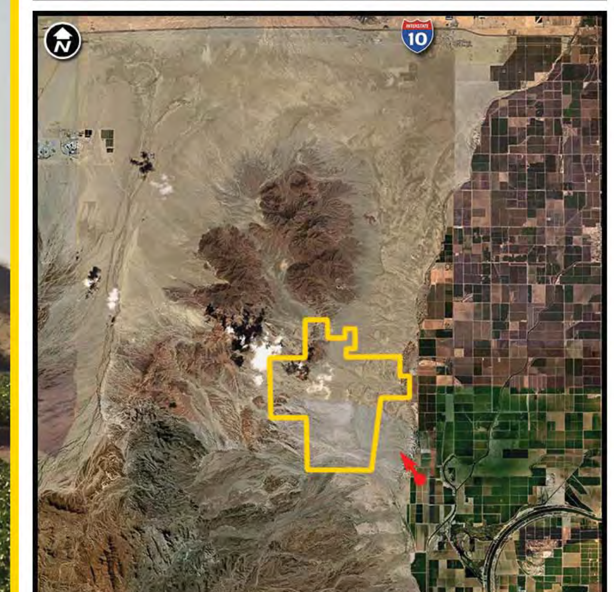
Time of photograph :	5:24:39 PM
Date of photograph :	8/4/2011
Weather condition :	Clear
Viewing direction :	West/Northwest
Latitude :	33° 25' 47.49" N
Longitude :	114° 44' 39.06" W

Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Amended AFC 7/23/2012, Fig. 5.13-14a (Rev)

VISUAL RESOURCES - FIGURE 10b

Rio Mesa Solar Electric Generating Facility - AFC KOP 1 - View From Nearest Residence To Project, Looking Northwest (Proposed Facility)



Key Observation Point

Photograph Information

Time of photograph :	5:24:39 PM
Date of photograph :	8/4/2011
Weather condition :	Clear
Viewing direction :	West/Northwest
Latitude :	33° 25' 47.49" N
Longitude :	114° 44' 39.06" W

Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Amended AFC 7/23/2012, Fig. 5.13-14b (Rev)

VISUAL RESOURCES - FIGURE 11

Rio Mesa Solar Electric Generating Facility - Staff KOP 1B - View from Residences, Town of Palo Verde, Looking Northwest

"Normal" field of view (approximately 40 degrees)

Distance to Project: 2 miles

Distance to nearest solar tower: 3 miles

"Panoramic view of northwest quadrant

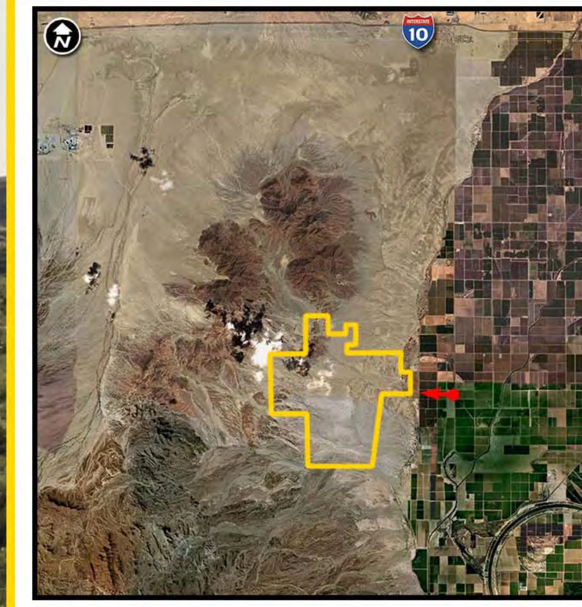
CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Staff Photo

VISUAL RESOURCES - FIGURE 12a

Rio Mesa Solar Electric Generating Facility - AFC KOP 4- View from 34th Avenue/SR 78 Looking West (Existing Conditions)

OVERVIEW MAP



Key Observation Point

Photograph Information

Time of photograph :	5:03PM
Date of photograph :	8/4/2011
Weather condition :	Clear
Viewing direction :	N/W - S/W
Latitude :	33° 27' 46.98" N
Longitude :	114° 43' 50.4" W

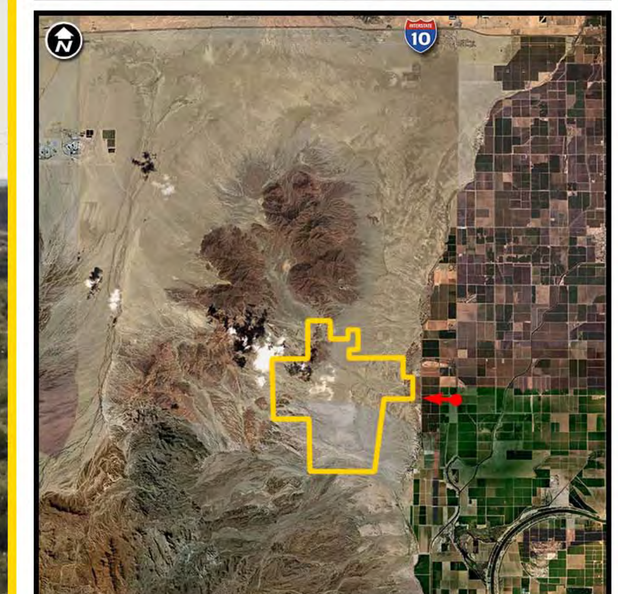
Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Amended AFC 7/23/2012, Fig. 5.13-17a (Rev)

VISUAL RESOURCES - FIGURE 12b

Rio Mesa Solar Electric Generating Facility - AFC KOP 4- View from 34th Avenue/SR 78 Looking West (Proposed Facility)



Key Observation Point

Photograph Information

Time of photograph :	5:03PM
Date of photograph :	8/4/2011
Weather condition :	Clear
Viewing direction :	N/W - S/W
Latitude :	33° 27' 46.98" N
Longitude :	114° 43' 50.4" W

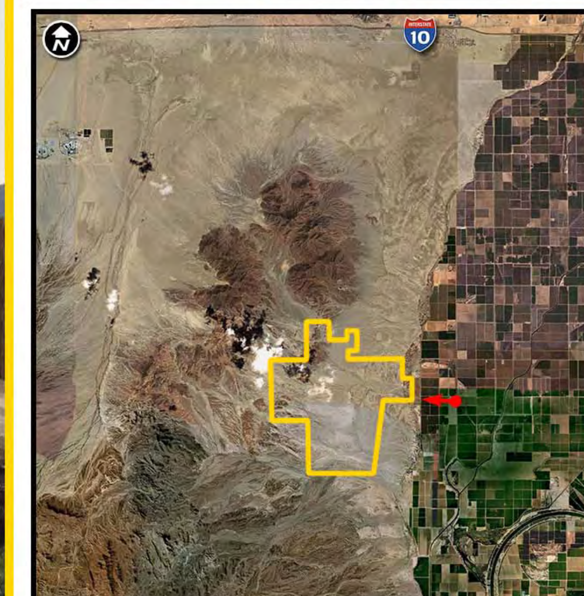
Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Amended AFC 7/23/2012, Fig. 5.13-17b (Rev)

VISUAL RESOURCES - FIGURE 12c

Rio Mesa Solar Electric Generating Facility - AFC KOP 4 - View from 34th Avenue/SR 78 Looking West (Existing Conditions)

OVERVIEW MAP

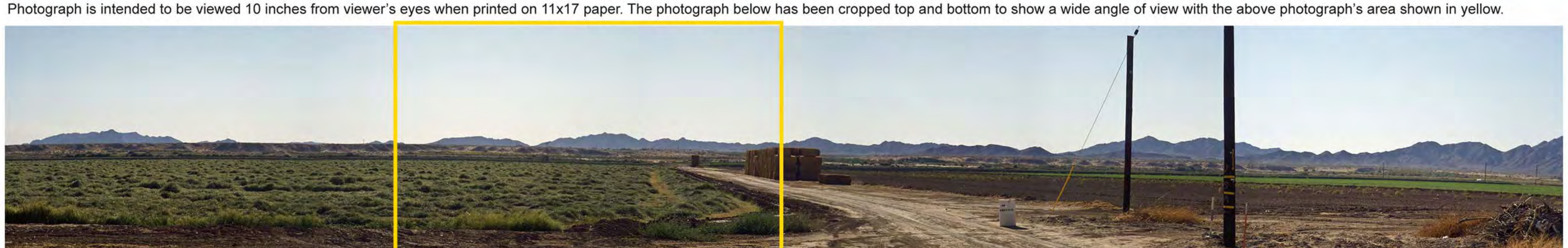


Key Observation Point

Photograph Information

Time of photograph :	5:03PM
Date of photograph :	8/4/2011
Weather condition :	Clear
Viewing direction :	N/W - S/W
Latitude :	33° 27' 46.98" N
Longitude :	114° 43' 50.4" W

Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.



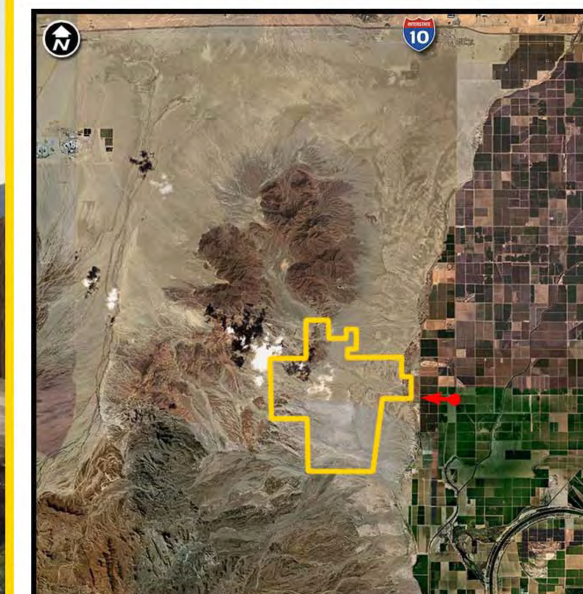
CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Amended AFC 7/23/2012, Fig. 5.13-17c (Rev)

VISUAL RESOURCES - FIGURE 12d

Rio Mesa Solar Electric Generating Facility - AFC KOP 4 - View from 34th Avenue/SR 78 Looking West (Proposed Facility)

OVERVIEW MAP



Key Observation Point

Photograph Information

Time of photograph :	5:03PM
Date of photograph :	8/4/2011
Weather condition :	Clear
Viewing direction :	N/W - S/W
Latitude :	33° 27' 46.98" N
Longitude :	114° 43' 50.4" W

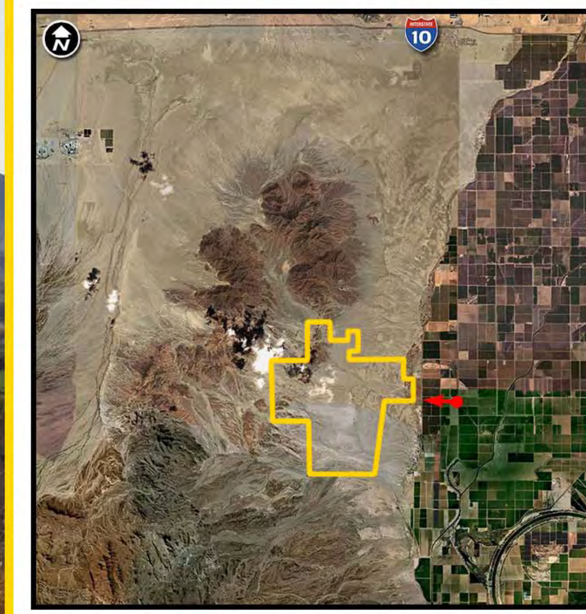
Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Amended AFC 7/23/2012, Fig. 5.13-17d (Rev)

Rio Mesa Solar Electric Generating Facility - AFC KOP 4 - View from 34th Avenue/SR 78 Looking West (Existing Conditions)

OVERVIEW MAP



Key Observation Point

Photograph Information

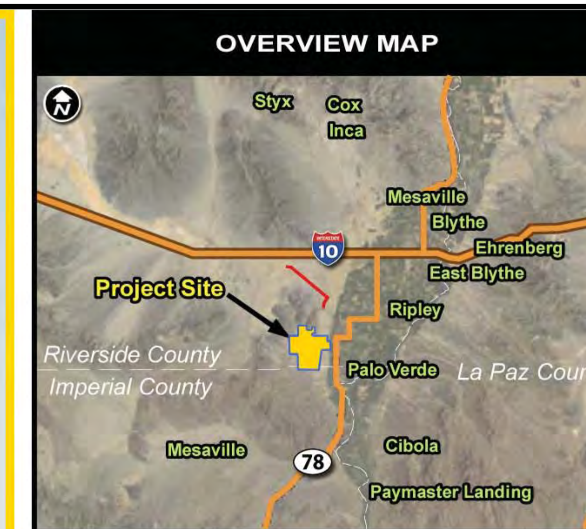
Time of photograph :	5:03PM
Date of photograph :	8/4/2011
Weather condition :	Clear
Viewing direction :	N/W - S/W
Latitude :	33° 27' 46.98" N
Longitude :	114° 43' 50.4" W

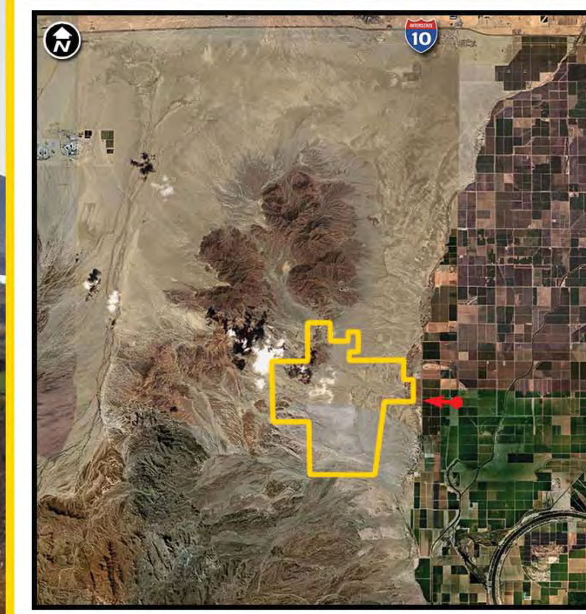
Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Amended AFC 7/23/2012, Fig. 5.13-17e (Rev)

VISUAL RESOURCES - FIGURE 12f

Rio Mesa Solar Electric Generating Facility - AFC KOP 4 - View from 34th Avenue/SR 78 Looking West (Proposed Facility)





Key Observation Point

Photograph Information

Time of photograph :	5:03PM
Date of photograph :	8/4/2011
Weather condition :	Clear
Viewing direction :	N/W - S/W
Latitude :	33° 27' 46.98" N
Longitude :	114° 43' 50.4" W

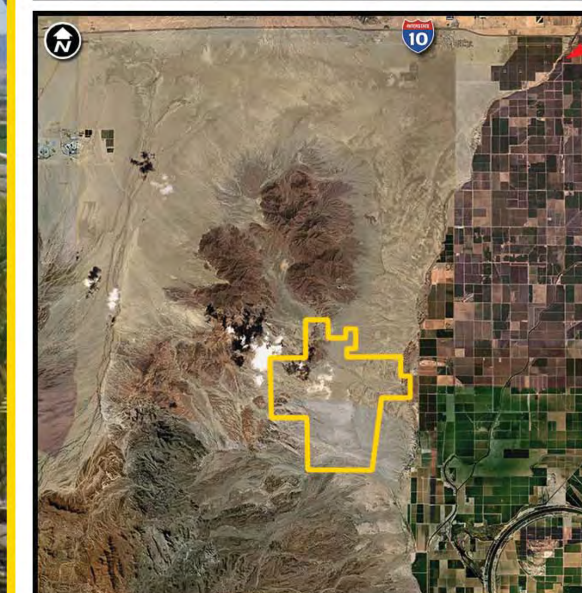
Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Amended AFC 7/23/2012, Fig. 5.13-17f (Rev)

VISUAL RESOURCES - FIGURE 13a

Rio Mesa Solar Electric Generating Facility - AFC KOP 6 - View From SR 78 at I-10 (Existing Conditions)



Key Observation Point

Photograph Information

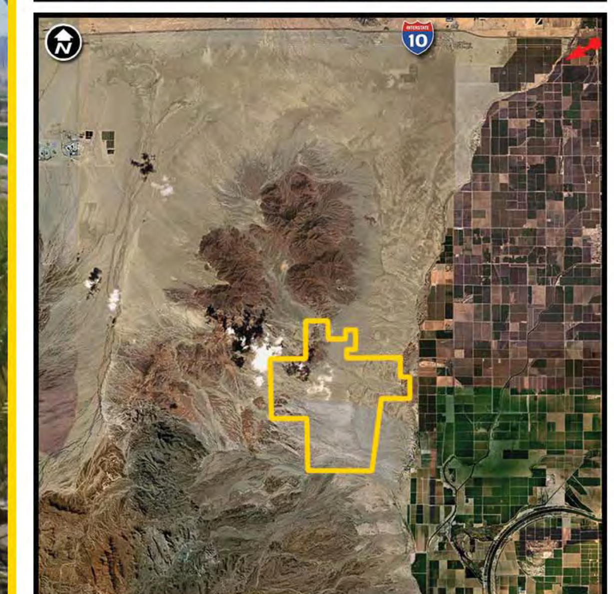
Time of photograph :	1:15:12 PM
Date of photograph :	8/4/2011
Weather condition :	Clear
Viewing direction :	S SW
Latitude :	33° 36' 20.07" N
Longitude :	114° 39' 28.03" W

Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Amended AFC 7/23/2012, Fig. 5.13-19a (Rev)

VISUAL RESOURCES - FIGURE 13b

Rio Mesa Solar Electric Generating Facility - AFC KOP 6 - View From SR 78 at I-10 (Proposed Facility)



Key Observation Point

Photograph Information

Time of photograph : 1:15:12 PM
Date of photograph : 8/4/2011
Weather condition : Clear
Viewing direction : S SW
Latitude : 33° 36' 20.07" N
Longitude : 114° 39' 28.03" W

Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Amended AFC 7/23/2012, Fig. 5.13-19b (Rev)

VISUAL RESOURCES - FIGURE 14

Rio Mesa Solar Electric Generating Facility - Staff KOPs 7A and 7B - Town of Ripley

KOP 7 A: Panorama Looking toward Site from SR 78 near Ripley

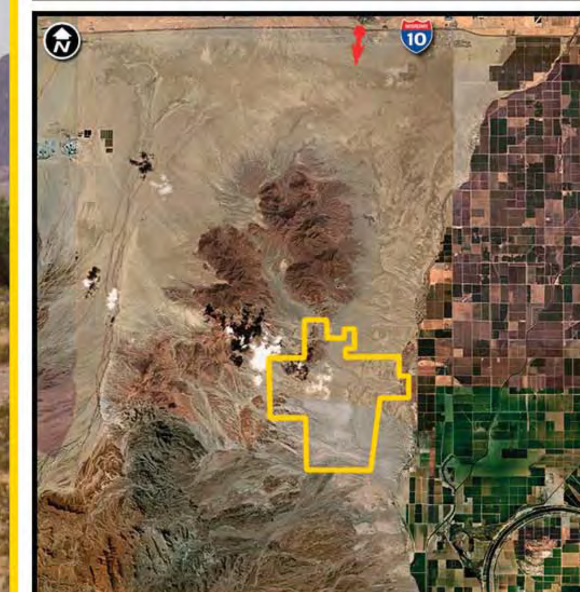
KOP 7B: View Looking Southwest toward Site from Marlowe Park in Ripley

KOP 7B: Jack E. Marlowe Park in Ripley

SOURCE: Staff Photo

VISUAL RESOURCES - FIGURE 15a

Rio Mesa Solar Electric Generating Facility - AFC KOP 3 - View From I-10 Looking South (Existing Conditions)

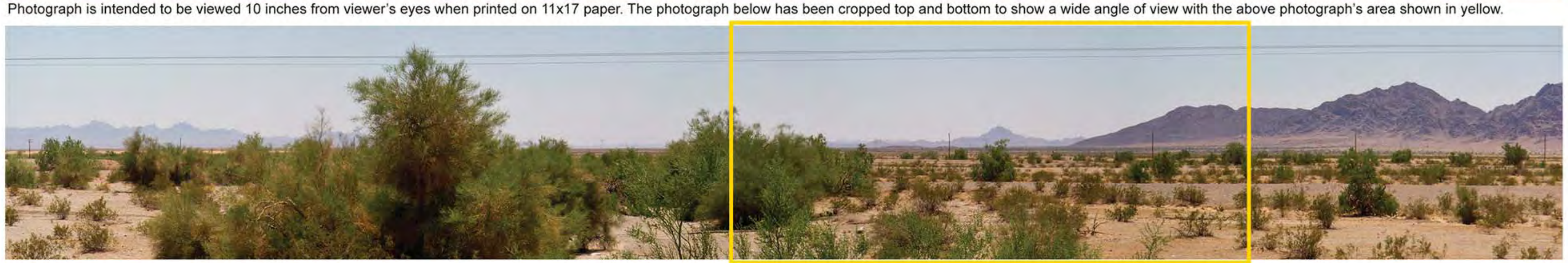


Key Observation Point

Photograph Information

Time of photograph :	12:54:33 PM
Date of photograph :	8/4/2011
Weather condition :	Clear
Viewing direction :	South
Latitude :	33° 36' 30.68" N
Longitude :	114° 46' 10.65" W

Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

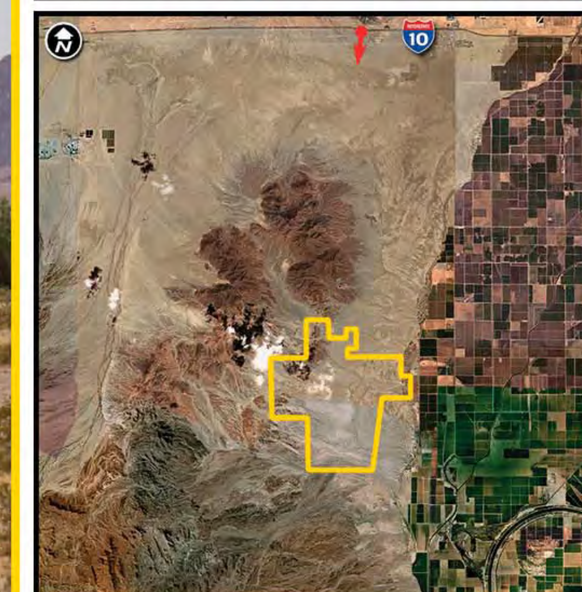


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Amended AFC 7/23/2012, Fig. 5.13-16a (Rev)

VISUAL RESOURCES - FIGURE 15b

Rio Mesa Solar Electric Generating Facility - AFC KOP 3 - View From I-10 Looking South (Proposed Facility)

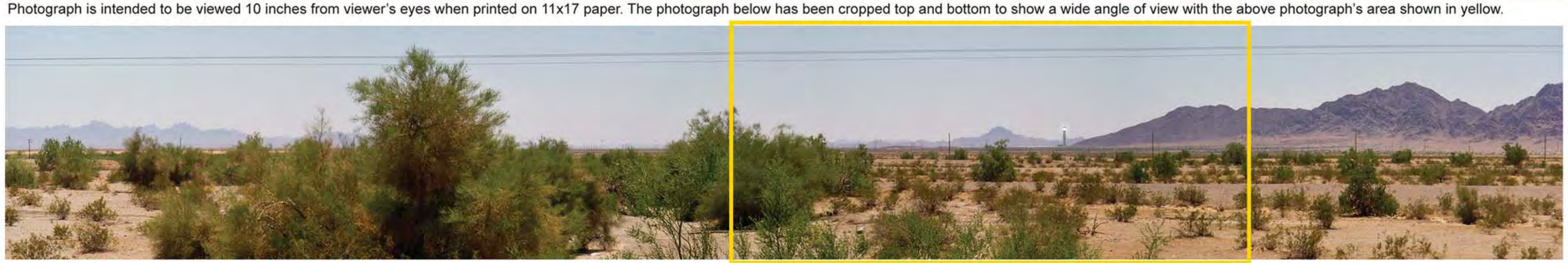


Key Observation Point

Photograph Information

Time of photograph :	12:54:33 PM
Date of photograph :	8/4/2011
Weather condition :	Clear
Viewing direction :	South
Latitude :	33° 36' 30.68" N
Longitude :	114° 46' 10.65" W

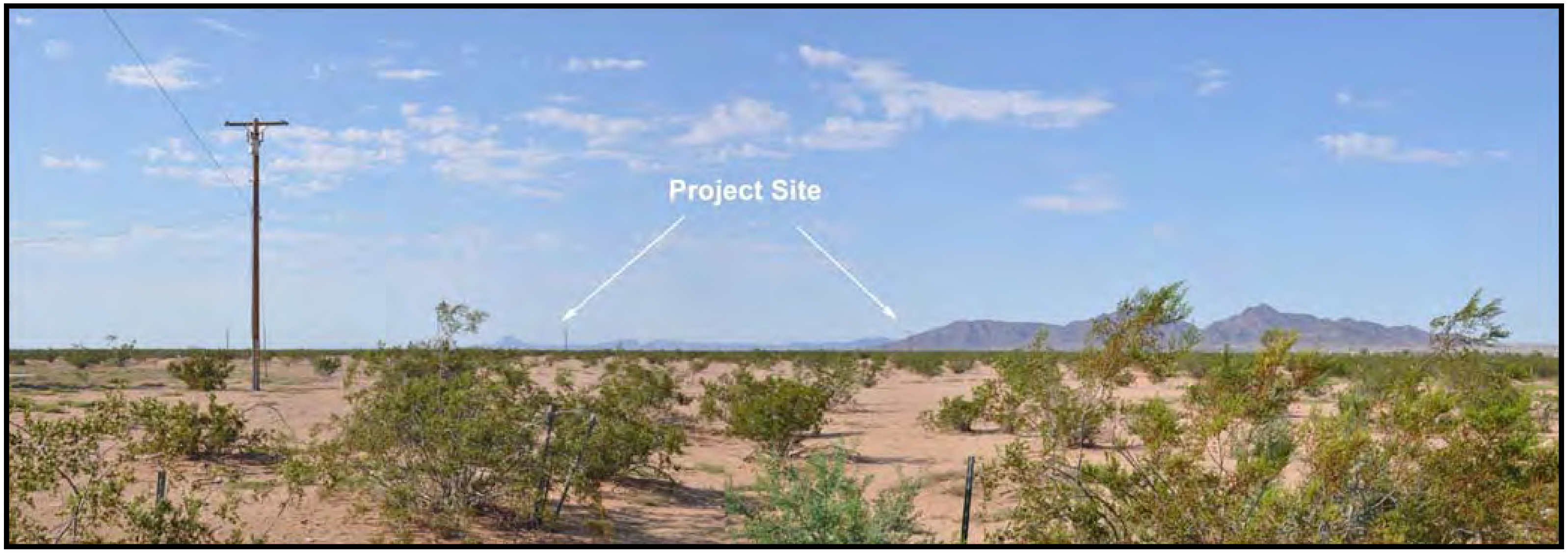
Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.



SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Amended AFC 7/23/2012, Fig. 5.13-16b (Rev)

VISUAL RESOURCES - FIGURE 16

Rio Mesa Solar Electric Generating Facility - Staff KOP 3B - View from Mesa Verde Residences



Staff KOP 3B: Panorama looking South toward site from Mesa Verde Residences

View of town of Mesa Verde

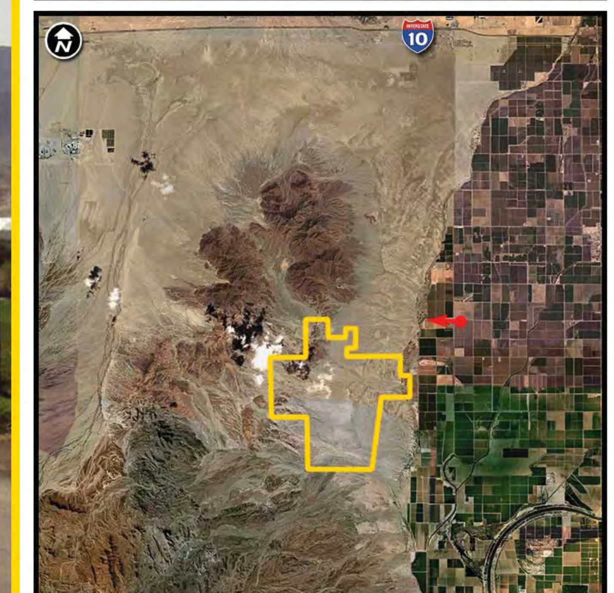
Residences, Mesa Verde

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Staff Photo

VISUAL RESOURCES - FIGURE 17a

Rio Mesa Solar Electric Generating Facility - AFC KOP 2 - View From Bradshaw Trail (Existing Conditions)



Key Observation Point

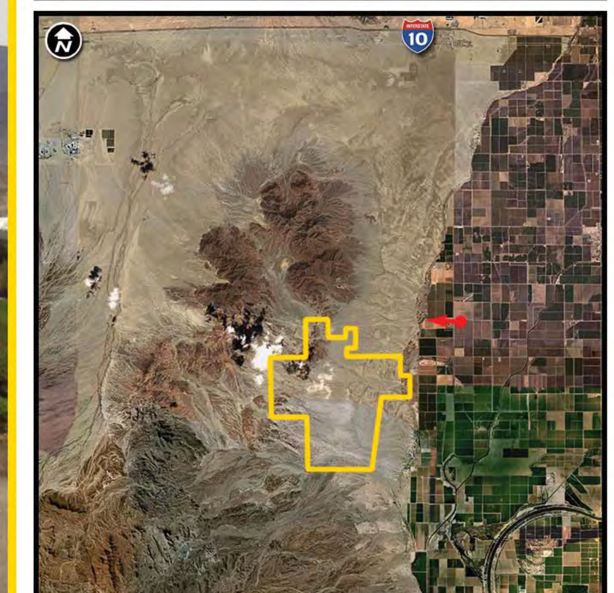
Photograph Information

Time of photograph :	4:44:40 PM
Date of photograph :	8/4/2011
Weather condition :	Clear
Viewing direction :	N NW to S SW
Latitude :	33° 29' 33.70" N
Longitude :	114° 43' 24.87" W

Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Amended AFC 7/23/2012, Fig. 5.13-15a (Rev)

VISUAL RESOURCES - FIGURE 17b
Rio Mesa Solar Electric Generating Facility - AFC KOP 2 - View From Bradshaw Trail (Proposed Facility)



Key Observation Point

Photograph Information

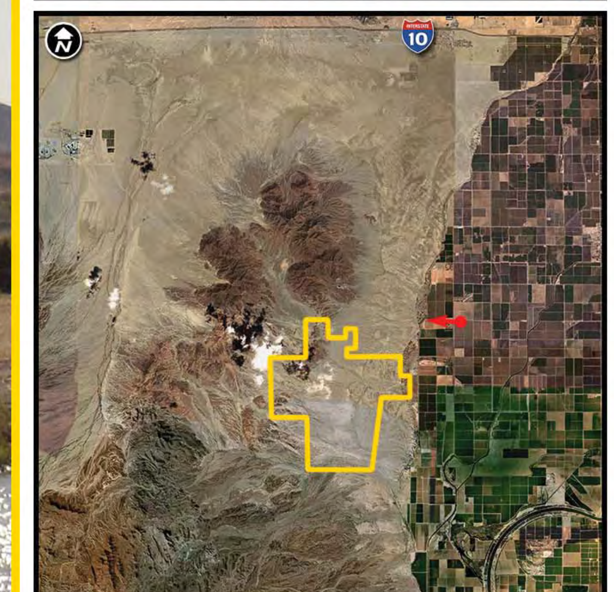
Time of photograph :	4:44:40 PM
Date of photograph :	8/4/2011
Weather condition :	Clear
Viewing direction :	N NW to S SW
Latitude :	33° 29' 33.70" N
Longitude :	114° 43' 24.87" W

Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Amended AFC 7/23/2012, Fig. 5.13-15b (Rev)

VISUAL RESOURCES - FIGURE 17c

Rio Mesa Solar Electric Generating Facility - AFC KOP 2 - View From Bradshaw Trail (Existing Conditions)



Key Observation Point

Photograph Information

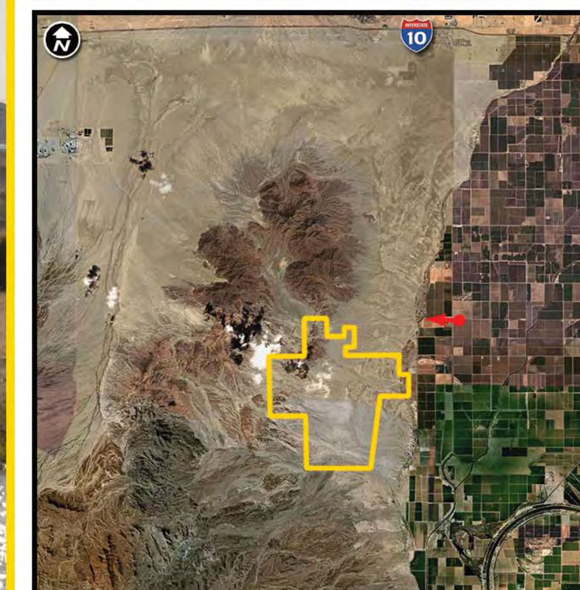
Time of photograph :	4:44:40 PM
Date of photograph :	8/4/2011
Weather condition :	Clear
Viewing direction :	N NW to S SW
Latitude :	33° 29' 33.70" N
Longitude :	114° 43' 24.87" W

Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Amended AFC 7/23/2012, Fig. 5.13-15c (Rev)

VISUAL RESOURCES - FIGURE 17d

Rio Mesa Solar Electric Generating Facility - AFC KOP 2 - View From Bradshaw Trail (Proposed Facility)



Key Observation Point

Photograph Information

Time of photograph :	4:44:40 PM
Date of photograph :	8/4/2011
Weather condition :	Clear
Viewing direction :	N NW to S SW
Latitude :	33° 29' 33.70" N
Longitude :	114° 43' 24.87" W

Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Amended AFC 7/23/2012, Fig. 5.13-15d (Rev)

VISUAL RESOURCES - FIGURE 18

Rio Mesa Solar Electric Generating Facility - Staff KOP 2B - View from Bradshaw Trail at WAPA Right-of-Way

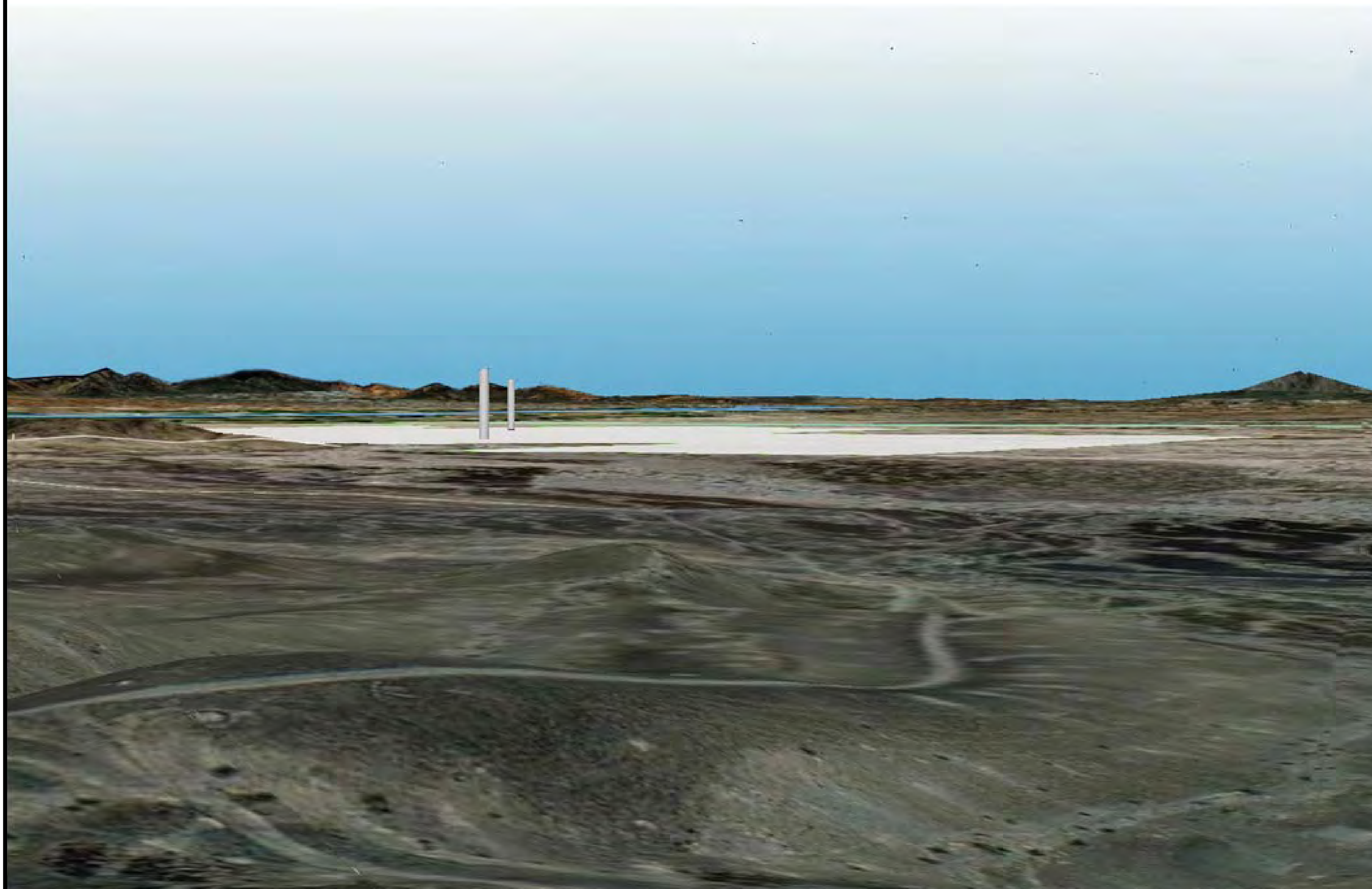
KOP 2B - Project Site from Bradshaw Trail at WAPA ROW, Southwest View Quadrant

Hodge Mine from Bradshaw Trail (KOP 2B), Looking Northwest

SOURCE: Staff Photo

VISUAL RESOURCES - FIGURE 19

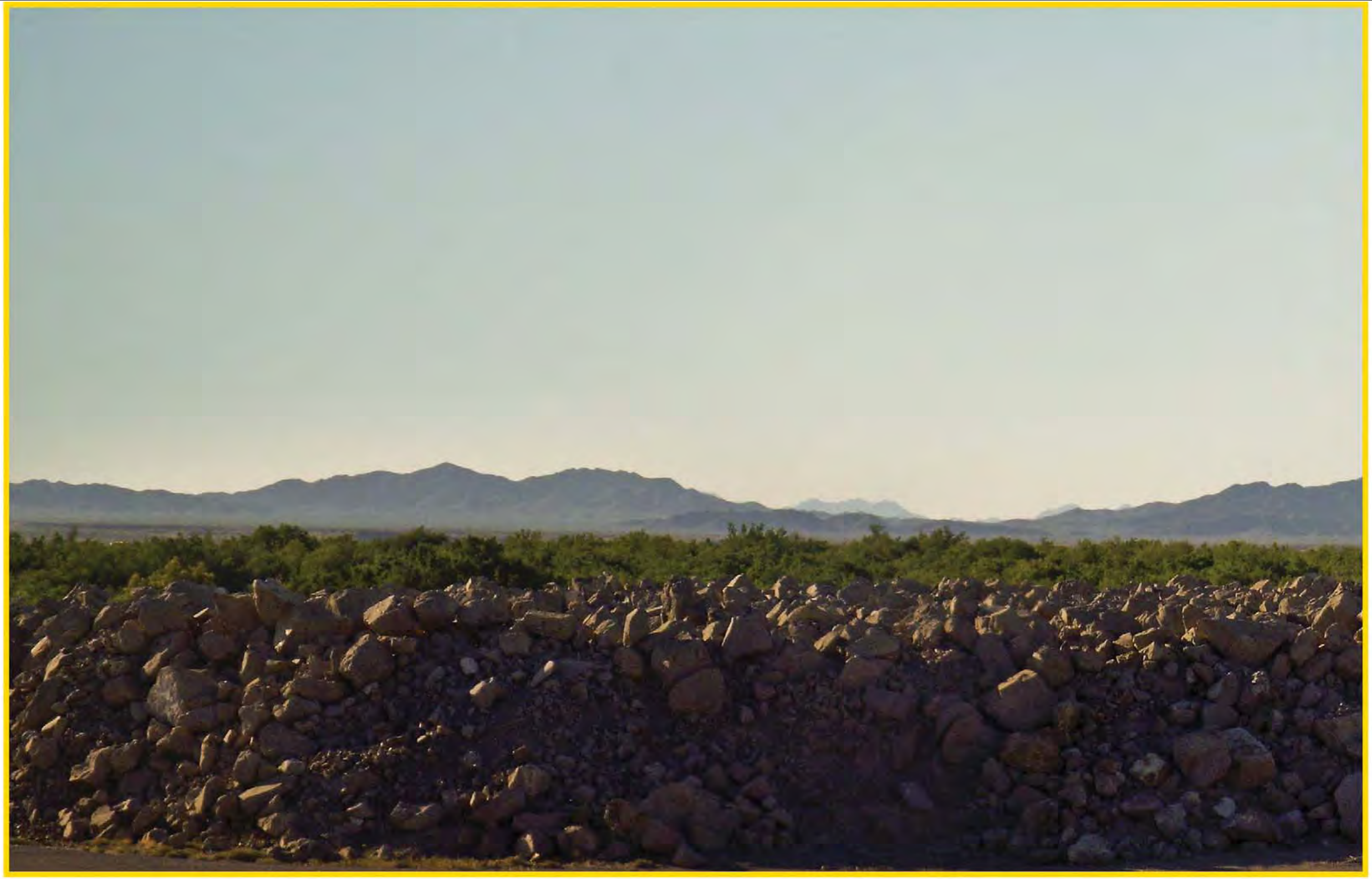
Rio Mesa Solar Electric Generating Facility - Staff KOP 8 - Simulated View From Roosevelt Mine

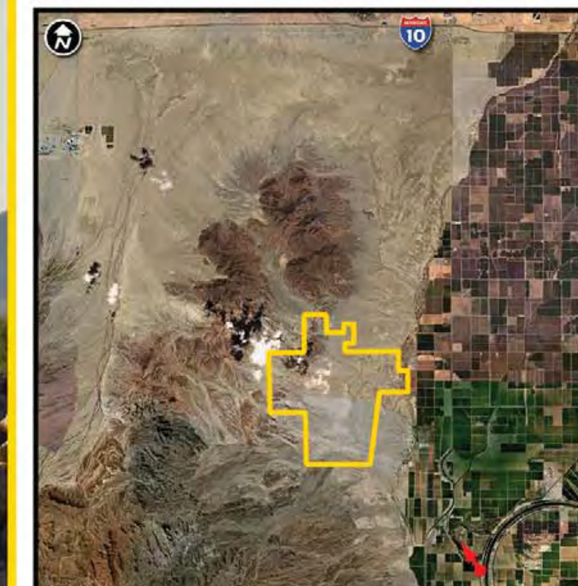


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Google Earth; CEC Staff

VISUAL RESOURCES - FIGURE 20a
Rio Mesa Solar Electric Generating Facility - AFC KOP 5 - View from Cibola NWR (Existing Conditions)





Key Observation Point

Photograph Information

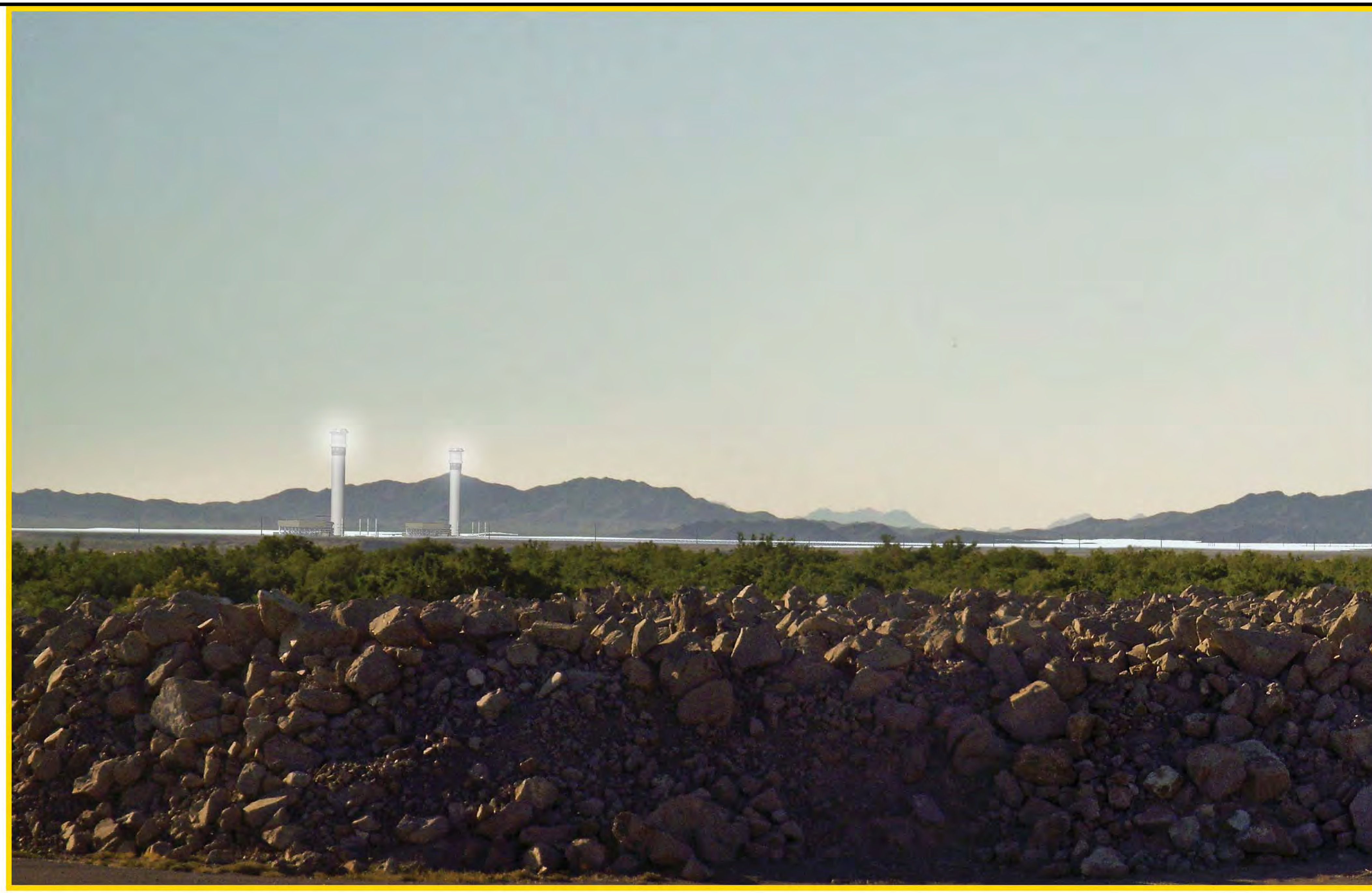
Time of photograph :	1:14PM
Date of photograph :	8/4/2011
Weather condition :	Clear
Viewing direction :	N - N/W
Latitude :	33° 23' 32.08" N
Longitude :	114° 42' 46.17" W

Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

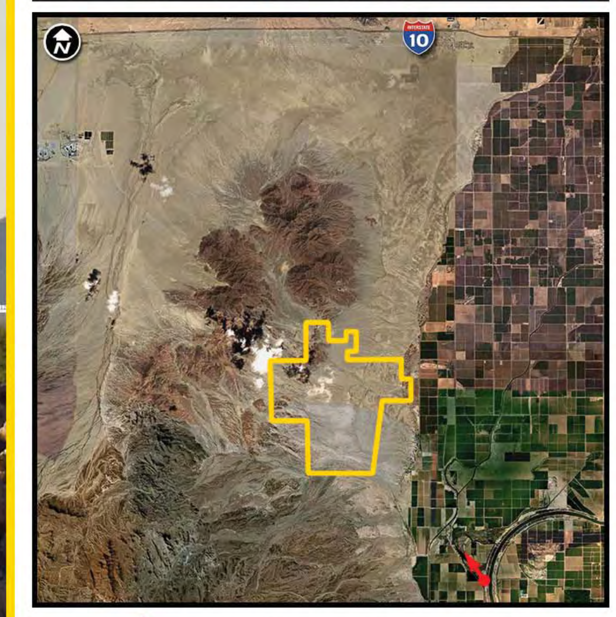
SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Amended AFC 7/23/2012, Fig. 5.13-18a (Rev)

VISUAL RESOURCES - FIGURE 20b

Rio Mesa Solar Electric Generating Facility - AFC KOP 5 - View from Cibola NWR (Proposed Facility)



OVERVIEW MAP



Key Observation Point

Photograph Information

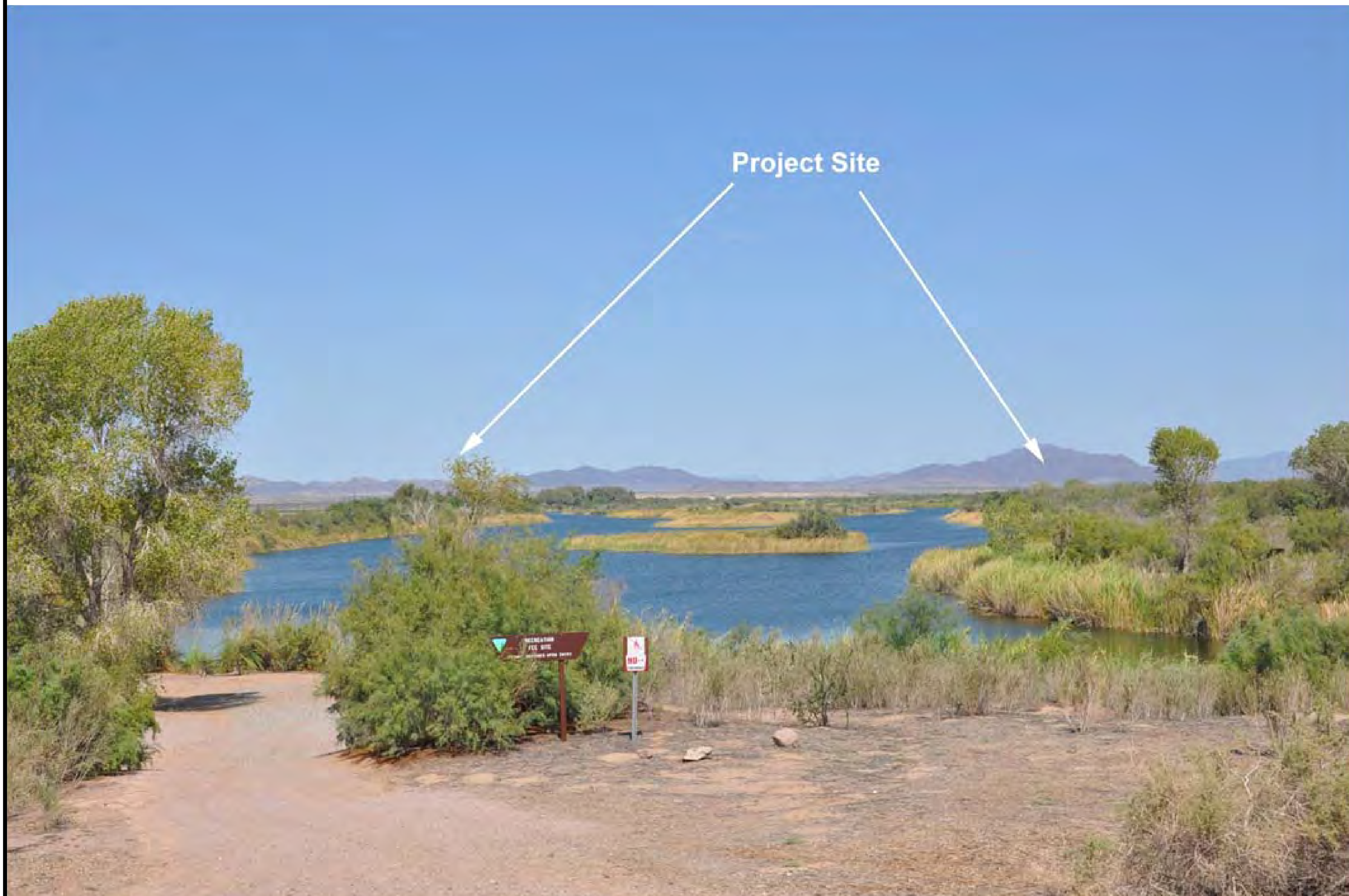
Time of photograph :	1:14PM
Date of photograph :	8/4/2011
Weather condition :	Clear
Viewing direction :	N - N/W
Latitude :	33° 23' 32.08" N
Longitude :	114° 42' 46.17" W

Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

SOURCE: Applicant's Supplemental Response to Data Request 16 and 26, Amended AFC 7/23/2012, Fig. 5.13-18b (Rev)

VISUAL RESOURCES - FIGURE 21

Rio Mesa Solar Electric Generating Facility - Staff KOP 5B - View From Cibola NWR



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Staff Photo

WASTE MANAGEMENT

Ellie Townsend-Hough, REA

SUMMARY OF CONCLUSIONS

Management of the nonhazardous and hazardous waste generated during construction and operation of the Rio Mesa Solar Electric Generating Facility (Rio Mesa SEGF) would not result in any significant adverse impacts, and would comply with applicable waste management laws, ordinances, regulations, and standards, provided that the measures proposed in the Application for Certification and staff's proposed conditions of certification are implemented.

INTRODUCTION

This Preliminary Staff Assessment (PSA) presents an analysis of issues associated with wastes generated from the proposed construction and operation of the Rio Mesa SEGF. The technical scope of this analysis encompasses solid wastes generated during facility construction and operation. Management and discharge of wastewater is addressed in the **Soil and Surface Water** section of this document. Additional information related to waste management may also be covered in the **Worker Safety and Fire Protection** and **Hazardous Materials Management** sections of this document.

The objectives of the Energy Commission staff's 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 material generated during the construction and operation of the proposed project would be managed in an environmentally safe manner.
- The disposal or diversion of project materials would not result in significant adverse impacts to existing waste disposal or diversion facilities.
- Upon project completion, the site is managed in such a way that project materials/wastes and waste constituents would not pose a significant risk to humans or the environment.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local environmental LORS 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. Project compliance with the various LORS is a major component of staff's determination regarding the significance and acceptability of the Rio Mesa SEGF with respect to management of waste.

Waste Management Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

<table>
<tr><th>Applicable LORS</th><th>Description</th></tr>
<tr><td colspan="2">Federal</td></tr>
<tr><td>Title 42, United States Code, §§ 6901, et seq.

Solid Waste Disposal Act of 1965 (as amended and revised by the Resource Conservation and Recovery Act of 1976, et al.)</td><td>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.</td></tr>
<tr><td>Title 42, United States Code, §§ 9601, et seq.

Comprehensive Environmental Response, Compensation and Liability Act</td><td>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
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’s “all appropriate inquiries” requirements.</td></tr>
<tr><td>Title 40, Code of Federal Regulations (CFR), Subchapter I – Solid Wastes</td><td>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 246 addresses source separation for materials recovery guidelines.
Part 257 addresses the criteria for classification of solid waste disposal facilities and practices.
Part 258 addresses the criteria for municipal solid waste landfills.</td></tr>
</table>

Applicable LORS	Description
	• 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 authorized state so the regulations are implemented by state agencies and authorized local agencies in lieu of U.S. EPA.
Title 49, CFR, Parts 172 and 173 Hazardous Materials Regulations	U.S. Department of Transportation 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, and section 262.20.
State	
California 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 (CCR), Division 4.5 Environmental Health Standards for the Management of Hazardous Waste	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. 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, CCR include: • Identification and Listing of Hazardous Waste (Chapter 11, §§ 66261.1, et seq.) • Standards Applicable to Generators 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 standards are also enforced at the local level by CUPAs.
California Health and	The Unified Program consolidates, coordinates, and makes consistent the

Applicable LORS	Description
Safety Code, Chapter 6.11 §§ 25404–25404.9 Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program)	administrative requirements, permits, inspections, and enforcement activities of the six environmental and emergency response programs listed below. • Aboveground Storage Tank Program • Business Plan Program • California Accidental Release Prevention (CalARP) Program • Hazardous Material Management Plan / Hazardous Material Inventory Statement Program • 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. Riverside County Department Hazardous Materials Division is the area CUPA. Note: The Waste Management analysis only considers application of the Hazardous Waste Generator/Tiered Permitting element of the Unified Program. Other elements of the Unified Program may be addressed in the **Hazardous Materials Management** and/or **Worker Safety and Fire Protection** sections of this PSA.
Title 27, CCR, Division 1, Subdivision 4, Chapter 1, §§ 15100, et seq. Unified Hazardous Waste and Hazardous Materials Management Regulatory Program	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). • 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 of 1989 (as amended) establishes mandates and standards for management of solid waste. Among other things, the law includes provisions addressing solid waste source reduction and recycling, standards for design and construction of municipal landfills, and programs for county waste management plans and local implementation of solid waste requirements. Also, cities and counties are required by this law to divert 50 percent of their waste from disposal. Finally, material that is exported out of state is still allocated back to the jurisdiction of origin in California.
Assembly Bill (AB) 341 (Chesbro) Chapter 476, Statutes of 2011	This bill requires a business, defined to include a commercial or public entity, which generates more than four cubic yards of commercial solid waste per week or is a multifamily residential dwelling of five units or more to arrange for recycling services, on and after July 1, 2012.
Title 24, CCR, Part 11 2010 Green Building Standards Code (CalGreen)	The code is established to reduce construction waste, make buildings more efficient in the use of materials and energy, and reduce environmental impact during and after construction. Effective January 1, 2011, in jurisdictions without a Construction and Demolition (C&D) ordinance requiring the diversion of 50 percent of construction waste, the owners/builders of newly constructed buildings within the covered occupancies will be required to develop a waste management plan and divert 50 percent of the construction waste materials generated during the project.
Title 14, CCR, Division 7, § 17200,	These regulations further implement the provisions of the California Integrated Waste Management Act and set forth minimum standards for solid waste

Applicable LORS	Description
et seq. California Integrated Waste Management Act	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.
Title 14, CCR, Division 7,Section 18808 –Disposal Report System	These regulations outline the disposal reporting requirements for a hauler.
California 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 (also known as SB 14).	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 (~ 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, CCR, § 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 22, CCR, Chapter 32, §67383.1 – 67383.5	This chapter establishes minimum standards for the management of all underground and aboveground tank systems that hold hazardous waste or hazardous materials, and are to be disposed, reclaimed or closed in place.
Title 8, CCR §1529 and §5208	These regulations require the proper removal of asbestos-containing materials in all construction work and are enforced by California Occupational Safety and Health Administration (Cal-OSHA).
Title 27, CCR , division 2, Subdivision 1, Chapter 3, Subchapter 4,	This regulation establishes that alternative daily cover (ADC) and other waste materials beneficially used at landfills constitutes diversion through recycling, and requires the California Integrated Waste Management Board to adopt regulations governing ADC.
California Porter-Cologne Water Quality Control Act of 1952: California Water Code, Division 7, Title 23, CCR, Division 3, Chapter 9	These regulations require adequate protection of water quality by appropriate design, sizing and construction of erosion and sediment controls.
Local	
County of Riverside General Plan, Safety Element: Chapter 6	This document describes the County's policies and siting criteria identified in the County of Riverside Hazardous Waste Management Plan including coordination of hazardous waste facility responsibilities on a regional basis through the Southern California Hazardous Waste Management Authority
Riverside County	The Countywide Integrated Waste Management Plan (CIWMP) was prepared in

Applicable LORS	Description
Integrated Waste Management Program	accordance with the California Integrated Waste Management Act of 1989, Chapter 1095 (AB 939). AB 939 redefined solid waste management in terms of both objectives and planning responsibilities for local jurisdictions and the state. AB 939 was adopted in an effort to reduce the volume and toxicity of solid waste that is landfilled and incinerated by requiring local governments to prepare and implement plans to improve the management of waste resources.
Riverside County Ordinance 615	This ordinance sets forth permit requirements for generators of hazardous waste.
California Building Code and California Fire Code	These codes are enforced by the local CUPA and Fire Department. They Include a requirement that businesses obtain permits for the use and storage of specified hazardous materials. These permits must be obtained before storing regulated hazardous wastes at the project site.
Policy	
Riverside County, Countywide Integrated Waste Management Plan	This document sets forth the county's goals, policies, and programs for reducing dependence on landfilling solid wastes and increasing source reduction, recycling, and reuse of products and waste, in compliance with the California Integrated Waste Management Act. The plan also addresses the siting and development of recycling and disposal facilities and programs within the county.

SETTING

Proposed Project

The proposed Rio Mesa SEGF would consist of two solar fields and associated facilities that would generate a total net output of 500 megawatts (MW). The total area required for the two power tower solar plants, common area, and associated equipment would occupy approximately 3,805-acres (see **Project Description** section of this PSA for a more detailed discussion of the project).

The project site is undeveloped but disturbed from World War II military training operations and investigative activities conducted in 1970 for a proposed San Diego Electric Sun Desert Nuclear Power Plant (BS 2011a, Section 2.1.2).

Construction activities associated with the Rio Mesa SEGF project would produce a variety of mixed nonhazardous wastes, such as soil, wood, metal, concrete, etc. Waste would be recycled where practical and non-recyclable waste would be deposited in a California Class III landfill. The hazardous waste generated during this phase of the project would consist of used oils, universal wastes, solvents, and empty hazardous waste materials (BS 2011a, § 5.14.4.1). Universal wastes are hazardous wastes that contain mercury, lead, cadmium, copper, and other substances hazardous to human and environmental health. Examples of universal wastes are batteries, fluorescent tubes, and some electronic devices. Hazardous waste will be disposed of in a California Class I hazardous waste landfill.

Operation and maintenance of the project and associated facilities would generate a variety of wastes, including hazardous wastes. All operational wastes produced at the Rio Mesa SEGF would be properly collected, treated (if necessary), and disposed of at an appropriate waste facility. Wastes include process and sanitary wastewater nonhazardous waste, and hazardous waste in both liquid and solid form. Wastewater concentrate would be delivered to the evaporation ponds. Sanitary waste would go to the leach field. A complete discussion of the wastewater system is provided in the **Soil and Surface Water** section of this PSA.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

This waste management analysis addresses: a) existing soil contamination on the project site associated with prior activities on or near the project site; and b) the impacts from the generation and management of wastes during demolition of existing structures and during project construction and operation.

a) 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 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 by Energy 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 application for certification. The Phase I ESA is conducted to identify any conditions indicative of releases or threatened releases of hazardous substances at the site and to identify any areas near the site that are known to be contaminated (or a source of contamination).

   The Phase I ESA is conducted by a qualified environmental professional. It includes inquiries into past uses and ownership of the property, former hazardous substance releases and/or hazardous waste disposal at the site and within a certain distance of the site, and visual inspection of the property, and 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 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 give an opinion about the potential need for any additional investigation. Additional investigation may be needed, for example, if there were significant gaps in the information available about the site, 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.

[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.

In conducting its assessment of a proposed project, Energy Commission staff 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 any mitigation is necessary at the site to ensure protection of human health and the environment from any hazardous substance releases or contamination identified.

b) Regarding the management of project-related wastes generated during demolition, construction and operation, staff reviews the applicant's proposed solid and hazardous waste management methods and determines if the methods proposed are consistent with the LORS identified for waste disposal and recycling. The federal, state, and local LORS represent a comprehensive regulatory system designed to protect human health and the environment from impacts associated with management of both non-hazardous and hazardous wastes. Absent any unusual circumstances, staff considers project compliance with LORS to be sufficient to ensure that no significant impacts would occur as a result of project waste management.

   Staff then reviews the capacity available at off-site treatment and disposal sites and determines whether or not the proposed power plant's waste would have a significant impact on the volume of waste a facility is permitted to accept. Staff uses a waste volume threshold equal to 10 percent of a disposal facility's remaining permitted capacity to determine if the impact from disposal of project wastes at a particular facility would be significant.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Existing Site Conditions and Potential for Contamination

The project site consists primarily of undeveloped land totaling approximately 3,805 acres. The majority of the acreage is owned by Metropolitan Water District of Southern California (MWD). The project site is located on the Palo Verde Mesa between Mule Mountain to the west and Palo Verde Valley to the east. The project is located in Riverside County, California, near the northern border of Imperial County, CA (BS 2011a, Appendix 5.11C).

The infrastructure that exists on site or within the transmission corridors includes two 161 kilovolt (kV) , a 220 kV and 500 kV electrical power transmission lines, a buried high-pressure gas line, buried telephone cables, and two unpaved utility roads. There are also a number of water wells located on the project site (BS 2011a Appendix 5.11C).

A Phase I Environmental Site Assessment (ESA) was conducted by URS for the proposed Rio Mesa SEGF site. The September 6, 2011 ESA report states that the assessment did not identify any recognized environmental conditions associated with the proposed project site. The assessment was completed in accordance with the American Society for Testing and Materials Standard Practice E 1527-05 for ESAs (BS 2011a, Appendix 5.11C). A Recognized Environmental Concern (REC) is the presence or likely presence of any hazardous substances or petroleum products on a property under the conditions that indicate 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 into the ground, groundwater, or surface water of the property.

No RECs were identified within the one-mile radius search of offsite areas. However, the project area was within General Patton's World War II (WWII) Desert Training Center, California-Arizona Maneuver Area region (DTC/CAMA) (1942 to 1944) which surrounds the project area and was considered a suitable location for training troops that would be deployed in the North Africa Campaign. The DTC/CAMA encompassed a large area in southern California, southern Nevada, and western Arizona. After two years in operation and the training of one million troops, the desert training camps were closed in 1944. The Training Area was used for a variety of training purposes some of which utilized munitions and explosives and/or munitions constituents. The applicant found several unexploded ordnances (UXO) and munitions and explosives of concern (MEC) on the project site.

The project site was also considered as a possible location for a San Diego Gas & Electric nuclear power plant in the 1970s. Water wells were installed to evaluate the characteristics of the underlying aquifers as a source for water supply.

The AFC identified several abandoned wells and historic dumping on the project site. PVC and steel casings, abandoned campgrounds, and automobile bodies, boats, piles of rusty cans, broken glass, tires and metal debris are located on or adjacent to the project site. Waste present on the site may present a safety risk to workers and the public. The applicant would include the wells, trash and other debris as construction waste and segregate, recycle and dispose of the material in the appropriate manner (URS 2012a, Data Responses 41 and 42).

To ensure site workers are properly trained to recognize, avoid, and report UXO, proposed Condition of Certification **WASTE-1** would require the project owner to develop a UXO identification training and reporting procedures program. The UXO training program should include the identification of trained UXO experts that are available to complete removal of UXO and supplemental geophysical surveys to search for additional or buried ordnance. Although there are no REC's, staff is concerned that the presence of trash in numerous areas and past uses of the site may have resulted in unrecognized site conditions that require identification, treatment, and/or removal. Staff recommends Condition of Certification **WASTE-2** and **WASTE-3** to address any soil contamination contingency that may be encountered during project construction. **WASTE-2** 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 geologist inspect the site, determine what is required to characterize the nature and extent of contamination, and provide a report to the compliance project manager (CPM) and the Department of Toxic Substances Control with findings and recommended actions including treatment and remediation if necessary.

Construction Impacts and Mitigation

Site preparation and construction of the proposed power plant and associated facilities would last approximately 35 months and generate both nonhazardous and hazardous wastes in solid and liquid forms (BS 2011a, Section 2.3.15). Before construction can begin, the project owner would be required to develop and implement a Construction Waste Management Plan.

Non-Hazardous Wastes

Approximately 270 tons of non-hazardous waste would be generated from packing materials, waste concrete, insulation and empty nonhazardous chemical containers. Forty-five tons of metal would also be generated from welding/cutting operations, packing materials, and empty nonhazardous chemical containers (BS 2011a, page 5.14-14). All non-hazardous wastes would be recycled to the extent possible and non-recyclable wastes would be collected by a licensed hauler and disposed in a solid waste disposal facility, in accordance with Title 14, California Code of Regulations, section 17200 et seq. The non-hazardous waste that cannot be recycled from the Rio Mesa SEGF would be disposed in a California Class III landfill.

The California Department of Resources Recycling and Recovery (now CalRecycle formerly California Integrated Waste Management Board (CIWMB)) is California's leading authority on recycling, waste reduction, and product reuse. CalRecycle plays an important role in the stewardship of California's vast resources and promotes innovation in technology to encourage economic and environmental sustainability. Under the authority of CalRecycle, the Integrated Waste Management Act requires jurisdictions such as Riverside County to divert 50 percent of their waste from landfill disposal. Jurisdictions select and implement the combination of waste prevention, reuse, recycling, and composting programs that best meet the needs of their community while achieving the diversion requirements of the Act. SB 1016, Wiggins, Chapter 343, Statutes of 2008 passed in 2008, introduced a per capita disposal measurement system that measures the 50 percent diversion requirement using a disposal measurement equivalent.

Each city, county or regional agency with a CalRecycle-approved planning document (such as a Source Reduction and Recycling Element (SRRE) or a countywide regional agency Integrated Waste Management Plan) must submit an annual report to CalRecycle summarizing its progress in reducing solid waste as required by Public Resource Code (PRC) Section 41821. Riverside County provides CalRecycle with an SRRE and an Integrated Waste Management Plan (IWMP). The SRRE sets forth a jurisdiction’s basic strategy for management of solid waste generated within its borders, with emphasis on implementation of the SRRE. Riverside County’s Construction and Demolition (C & D) program, waste generation totals, recycling and disposal are incorporated in Riverside’s SRRE.

Staff proposes Condition of Certification **WASTE-4** to facilitate proper management of project construction wastes. Furthermore Condition of Certification **WASTE-4** would require the project owner to develop and implement a Construction Waste Management Plan. This condition would also require the applicant to identify type, volume, and waste disposal and recycling methods to be used during construction of the facility.

Non-hazardous liquid wastes would also be generated during construction, including sanitary wastes, dust suppression drainage, and equipment wash water. Process wastewater would be treated onsite and recycled for use at each of the two plants. The applicant is proposing to use either an evaporator system with thermal distillation and mechanical vapor compression or a reverse osmosis system with ion exchange for treatment of their process wastewater (BS 2012v, §5.15.3.3). Effluent from the wastewater treatment system would be diverted to two on-site two-acre evaporation ponds. Pond sludge would be removed and properly disposed of at an off-site facility by an outside contractor. Domestic waste streams for items such as showers and toilets at each plant and the common facilities would be routed through separate on-site septic systems and leach fields. Sewage sludge from the septic tanks would be removed from the project site by a local sanitary service provider. Additionally, Table 5.14-3 of the Application for Certification estimates that there will be 200,000 to 400,000 gallons of passivating and chemical cleaning fluid waste used for pipe cleaning and flushing, and 600,000 gallons of hydotest water disposed of during construction (see the **Soil and Surface Water** section of this document for more information on the management of project wastewater).

Hazardous Wastes

Hazardous wastes that would likely be generated during construction include solvents, waste paint, oil absorbents, used oil, oily rags, batteries, cleaning wastes, spent welding materials, and empty hazardous material containers (BS 2011a, Table 5.14-2). The 153 cubic yards of hazardous waste generated would be minor if handled in the manner identified in the AFC (BS 2011a, § 5.14.4.1). Hazardous waste generators must obtain identification numbers, prepare manifests before transporting the waste off site, and use only permitted treatment, storage, and disposal facilities in accordance with Title 22, CCR, Division 4.5, Chapter 12, and Section 66262.12.

The project owner would be required to obtain a unique hazardous waste generator identification number for the site prior to starting construction, pursuant to proposed Condition of Certification **WASTE-5.** Although the hazardous waste generator number is determined based on site location, both the construction contractor and the project owner/operator could be considered the generator of hazardous wastes at the site.

Absent any unusual circumstances, staff considers project compliance with LORS to be sufficient to ensure that no significant impacts would occur as a result of project waste management activities.

Operation Impacts and Mitigation

The proposed Rio Mesa SEGF would generate non-hazardous and hazardous wastes in both solid and liquid forms under normal operating conditions. Table 5.14-4 of the project AFC (BS 2012v) gives a summary of the operation waste streams, expected waste volumes and generation frequency, and management methods proposed~~.~~

Non-Hazardous Solid Wastes

Operation of the project is expected to generate approximately 300 pounds per week of non-hazardous waste, this would include routine maintenance wastes (such as used air filters, spent deionization resins, sand and filter media) as well as domestic and office wastes (such as office paper, newsprint, aluminum cans, plastic, and glass). All non-hazardous wastes would be recycled, to the maximum extent possible, and non-recyclable wastes would be regularly transported off site to a California Class III landfill (BS 2012v, § 5.14.4.2).

Before operations can begin, the project owner would be required to develop and implement an Operation Waste Management Plan (OWMP) pursuant to proposed Condition of Certification **WASTE-6**. The purpose of the OWMP is to avoid the potential effects on human health and the environment from handling and disposing of hazardous wastes. Procedures would be developed to ensure proper labeling, storage, packaging, recordkeeping, recycling, and disposal of all hazardous wastes reported. Reporting in accordance with the proposed OWMP would provide waste disposal and recycling information for input in to Riverside County reports for CalRecycle, for the county's demonstration of compliance with the IWMP as discussed above. Non-hazardous liquid wastes would be generated during facility operation and are discussed in the **Soil and Surface Water** section of this document.

Hazardous Wastes

The project owner/operator would be considered the generator of hazardous wastes at the site during facility operations. Therefore, the project owner's unique hazardous waste generator identification number, obtained prior to construction in accordance with proposed Condition of Certification **WASTE-5**, would be retained and used for the management of hazardous liquid wastes generated during facility operation.

The generation of hazardous liquid wastes expected during routine project operation includes used hydraulic fluids, oils, greases, oily filters and rags, cleaning solutions and solvents, and batteries. In addition, spills and unauthorized releases of hazardous liquid materials or hazardous wastes may generate contaminated soils or materials that may require corrective action and management as hazardous waste. Proper hazardous materials handling and good housekeeping practices would help keep spilled wastes to a minimum. However, to ensure proper cleanup and management of any contaminated soils or waste materials generated from hazardous materials spills, staff proposes Condition of Certification **WASTE-7**, which would require the project owner/operator to report, clean up, and remediate as necessary, any hazardous materials spills or releases in accordance with all applicable federal, state, and local requirements. More information on hazardous material management, spill reporting, containment, and spill control and countermeasures plan provisions for the project are provided in the **Hazardous Materials Management** section of the PSA.

Approximately 72 cubic yards per year of hazardous wastes would be generated during the 25 to 30-year anticipated operation of the Rio Mesa SEGF facility, with source reduction and recycling of wastes implemented whenever possible. The hazardous wastes 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, CCR, §§ 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-8** to notify the CPM whenever the owner becomes aware of any such action.

Impact on Existing Waste Disposal Facilities

Non-Hazardous Wastes

The Rio Mesa SEGF facility would generate nonhazardous solid waste that would add to the total waste generated in Riverside County, California. During construction of the proposed project, approximately 2,135 cubic yards of solid waste would be generated, and approximately 69 cubic yards[2] per year would be produced during operation. Nonhazardous waste would be disposed in a California Class III landfill.

CalRecycle is the state agency responsible for implementing the California Integrated Waste Management Act and is the state's leading authority on recycling, waste reduction, and product reuse. CalRecycle plays an important role in the stewardship of California's vast resources and promotes innovation in technology to encourage economic and environmental sustainability. CalRecycle's programs are designed to increase public participation in all aspects of diverting waste from landfill disposal, including waste reduction, reuse, recycling, and composting, as well as promoting the safe disposal of waste that cannot be diverted.

The County is required to submit an Integrated Waste Management Plan (IWMP) in accordance with State waste diversion mandates for jurisdictions (Chapter 764, Statutes of 1999). The Source Reduction and Recycling Element (SRRE), a Household Hazardous Waste Element (HHWE) and a Non-Disposal Facility Element (NDFE) are all elements that comprise the IWMP. For enforcement purposes, jurisdictions are evaluated on the effectiveness of their SRRE.

Once a California jurisdiction adopts an SRRE, it must implement the SRRE to the best of its ability. The jurisdiction can update the SRRE through CalRecycle's electronic annual reporting system at any time as diversion programs need to be modified (e.g., a new program to address commercial waste and the expansion of educational programs.)

To help CalRecycle determine whether a jurisdiction is taking the appropriate steps to implement its SRRE, the jurisdiction submits an annual report to CalRecycle. The annual report includes the jurisdiction's program information and per capita disposal information (Note: The per capita disposal data is derived from the statewide disposal reporting system). CalRecycle requires the county to report to the disposal reporting system all waste disposed in the county pursuant to Title 14, CCR, Sections 18800-18814.11. The disposal data is compiled for each jurisdiction to measure if the jurisdiction has met its 50 percent equivalent diversion requirement.

CalRecycle reviews each jurisdiction's annual report information and conducts site visits to verify program implementation. Depending on the particular review cycle of the jurisdiction, CalRecycle staff review the jurisdiction's progress toward implementation of its SRRE, as well as its overall achievement of the 50 percent diversion requirement.

If implementation of a jurisdiction's CalRecycle-approved SRRE does not result in 50 percent solid waste diversion, CalRecycle may do one of the following:

- Decide that, even though the waste diversion requirement has not been met, the jurisdiction's program implementation efforts are sufficient to warrant "good-faith effort" status; or
- Place the jurisdiction under a compliance order (PRC 41825).

[2] The volume estimates (cubic yards) for solid/non-hazardous waste are staff generated numbers based on a conversion factor of approximately 300 pounds per cubic yard (RIO MESA SEGF Tables 5.14-3 and Table 5.14-4). Staff used 202 gallons per cubic yard for liquid waste, and 50 lbs per cubic foot for sludge as conversion factors for waste volume estimates. See http://www.calrecycle.ca.gov/lgcentral/library/dsg/apndxi.htm

A compliance order issued by CalRecycle at a public hearing leads to the creation of a local implementation plan (LIP). The LIP outlines specific steps and a schedule of deadlines which will bring the jurisdiction into compliance with the Integrated Waste Management Act.

When a jurisdiction fails to implement the conditions of its compliance order, CalRecycle conducts a penalty hearing to determine whether to exercise its authority under PRC 41850 to fine the jurisdiction up to $10,000 per day.

Riverside County is required to submit an annual report that is reviewed by CalRecycle at a minimum every four years to determine if it is meeting the 50 percent diversion requirement and implementing its programs. The applicant, pursuant to recommended Condition of Certification **WASTE-4**, would be required to submit for approval to the Energy Commission compliance project manager (CPM) and review by Riverside County, information in a construction waste management plan (CWMP), that demonstrates that they met the construction waste diversion requirements of 50 percent pursuant to the CalGreen Building Codes (e.g., weigh tickets from diversion facilities, etc.). The applicant, pursuant to recommended Condition of Certification **WASTE-6,** would also be required to submit to the CPM for approval, and to Riverside County for review, an Operation Waste Management Plan, discussing how the project would divert to the maximum extent feasible the recyclable materials that would be generated during construction and operation of the facility. The CPM and County would then determine with the applicant if the plan is diverting recyclables to the maximum extent feasible. The applicant would then be required to divert all materials from the solid waste stream that could reasonably be diverted for alternate uses as a condition prior to issuance of the project's building permit.

Waste Management Table 2 presents details of five non-hazardous (Class III) waste disposal facilities that could potentially take the non-hazardous construction and operation wastes that would be generated but could not be diverted by the Rio Mesa SEGF. Total solid waste disposal in Riverside County in 2010, was 3,089,583 tons (CalRecycle 2012). The remaining capacity for the five landfills combined is approximately 37 million cubic yards. The total amount of non-hazardous waste generated from project construction and operation after the material has been diverted to the maximum extent feasible would contribute less than one percent of the available landfill capacity. Staff concludes that disposal of the solid wastes generated by Rio Mesa SEGF could occur without significantly impacting the capacity or remaining life of any of these facilities.

Waste Management Table 2
Recycling/Disposal Facilities

Landfill	Location	Permitted Capacity	Remaining Capacity	Estimated Closure Date
	City	Cubic yards	Cubic yards	
Nonhazardous				
Blythe Sanitary (Class III)	Blythe, CA	6 million	4.2 million	2047
Oasis Sanitary (Class III)	Oasis, CA	247,411 tons**	67,545 tons**	2186
Lamb Canyon Sanitary (Class III)	Borrego Springs, CA	34.3 million	19 million	2021
Badlands Sanitary (Class III)	Moreno Valley, CA	33.6 million	14.7 million	2024
Colton Sanitary (Class III)	Colton, NV	15.5 million	2.7 million	2017
Hazardous Waste Facilities				
Chemical Waste Management- Kettleman (Class I, II, III)	Kettleman, CA	10 million*	6 million*	2044
Clean Harbors Buttonwillow (Class I)	Kern, CA	14.3 million	9.2 million	2040
Liquid Recycling				
DeMonno/Kerdon	Compton	30 million gallons	NA	NA
Veolia Environmental Services	Azusa, CA	582,400 gallons		
Soil Recycling				
TPST Soil Recyclers of California	Adelanto, CA	350,000 tons	NA	NA

Source: BS 2011a Table 5.14-2
*CalRecycle Solid Waste Information System (SWIS) facility directory 3/28/12
** Jeff Gow, Riverside County Waste Management Department, 9/24/12

Hazardous Wastes

Waste Management Table 2 displays information on Class III landfills in the vicinity of the project and Class I landfills available in California. The Kettleman Hills facility also accepts Class II and Class III wastes. Kettleman Hills and Buttonwillow landfills have a combined excess of 15 million cubic yards of remaining hazardous waste disposal capacity, with up to 33 years of combined remaining operating lifetime (BS 2011a, Table 5.14-2).

Hazardous wastes generated during construction and operation 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. Less than 153 cubic yards of construction hazardous waste, and 72 cubic yards per year of operation hazardous waste would be generated from the Rio Mesa SEGF. The total amount of hazardous wastes generated by the Rio Mesa SEGF project would consume less than one percent of the remaining permitted capacity. Therefore, impacts from disposal of Rio Mesa SEGF generated hazardous wastes would have a less than significant impact on the remaining capacity at Class I landfills.

The existing available capacity for the three Class III landfills that may be used to manage nonhazardous project wastes exceeds 53 million cubic yards. The total amount of nonhazardous wastes generated from construction and operation of the proposed Rio Mesa SEGF project would consume less than 1 percent of the remaining landfill capacity. Therefore, disposal of project generated non-hazardous wastes would have a less than significant impact on Class III landfill capacity.

In addition, the two Class I disposal facilities that could be used for hazardous wastes generated by the construction and operation of the Rio Mesa SEGF project have a combined remaining capacity in excess of 15 million cubic yards. The total amount of hazardous wastes generated by the Rio Mesa SEGF project would consume less than 1 percent of the remaining permitted capacity. Therefore, impacts from disposal of Rio Mesa SEGF generated hazardous wastes would also have a less than significant impact on the remaining capacity at Class I landfills

CUMULATIVE IMPACTS AND MITIGATION

The CEQA Guidelines (Section 15355) define cumulative effects as “two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.”

The proposed project would not make a significant contribution to regional impacts related to new development and growth. The project is planned to serve the existing and anticipated electrical needs of the region by connecting to the existing electric transmission system and other utility infrastructure. The waste management impacts of the proposed project, in combination with past, present and reasonably foreseeable projects in the area, as noted in the **Executive Summary** section of this PSA, would not be cumulatively considerable as long as the applicant recycles to the maximum extent feasible the material generated during construction and operation and implements its recycling plans.

As proposed, the amount of non-hazardous and hazardous wastes generated during construction and operation of the Rio Mesa SEGF facility would add to the total quantity of waste generated in the State of California. Project non-hazardous wastes would be generated in modest quantities, approximately 2,135 cubic yards of solid waste during construction, and 12 cubic yards per year during operation (BS 2011a, Section 5.14-4). The waste would be recycled wherever practical and sufficient capacity is available at several treatment and disposal facilities to handle the volumes of wastes that would be generated by the project. The five Class III landfills listed in **Waste Management Table 2** have a remaining capacity of approximately 37 million cubic yards. Less than 153 cubic yards of construction hazardous waste, and less than 100 cubic yards per year of operation hazardous waste would be generated from the Rio Mesa SEGF facility. California Class I landfills have over 15 million cubic yards of remaining capacity for hazardous waste. There is sufficient landfill capacity for non-hazardous and hazardous waste in Riverside County and California; therefore there will not be a waste management cumulative impact from the Rio Mesa SEGF.

COMPLIANCE WITH LORS

Energy Commission staff concludes that the proposed Rio Mesa SEGF would comply with applicable LORS regulating the management of hazardous and non-hazardous wastes during both facility construction and operation. Staff also concludes that Rio Mesa SEGF would comply with LORS that will mitigate areas where historical soil contamination may be discovered or accidental releases occur. Staff has recommended the applicant be required to comply with Conditions of Certification **WASTE-1** through **WASTE-8** which address applicable LORS.

Conditions of Certification **WASTE-2** and **WASTE-3** would require a qualified environmental professional be responsible for the assessment and remediation of past, present or future contamination which would ensure the applicant would comply with CEQA.

Conditions of Certification **WASTE-4** and **WASTE-6** would require waste management construction and operation plans that ensure compliance with the California Integrated Waste Management Act, Title 22, Title 24, Part 11, and AB 341. The applicant would be required to recycle and/or dispose of hazardous and non-hazardous wastes at facilities licensed or otherwise approved to accept the wastes. The project owner would also be required to submit a plan to the CPM and Riverside County as to how it would divert to the maximum extent feasible the recyclable materials that are generated during operation at the facility. The applicant would also be required to divert all materials from the solid waste stream that could reasonably be diverted based upon their approved plans.

Because hazardous wastes would be produced during both project construction and operation, the Rio Mesa SEGF would be required to obtain a hazardous waste generator identification number from U.S. EPA in accordance with Condition of Certification **WASTE-5**. The Rio Mesa SEGF 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 of Title 22, CCR, Section 66262.12.

In hopes of reducing and eliminating risks to the environment, workers and the public, staff recommends Conditions of Certification **WASTE-7** and **WASTE-8**. These conditions would keep staff informed of accidents, releases, clean-up actions, and enforcement actions at the project site in accordance with CEQA, Title 22 and the California Health and Safety Code, Chapter 6.11.

Staff has reviewed **Socioeconomics Figure 1**, which shows the environmental justice population (see the **Socioeconomics** and **Executive Summary** sections of this PSA for further discussion of environmental justice) is not greater than fifty percent within a six-mile buffer of the proposed Rio Mesa SEGF and therefore there would not be a disproportionate **Waste Management** impact resulting from construction and operation of the proposed project to an environmental justice population.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff received comments from the Department of Toxic Substances Control (DTSC). DTSC provided staff with a memorandum outlining nine steps that would be necessary for safe construction and operation of the Rio Mesa SEGF (DTSC 2011a). In the memorandum DTSC provided comments that required Rio Mesa SEGF to supply documentation on the information that would normally be included in a Phase I ESA report. The applicant provided a Phase I ESA with the AFC. These submittals address DTSC's comments.

CONCLUSIONS

Consistent with the three main objectives for staff's waste management analysis (as noted in the Introduction section of this analysis), staff provides the following conclusions:

1) Based on its review of the applicant's proposed waste management procedures, staff concludes that project wastes would be managed in compliance with all applicable waste management LORS from California, recycled to the maximum extent feasible, and the owner/operator would follow their waste management plans. Staff notes that both construction and operation wastes would be characterized and managed as either hazardous or non-hazardous waste. All non-hazardous wastes would be recycled to the maximum 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 onsite in accordance with accumulation time limits (90,180, 270, or 365 days depending on waste type and volumes generated), and then properly manifested, transported to, and disposed of at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies.

   However, to help ensure and facilitate environmental protection, public safety, and ongoing project compliance with LORS, staff proposes Conditions of Certification **WASTE-1** through **8**. These conditions would require the project owner to do all of the following:

   - Prepare and implement an UXO Identification, Training and Reporting and Work Plan and outlining procedures to recover and dispose of ordnance, as well as complete additional field surveys **(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 a hazardous waste generator identification number (**WASTE-5**).
   - Prepare a Construction and Operation Waste Management Plan that details the types and volumes of waste to be generated and how wastes would be managed, recycled, and/or disposed of after generation. Comply with local and state waste recycling and diversion requirements (**WASTE-4** and **WASTE-6**).
   - 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-7)**.

- Report any waste management-related LORS enforcement actions and how violations would be corrected (**WASTE-8)**.

2) Although the ESA established that there were no RECs, potentially contaminated soil could be encountered during excavation activities at the project site or the linear facilities and staff is concerned that the environment and/or human health could be potentially exposed to unforeseen contaminates. To ensure that the project site is investigated and remediated, as necessary, and to reduce any impacts from prior or future hazardous substance or hazardous waste releases at the site to a level of insignificance, staff proposes conditions of certification **WASTE-2** and **WASTE-3.** These conditions would require the project owner to ensure that the project site is investigated and remediated as necessary; demonstrate that project wastes are managed properly; and ensure that any future spills or releases of hazardous substances or wastes are properly reported, cleaned up, and remediated as necessary. Therefore, staff concludes that construction and operation of the proposed Rio Mesa SEGF Project would not result in contamination or releases of hazardous substances that would pose a substantial risk to human health or the environment.

3) Disposal of project generated non-hazardous and hazardous wastes would have a less than significant impact on Class III and Class I landfill capacity.

PROPOSED CONDITIONS OF CERTIFICATION

WASTE-1 The project owner shall prepare Unexploded Ordnance (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.
- Identification of available trained experts that will respond to notification of discovery of any ordnance (unexploded or not).

  A 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.

<u>**Verification:**</u> The project owner shall submit the UXO Identification, Training and Reporting Plan to the CPM 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 within 30 days of completion of the surveys.

WASTE-2 The project owner shall provide the resume of an experienced and qualified professional engineer or professional geologist, who shall be available for consultation during site characterization (if needed), excavation, and grading activities, to the CPM for review and approval. The resume shall show experience in remedial investigation and feasibility studies.

The professional engineer or professional geologist shall be given full authority by the project owner to oversee any earth moving activities that have the potential to disturb contaminated soil, and to determine appropriate actions to be taken.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit the resume to the CPM for review and approval.

WASTE-3 If potentially contaminated soil is identified during site characterization, demolition, excavation or grading 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 the Department of Toxic Substances Control or Regional Water Quality Control Board, and the 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 Department of Toxic Substances Control or Regional Water Quality Control Board, 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 five days of their receipt. The project owner shall notify the CPM within 24 hours of any orders issued to halt construction.

WASTE-4 The project owner shall prepare a Construction Waste Management Plan for all wastes generated during construction of the facility, in accordance with Title 24, Part 11, and shall submit the plan to the CPM for review and approval. 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.
- 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/source reduction plans.
- Method for collecting weigh tickets or other methods for verifying the volume of transported and or location of waste disposal.

AB 341 (Chesbro) requires a business, defined to include a commercial or public entity, which generates more than four cubic yards to recycle 50% of construction waste.

Verification: The project owner shall submit the Construction Waste Management Plan to Riverside County for review, and to the CPM for review and approval no less than 30 days prior to the initiation of construction activities at the site. The project owner shall submit to the County demonstration that they met the construction and demolition waste diversion requirements of 50 percent diversion pursuant to the CalGreen Building codes.

WASTE-5 The project owner shall obtain a hazardous waste generator identification number from the United States Environmental Protection Agency prior to generating any hazardous waste during construction or 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 in the next scheduled Monthly Compliance Report after receipt of the number. Submittal of the notification and issued number documentation to the CPM 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 in the next scheduled compliance report.

WASTE-6 The project owner shall prepare an Operation Waste Management Plan for all wastes generated during operation of the facility and shall submit the plan to the CPM 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 assure 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 be employed in the event of an unplanned closure or planned temporary facility closure.
- A detailed description of how facility wastes will be managed and disposed of upon closure of the facility.

- The project owner shall submit to the CPM and Riverside County demonstration that they diverted operation wastes to the maximum extent feasible.

Verification: The project owner shall submit the Operation Waste Management Plan to the CPM for approval no less than 30 days prior to the start of project operation. The project owner shall submit any required revisions to the CPM 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-7 The project owner shall ensure that all spills or releases of hazardous substances, hazardous materials, or hazardous waste are documented and cleaned up and that wastes generated from the release/spill are properly managed, cleaned up, and disposed of, in accordance with all applicable federal, state, and local requirements.

The project owner shall document management of all unauthorized releases and spills of hazardous substances, hazardous materials, or hazardous wastes that are in excess of the Environmental Protection Agency's reportable quantities (RQ), that occur on the project property or related linear facilities during construction and on the property during operation. 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.

Verification: A copy of the unauthorized release/spill documentation shall be provided to the CPM within 30 days of the date the release was discovered.

WASTE-8 Upon becoming aware of any impending waste management-related enforcement action by any local, state, or federal authority, related to the Rio Mesa SEGF, the project owner shall notify the CPM of any such action taken or proposed to be taken against the project itself, or against any waste hauler or disposal facility or treatment operator with which the owner contracts.

Verification: The project owner shall notify the CPM in writing within 10 days of becoming aware of an impending enforcement action. The CPM shall notify the project owner of any changes that will be required in the way project-related wastes are managed.

REFERENCES

BS 2011a – Bright Source/J. Woolard (tn 62584). Rio Mesa Application for Certification - Volumes 1, 2, and 3, dated October 14, 2011. Submitted to CEC Docket Unit on October 14, 2011.

BS 2011b – Bright Source/T. Stewart (tn 62930). Supplement to the Application for Certification, dated November 18, 2011. Submitted to CEC Docket Unit on November 18, 2011.

BS 2011c – Bright Source/T. Stewart (tn 63101). Supplement #1A to the Application for Certification, dated December 9, 2011. Submitted to CEC Docket Unit on December 12, 2011.

BS 2012q – Bright Source/T. Stewart (tn 65066) Supplemental Response to Data Request No. 40, dated May 3, 2012. Submitted to CEC Dockets Unit May 3, 2012.

BS 2012v – Bright Source/ T. Stewart (tn 66292) Applicant's Enviormental Enhancement Proposal dated July 23, 2012. Submitted to CEC Dockets Unit on July 23, 2012.

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WORKER SAFETY AND FIRE PROTECTION

Geoff Lesh, PE, and Rick Tyler

SUMMARY OF CONCLUSIONS

Energy Commission staff (staff) has reviewed the Rio Mesa Solar Energy Generating Facility (Rio Mesa SEGF) in accordance with the requirements of the California Environmental Quality Act (CEQA). With respect to CEQA, staff concludes that if the applicant for the proposed Rio Mesa SEGF 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 Conditions of Certification **WORKER SAFETY-3** through **-10** the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable laws, ordinances, regulations, and standards (LORS).

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 agency before implementation. The conditions also require verification that the proposed plans adequately assure worker safety and on-site fire protection and comply with applicable laws, ordinances, regulations, and standards.

Staff has considered the position of the Riverside County Fire Department (RCFD) and all relevant information as well as past experience at other solar power plants in California.

In response to data requests, the applicant provided a Fire and Emergency Services Risk and Needs Analyses (FESNA). The analyses suggest that by complying with LORS, the project would not create significant impacts on the local RCFD or local emergency response resources because of the projected infrequency and small scale of any responses needed for fire, medical, or technical rescue needs. In the event that Riverside County Solar Policy B-29 is overturned, staff proposes Conditions of Certification **Worker Safety-9**, and **-10**, to provide an alternative mechanism for determining and implementing mitigation for impacts to the fire department.

INTRODUCTION

The proposed action evaluated within this Preliminary Staff Assessment (PSA) is for the construction and operation of the Rio Mesa SEGF, a proposed solar-thermal electricity generation facility located on lands in eastern Riverside County, California.

The purpose of this PSA is to assess the worker safety and fire protection measures proposed by the Rio Mesa SEGF and to determine whether the applicant has proposed adequate measures to:

- comply with applicable safety laws, ordinances, regulations, and standards (LORS);
- protect the workers during construction and operation of the facility;

- protect against fire; and
- provide adequate emergency response procedures.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Worker safety and fire protection are regulated through 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. **Worker Safety and Fire Protection Table 1** below provides a list of the applicable LORS along with a brief description of their purpose.

Worker Safety and Fire Protection Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
Federal	
Title 29, U.S. Code (U.S.C.) 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 U.S.C. § 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.
Title 29, C.F.R., 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 Title 29 C.F.R. 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.
Title 24, Cal Code Regs., section 3, et seq.	This section incorporates the current addition of the International 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	
Riverside County Fire Code, Riverside County Code Chapter 8.32: Ordinance No. 787	Adopts the California Fire Code, 2010 Edition, with some of its appendices, into Riverside County regulations.
Riverside County Subdivision Regulations, Ordinance No. 460	Establishes requirements for layout including fire protection and access requirements for developed land parcels.
Riverside County Board of Supervisors Policy	Establishes requirements for utility scale solar power plants to make annual payments to the County based on acreage used in the power production

No. B-29	process.
Staff Recommended Standards and Codes	
National Fire Protection Association Standard: NFPA 860	Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations 2010 Edition
National Fire Protection Association Standard: NFPA 56 (PS)	Standard for Fire and Explosion Prevention During Cleaning and Purging of Flammable Gas Piping Systems 2012 Edition

METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

Two issues are assessed in Worker Safety and 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 services (EMS) and response, and hazardous materials (hazmat) spill response during demolition, construction, and operations.

Worker safety issues are thoroughly addressed by the California Department of Occupational Safety and Health (Cal/OSHA) regulations. If all LORS were to be followed, workers would 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 identifies and 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 whether they feel adequately trained, manned, and equipped to respond to the actual and potential needs of the proposed 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 would identify and recommend that the applicant mitigate this impact by providing increased resources to the fire department.

Staff has also established a procedure for use when a local fire department has identified either a significant incremental project impact to a local agency or a significant incremental cumulative impact to a local agency. Staff first conducts an initial review of the fire department's position and either agrees or disagrees with the fire department's determination that a significant impact would exist if the proposed power plant were 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 and Emergency Services Needs Assessment and a Risk Assessment. The Fire and Emergency Services 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 might indeed exist, the risk (chance) of that impact occurring and causing injury or death may or may not be less than significant.

PROPOSED PROJECT

SETTING AND EXISTING CONDITIONS

Rio Mesa SEGF would be located on the Palo Verde Mesa in Riverside County, California. It would be located about 13 miles southwest of Blythe, California. The project site is located in a rural area and is currently undeveloped and unoccupied.

The project site consists of previously disturbed land. Unexploded ordnance (UXO) and munitions and explosives of concern (MEC) are potentially present on-site, as the military used much of the desert for training exercises during World War II.

Construction of the entire generating facility, from site preparation and grading to commercial operation, is expected to take place from the Fourth Quarter of 2013 to the First Quarter of 2016. Construction of the shared facilities would occur during construction of the first plant. Based on an approximate 35-month construction period, there would be an average and peak workforce of approximately 840 and 2,200, respectively. The workforce would consist of construction craft people, supervisory, support, and construction management personnel. During some construction periods and during the start-up phase of the project, some activities would occur 24 hours per day, 7 days per week.

Management, engineering, administrative staff, skilled workers, and operators would serve both plants. Rio Mesa SEGF is expected to employ up to 100 full-time employees: 30 with Rio Mesa I (the southern plant), 30 with Rio Mesa II (the northern plant), as well as 40 for the common area. The facility would be operated 7 days a week, typically up to 16 hours per day.

ASSESSMENT OF DIRECT AND INDIRECT IMPACTS AND DISCUSSION OF MITIGATION

Worker Safety

Industrial environments are potentially dangerous during construction and operation of facilities. Workers at the proposed Rio Mesa SEGF would be exposed to loud noises, moving equipment, trenches, and confined space entry and egress problems. The workers could experience falls, trips, burns, lacerations, and numerous other injuries. Workers would also have the potential to be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, and electrical sparks and electrocution. Therefore, it is important for the Rio Mesa SEGF 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 would be adequately protected from health and safety hazards.

Safety and Health Programs 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 Rio Mesa SEGF 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 (Cal Code Regs., tit. 8, § 1509)
- Construction Fire Prevention Plan (Cal Code Regs., tit. 8, § 1920)
- Personal Protective Equipment Program (Cal Code Regs., tit. 8, §§ 1514 — 1522)
- Emergency Action Program and Plan

Additional programs under General Industry Safety Orders (Cal Code Regs., tit. 8, §§ 3200 to 6184), Electrical Safety Orders (Cal Code Regs., tit. 8, §§2299 to 2974) and Unfired Pressure Vessel Safety Orders (Cal Code Regs., tit. 8, §§ 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

- Hazard Communication Program
- Lock Out/Tag Out Safety Program
- Pressure Vessel and Pipeline Safety Program
- Solar Components Safe Handling Program

The Application for Certification (AFC) includes outlines of the above programs (BS 2011a, § 5.16.4). Prior to the start of construction of the Rio Mesa SEGF, detailed programs and plans would be provided to the Energy Commission compliance project manager (CPM) and to the RCFD pursuant to proposed Condition of Certification **WORKER SAFETY-1**.

Operations and Maintenance Safety and Health Program

Prior to the start of operations at the Rio Mesa SEGF, an Operations and Maintenance Safety and Health Program would be prepared, as required by proposed Condition of Certification **WORKER SAFETY-2**. This operational safety program would include the following programs and plans:

- Injury and Illness Prevention Program (Cal Code Regs., tit. 8, § 3203)
- Fire Protection and Prevention Program (Cal Code Regs., tit. 8, § 3221)
- Personal Protective Equipment Program (Cal Code Regs., tit. 8, §§ 3401 to 3411)
- Emergency Action Plan (Cal Code Regs., tit. 8, § 3220)

In addition, the requirements under General Industry Safety Orders (Cal Code Regs., tit. 8, §§ 3200 to 6184), Electrical Safety Orders (Cal Code Regs., tit. 8, §§2299 to 2974) and Unfired Pressure Vessel Safety Orders (Cal Code Regs., tit. 8, §§ 450 to 544) would be applicable to the project. Written safety programs for the Rio Mesa SEGF, 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 (BS 2011a, § 5.16.4). Prior to operation of the Rio Mesa SEGF, all detailed programs and plans would be provided to the CPM and RCFD 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 (BS 2011a, § 5.16.4):

- identity of person(s) with authority and responsibility for implementing the program; and 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 (Cal Code Regs., tit. 8, § 3221). The AFC outlines a proposed Fire Prevention Plan which is acceptable to staff with respect to CEQA (BS 2011a, § 5.16.4). 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.

Staff proposes that the applicant submit a final Fire Prevention Plan to the RCFD for review and comment and to the CPM for review and approval to satisfy proposed Conditions of Certification WORKER SAFETY-1 and -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 (Cal Code Regs., tit. 8, §§ 3380 to 3400). The Rio Mesa SEGF 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 (Cal Code Regs., tit. 8, § 3220). The AFC contains an outline for an emergency action plan (BS 2011a, § 5.16.4). The emergency action plan would 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

Worker Exposure to Herbicides

The applicant has indicated that they will include a Best Management Practices Plan for Herbicide and Pesticide Storage and Application in their Operations & Maintenance Health and Safety Program so that workers would be adequately trained and protected against exposure to herbicides and pesticides (BS 2011a, § 5.16.6.2). Therefore, to ensure that workers are indeed protected, staff recommends that the plan include the development and implementation of Best Management Practices (BMP) for the storage and application of herbicides and pesticides used to control weeds beneath and around the solar heliostats. A BMP requiring proper herbicide storage and application would mitigate potential risks to workers from exposure to herbicides and reduce the chance that herbicides would contaminate either surface water or groundwater. Staff recommends 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.

Unexploded Ordnance

The site of the proposed Rio Mesa SEGF was used in the past for military training exercises. Therefore, to ensure site workers are properly trained to recognize, avoid, and report any unexploded ordnance (UXO), staff also recommends adoption of the proposed Condition of Certification **WASTE-1** in the **Waste Management** section of this PSA, which would require the project owner to develop a UXO identification training and reporting procedures program. The UXO training program should include the identification of trained UXO ordnance experts that are available to complete removal of UXO and supplemental geophysical surveys to search for additional or buried ordnance.

Eyesight Protection from Photochemical Retinal Damage

Photochemical retinal damage is associated with long-duration exposure times as well as lower-wavelength (higher-energy) light exposure. While retina pigment epithelium (RPE) and the neurosensory retina are protected from light-induced exposure by the absorption profile of the surrounding ocular structures (e.g., cornea, crystalline lens, macular pigments) and through retinal photoreceptor outer segment regeneration, photic injury is still possible due to photochemical retinal light toxicity mechanisms.

Photochemical injury is both dose-dependent and cumulative in nature. The cumulative time-dependent nature is that daily exposures can build up and can last many weeks. For example, it has been estimated that the half-life (when an exposure effect has decayed to approximately 37 percent) of the cumulative dose exposure effect is on the order of 30 days. This has significant implications for workers over many weeks that spend a significant amount of time in proximity to the high luminance environment of a solar field in the presence of the additional high natural ambient brightness of the desert environment.

When evaluating the implications of these effects on the viewer of the tower or the heliostats, it must be noted that the effect is directly related to the ambient and background light conditions. The Rio Mesa SEGF is located in a bright desert environment thereby increasing the potential chance for photochemical retinal damage. The cumulative daily exposure to workers to the ambient environment combined with the additional potential cumulative effects of heliostat and solar receiver steam generator (SRSG) exposure puts project workers at risk for photochemical retinal damage. This is due to the cumulative effect discussed above.

Thus, to ensure the safety of the workers and others within the project boundaries, personnel protection equipment (PPE), in the form of protective glasses will be provided. Protective glasses have been developed for workers engaged in intense solar field work, tower work, and intense close viewing of the SRSG.

The potential photochemical retinal hazards are calculated according to IEC 62471 standard (same as CIE S 009: 2002), titled: “Photobiological Safety of Lamps and Lamp Systems”, where the spectral values were taken from “ASTM G173-03 Reference Spectra Derived from SMARTS v. 2.9.2 (AM1.5)” and are the same as the “ISO 9845-1-1992.”

Therefore, staff recommends that the applicant include in their personal protective equipment (PPE) plans that will be elements of the Project Construction Safety and Health Program required by proposed Condition of Certification **Worker Safety-1** and the Project Operations and Maintenance Safety and Health Program required by proposed Condition of Certification **Worker Safety-2,** an Eyesight Protection from Retinal Damage Plan that is designed to insure that workers in the solar field receive and wear the appropriate protective sunglasses. This Eyesight Protection from Retinal Damage Plan would:

(1) identify and acquire the appropriate eye protection (EP) equipment based on the IEC 62471 standards in sufficient numbers to provide safety glasses for the workers engaged in solar field work, and tower work where the potential exists for heliostat solar reflective exposure or SRSG exposure during operations,

(2) establish the requirements and procedures for the donning and doffing of the EP by workers and provide training and,

(3) monitor worker use of the PPE and compliance with the EP procedures.

Refer to the **Traffic and Transportation** section or **Appendix TT1- Glint and Glare Safety Impact Assessment** of this PSA for a more complete and detailed discussion of this topic.

Valley Fever (Coccidioidomycosis)

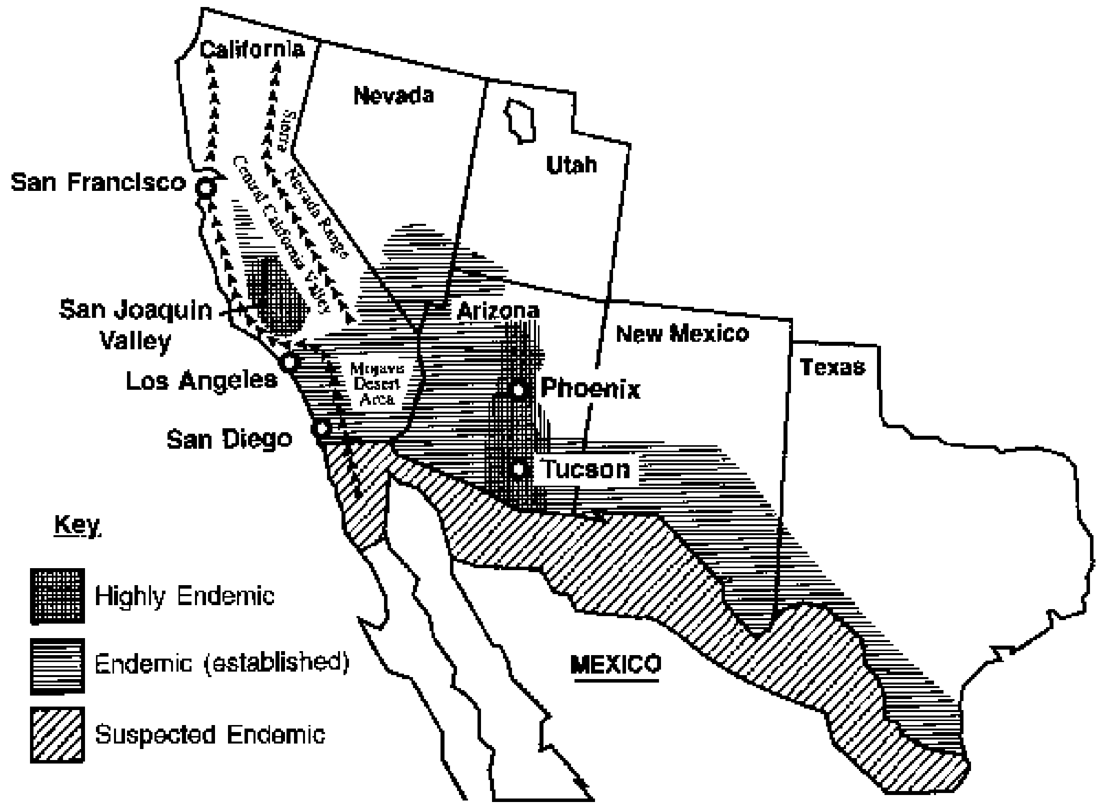
Coccidioidomycosis or "Valley Fever" (VF) is primarily encountered in southwestern states, particularly in Arizona and California. It is caused by inhaling the spores of the fungus Coccidioides immitis, which are released from the soil during soil disturbance (e.g., during construction activities) or 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 VF. VF is endemic to the San Joaquin Valley in California, which presumably gave this disease its common name. In California, the highest VF rates are recorded in Kern, Kings, and Tulare Counties, followed by Fresno and San

Luis Obispo Counties. LA County, San Diego County, San Bernardino County, and Riverside County also have reported VF cases, although much fewer.

A 2004 Center for Disease Control and Prevention (CDC) report found that the number of reported cases of Coccidioidomycosis in the US increased by 32 percent 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 percent) of the 8,657 persons hospitalized for Coccidioidomycosis died (CDC 2009).

Worker Safety and Fire Protection Figure 1
The geographic distribution of Coccidioidomycosis*



*Source: CDC 2006, Figure 2

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 2 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.

Worker Safety and Fire Protection Table 2
Hospitalizations for Coccidioidomycosis, California, 1997–2002*

Category	Total hospitalizations	Total person-yrs (× 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	
SLO	170	1.48	11.5	

*Source: Flaherman 2007 **Per 100,000 residents per year

Riverside County has approximately 50 cases of VF per year (population is roughly 2 million) while nearby San Diego County has about 120 cases per year (population roughly 3 million). In comparison, over 1,000 cases have been reported annually in Kern County during the last five years. Cases of VF in Riverside County have remained steady in the past several years, fluctuating only slightly between 48 and 55 cases per year. Nine deaths related to VF have been reported in Riverside County between 2005 and 2008 (Williams 2009). A rate of 50 cases per year per 2,000,000 persons corresponds to a risk of about 25 in one million and a rate of 2.5 cases per 100,000 persons, which is lower than the average rate for the entire state of California (~3.6 cases per 100,000 residents). Data received from the Riverside County Department of Public Health indicates that the crude VF rate in Riverside County between 1999 and 2006 has been even lower, about 15 per 100,000 residents. The region near which the Rio Mesa SEGF project would be located (generally between Blythe and Dessert Center) has recorded five or fewer cases between 1999 and 2006 (RCDPH 2007).

Worker Safety and Fire Protection Table 3
Valley Fever rates in Riverside County

County of Riverside

Reported Cases: Coccidioidomycosis (Valley Fever)

Years 1999 – 2006

By Zip Code of Residence*			
ZIP	**PO_NAME**	**8 Year Total**	**8 Year Estimated Crude Aggregate Rate (per 10,000)**
92236	Coachella	5	1.7
92225	Blythe	5	2.8
92883	Corona	5	2.6
92591	Temecula	5	1.5
92201	Indio	6	1.0
92505	Riverside	6	1.4
92544	Hemet	7	1.6
92530	Lake Elsinore	7	1.4
92506	Riverside	7	1.5
92879	Corona	8	1.6
92507	Riverside	10	1.9
92583	San Jacinto	10	4.0
92570	Perris	11	2.5
92220	Banning	12	3.8
92586	Sun City	12	6.2
92509	Riverside	13	1.8
92504	Riverside	21	4.0
92503	Riverside	32	4.1
TOTAL	ALL COUNTY	280	1.5

* only zip codes for which more than 4 cases were recorded during the 8-year period are included

Source: DHS: AVSS CMR reporting

Compiled:

Riverside County Department of Public Health

Epidemiology and Program Evaluation

Kevin Meconis, Epidemiologist

11/19/2007

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. 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 (Kirkland 1996). 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 percent 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).

During correspondence 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 uncommon to find the fungus in soil that was previously farmed and irrigated. Therefore, the risk of infection resulting from disturbance of farmed lands is greatly reduced. 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).

VF 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).

Worker Safety and Fire Protection Table 4
Disease Forms of Valley Fever

CATEGORIES	NOTES
Asymptomatic	• Occurs in about 50 percent 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 percent to 10 percent 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 VF, it is difficult for staff to assess the potential for VF to impact workers during construction and operation of the proposed Rio Mesa SEGF with a reasonable degree of certainty. 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 PSA should be strictly adhered to in order to adequately reduce the risk of contracting VF to a less than significant level. Towards that end, staff proposes Condition of Certification **WORKER SAFETY-7** which would require that the dust control measures found in proposed Conditions of Certification **AQ-SC3** and **AQ-SC4** be supplemented with additional requirements including implementing methods equivalent to the requirements of Rule 402 of the Kern County Air Pollution Control District (as amended Nov. 3, 2004).

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; and,
- 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, 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 staff audits 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 proposed Condition of Certification **WORKER SAFETY-4**. A Safety Monitor, hired by the project owner, yet reporting to the Chief Building Official (CBO) and CPM, would 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.

Fire Hazards

During construction and operation of the proposed Rio Mesa SEGF 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. Compliance with all LORS and the proposed conditions of certification would be adequate to assure protection from all fire hazards.

Staff reviewed the information provided in the AFC, the Fire and Emergency Services Risk and Needs Analyses (FESNA), and reviewed correspondence from a representative of the RCFD 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 would 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 RCFD (RCFD 2012a, URS 2012e, BS 2011a, §§ 2.3.6 and 2.3.11,).

Construction

During construction, the permanent fire protection systems proposed for the Rio Mesa SEGF 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.

The applicant has also indicated that it intends to construct and operate an above-ground fuel depot for motor vehicles at each power block. Each fuel depot would contain a maximum of 8,000 gallons of diesel fuel (BS 2011a, § 5.5.4.2).

The fire protection measures that are required by code for the fuel depot and dispensing facility include:

- Chapter 22 of the 2010 California Fire Code: Motor Fuel-Dispensing Facilities and Repair Garages
- NFPA 30a: Code for Motor Fuel Dispensing Facilities and Repair Garages (2012 Edition)

Applicable sections of the 2010 California Fire Code (CFC) and NFPA 30a are very similar; however NFPA 30a contains more details for fuel tank design specifications and other requirements. The requirements listed in these codes include the materials to be used to construct fuel tanks, location of dispensing devices, spacing from other structures, fencing, physical protective barriers, shut-off valves, emergency relief venting, secondary containment, vapor and liquid detection systems with alarms, and other general design requirements.

NFPA 30a requires the following:

> 7.3.5 Fixed Fire Protection.
>
> 7.3.5.1 For an unattended, self-serve, motor fuel dispensing facility, additional fire protection shall be provided where required by the *authority having jurisdiction.(italics added)*
>
> 7.3.5.2 Where required, an automatic fire suppression system shall be installed in accordance with the appropriate NFPA standard, manufacturers' instructions, and the listing requirements of the systems.
>
> 9.2.5 Basic Fire Control.
>
> 9.2.5.1 Sources of Ignition. Smoking materials, including matches and lighters, shall not be used within 6m (20 ft) of areas used for fueling, servicing fuel systems.
>
> 9.2.5.2 Fire Extinguishers. Each motor fuel dispensing facility or repair garage shall be provided with fire extinguishers installed, inspected, and maintained as required by NFPA 10, *Standard for Portable Fire Extinguishers.* Extinguishers for outside motor fuel dispending areas shall be provided according to the extra (high) hazard requirements for Class B hazards, except that the maximum travel distance to an 80 B:C extinguisher shall be permitted to be 30.48m (100 feet).
>
> 9.2.5.3 Fire Suppression Systems. Where required, automatic fire suppression systems shall be installed in accordance with appropriate NFPA standard, manufacturer's instructions, and the listing requirements of the systems.

The authority having jurisdiction is the Energy Commission and the RCFD, which will review and comment on the fire detection and suppression plans for the fuel depot before it is built and operated.

The only fire protection measure explicitly listed in the California Fire Code is a requirement for fire extinguishers to be located within 75 feet of the fuel dispensing equipment. Neither the CFC nor the Riverside County code requires sprinkler systems for fuel dispensing facilities. Section 2203.2 of the CFC requires an approved, clearly identified and readily accessible emergency disconnect switch at an approved location to stop the transfer of fuel to the fuel dispensers in the event of a fuel spill or other emergency. Section 2205.3 requires spill control to prevent liquids spilled during dispensing operations from flowing into buildings and section 2206.5 requires that above-ground tanks be provided with secondary containment in the form of drainage control or placement of berms or dikes. The applicant has proposed to install secondary containment.

Staff assessed the proposed fuel depot and determined that the applicant intends to meet all codes and standards in their operations of the fuel depot. Proposed Condition of Certification **WORKER SAFETY-1** would require that the RCFD review and the CPM review and approve the fire protection systems for the fuel depot.

Recent incidents have demonstrated significant risks associated with purging of new pipelines with natural gas. On June 28, 2010, the United States Chemical Safety and Hazard Board (CSB) issued Urgent Recommendations to the United States Occupational Safety and Health Administration (OSHA), the National Fire Protection Association (NFPA), the American Society of Mechanical Engineers (ASME), and major gas turbine manufacturers to make changes to their respective regulations, codes, and guidance to require the use of inherently safer non-flammable alternatives to natural gas blows for the purposes of pipe cleaning, such as the use of steam, air, nitrogen or water as the cleaning medium. Recommendations were also made to the fifty states to enact legislation applicable to power plants that prohibits flammable gas blows for the purposes of pipe cleaning. In accordance with those recommendations, staff proposes Condition of Certification **WORKER SAFETY-8** which prohibits the use of flammable "gas blows" for pipe cleaning at the facility either during construction or after the start of operations.

All fuel gas pipe purging activities shall vent any gases to a safe location outdoors, away from workers and sources of ignition. Fuel gas pipe cleaning and purging shall adhere to the provisions of the most current versions of the National Fuel Gas Code (NFPA 54 and 56-PS) including all Temporary Interim Amendments.

Regarding the need for emergency response during construction and the impacts on the RCFD, please see the discussion below.

Operation

The information in the AFC indicates that the project intends to meet the fire protection and suppression requirements of the 2010 California Fire Code, all applicable recommended NFPA standards (including Standard 850 addressing fire protection at electric generating plants), and all Cal/OSHA requirements, including providing a secondary access point for emergency response vehicles. The California Fire Code (24 CCR Part 9, chapter 5, section 503.1.2) requires 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 personnel to access the site should the main gate be blocked.

Fire suppression elements in the proposed plants would include both fixed and portable fire extinguishing systems. A combined service water/firewater storage tank that has sufficient capacity for service water and a dedicated 2-hour reserve volume for firewater would be provided in each power block area. Another dedicated firewater storage tank, with the capacity to fight a 2-hour fire, also would be provided in the common area (BS 2011a, § 2.3.6).

Two sets of fire pumps, each consisting of one electric and one diesel-fueled backup firewater pump would ensure water supply to two fire protection water loops and an electric jockey pump would maintain pressure in the system (BS 2011a, § 5.16.4.1).

Fire hydrants would be installed throughout the power blocks per California Fire Code requirements. Fixed fire suppression systems would be installed at determined fire risk areas such as the generator step-up transformers and turbine lube oil equipment. A sprinkler system would be installed at the steam turbine generator and in administrative buildings. In addition to the fixed fire protection system, appropriate class of service portable extinguishers and fire hydrants/hose stations would be located throughout the facility at code-approved intervals.

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 would ensure adequate fire protection.

The applicant would be required by Conditions of Certification **WORKER SAFETY-1** and **-2** to provide the final construction and operations Fire Protection and Prevention Programs to staff prior to construction and operation of the project to confirm the adequacy of the proposed fire protection measures.

RCFD Impacts

The three closest Riverside County Fire stations that would respond to an incident at the proposed project are Station # 44, located at 13984 Main St., Ripley, CA, Station #43, located at 140 West Barnard Street, Blythe, CA, and Station #45 located at 17280 West Hobson Way, Blythe, CA. Riverside County Fire Station #44 is located approximately 10 miles from the project site, Station #43 is located approximately 18 miles from the project site, and Station #45 is located approximately 21 miles from the proposed site. The response times for Engines #44, #43, and #45 are approximately 12, 23, and 24 minutes respectively after dispatch. Riverside County Fire Department Fire Stations are staffed full-time, 24 hours/7 days a week, with a minimum 3 person crew, including paramedics, operating a "Type-1" structural fire fighting apparatus. Each member of the engine company is a certified Emergency Medical Technician and certified to the level of Hazardous Materials First Responder Operational (URS 2012e, Draft Fire Protection and Emergency Services Needs Assessment).

For responses requiring more assistance than is available from RCFD, RCFD has mutual aid agreements with the following fire departments (FD) in the State of Arizona. Buckskin FD, Parker FD, Quartzite FD providing Advanced Life Support, Ehrenberg FD, Wenden FD, Salome FD, Bouse Volunteer FD, Colorado river Indian Tribe FD (RCFD 2012a).

A letter from Captain Jason Neuman of RCFD (RCFD 2012a), states that although increased demands on the RCFD would be expected to result from the construction and operation of the project, the project's participation in Riverside County's Development Impact Fee Program and the Solar Policy B-29 as adopted by the Riverside County Board of Supervisors would mitigate the impacts. More detailed information pertaining to Policy B-29 can be found in the **Land Use** section of this PSA. In the event that Riverside County Solar Policy B-29 is overturned, staff proposes Conditions of

Certification **Worker Safety-9**, and **-10**, to provide an alternative mechanism for determining and implementing mitigation for impacts to the fire department.

Staff has considered the position of the RCFD and all relevant information as well as past experience at existing solar power plants that are similar to, but smaller than, the proposed project. Staff reviewed the records of emergency responses of the San Bernardino County Fire Department (SBCFD), the primary emergency responding agency to the only three operating thermal solar power plants in the state. These are the Solar Electric Generating Station (SEGS) 1 & 2 in Daggett (operating since 1984), SEGS 3-7 at Kramer Junction (1989), and SEGS 8 & 9 at Harper Dry Lake (1989). Staff also reviewed what records were immediately available at the three solar plants. All sources stated that their records were incomplete and not comprehensive. Staff wishes to caution that since the number of thermal solar power plants is so few and their operating history so short, any conclusion as to accident incident rates is meaningless from a statistical perspective. Simply put, the data set is not robust enough to draw any conclusions about their safety records. Nevertheless, this information is provided for illustrative purposes.

Three types of fire department responses to the solar power plants were surveyed:

1. Plan reviews,

2. Hazmat and fire inspections, and

3. Emergency Response including medical, fire, rescue, and hazardous materials incidents.

Regarding visits to the sites for plan review during the years the plants were operating, the SBCFD made four visits to the Kramer Junction facility and one visit to the Harper Lake facility.

Regarding site visits for inspections, reviews, enforcement activities, and follow ups, the SBCFD made 10 inspections to Daggett since 2008, totaling 24 hours of time, 48 visits to Kramer Junction since 2003, totaling 128 hours of time, and 29 visits to Harper Lake since 2004, totaling 105 hours of time.

Regarding emergency response including fire, rescue, medical and hazardous materials incidents, approximately 30 incidents occurred since 1998 that required the SBCFD (and other fire stations through mutual aid agreements) to respond to the three solar power plant sites. These include fires, fire alarm activations, injuries, medical emergencies, hazardous materials spills, complaints/calls from the public, and false alarms. However, the available records did not include documentation of a major fire at the SEGS 8 facility in January of 1990 that required a large part of the regional resources from four different fire districts including the San Bernardino County, Edwards Air Force Base, California Department of Forestry and Fire Protection (CDF), and the Kern County Fire Departments. This fire is the largest incident that has occurred at a solar thermal plant in California and demonstrates the magnitude of fire department resources that can be required to respond to a fire at a large thermal solar facility.

According to the Daggett solar plant records, only three incidents in the life of the plant required emergency services:

1. Feb 25, 1999: A heat transfer fluid (HTF) fire occurred in the HTF tanks. This was a major fire and the fire department allowed the fire to burn itself out over two days. There were no injuries, but extensive damage occurred.

2. Feb 28, 2000: An employee had a suspected heart attack (which was actually caused by drinking a whole bottle of hot sauce), and an ambulance responded from the fire department.

3. May 15-17, 2010: An HTF spill of about 60 gallons occurred in the solar field. The facility personnel cleaned it up on May 15 and reported it to San Bernardino County on the next business day, May 17. When receiving the report, the dispatcher misunderstood the report and sent out a 911 call indicating a spill is in progress. The whole fire department showed up on scene.

According to information received from the Kramer Junction plant, the following incidents required fire department response:

1. August 2002 for an unknown hazmat incident.

2. In 2007 when 30,000 gallons of HTF spilled.

3. In Feb. 2009 when a flex hose failure and an HTF vapor cloud ignited. According to Kramer Junction plant officials, the fire department was not needed as plant staff had the situation under control. A concerned citizen had made a 911 call.

According to information received from the Harper Lake plant, only the January 1990 fire required fire department response.

To summarize, relying on sparse data received from the SBCFD for only the past 10 years and not including the 1990 SEGS 8 fire, the department responded to about 30 incidents and emergencies at the nine solar units (at three locations), including two fires and two hazardous materials spills. During the same period the SBCFD conducted approximately 90 inspections and visits for enforcement actions/plan reviews, totaling about 260 hours of personnel time. The incident rate, therefore, for all three power plants would be 30 in 12 years or 2.5 emergency calls per year or 0.83 emergencies per solar plant per year.

Additionally, it is very important to note that the Rio Mesa SEGF power plant (along with the other solar power plants) would be located in an extremely harsh desert environment. The ability of a fire fighter to perform duties while wearing a turn-out coat, heavy boots, and a respirator (self contained breathing apparatus) is limited under the best of circumstances. If conducting a rescue or fighting a fire that necessitates use of a respirator, the high-temperatures of the desert, which often exceed 115 degrees Fahrenheit (^{o}F), severely limit a fire fighter’s ability to perform the duties to 15 minutes at a time. This severe time restriction necessitates the mobilization of more fire fighters to respond to the emergency.

Staff has considered the position of the RCFD and all relevant information as well as past experience at existing solar power plants all of which have higher risk than the proposed Rio Mesa SEGF. The proposed facility would be located in an area that is currently served by the RCFD. The fire, hazmat, and EMS needs at the proposed plant are real and would pose added demands on local fire protection and emergency medical services.

Proposed Mitigation

Certain tax exemptions for solar power plants reduce the tax revenues going to counties and local agencies that would normally be used to provide the resulting expansion in fire and emergency medical services needed to cover them. Thus, the potential exists with such solar power plants to cause impacts on public safety as a result of usage and drawdown of local agency resources that provide needed services, such as fire and EMS response to protect the public during emergencies, especially in rural districts where resources are limited.

Staff evaluated the potential and likely demands on the RCFD with the proposed mitigation provided by the applicant. Staff believes that there would be an intrinsically lower fire risk at the Rio Mesa SEGF resulting from its use of water and steam, rather than a combustible organic heat transfer fluid (HTF) as is used in the existing operational solar-thermal power plants at Harper Lake, Kramer Junction, and Daggett. Additionally, the design of the Rio Mesa SEGF solar field, consisting of solar heliostats (mirrors) and having no piping arrays carrying HTF will greatly reduce the potential for fire, EMS, and Hazmat service calls to RCFD. Without HTF storage tanks and solar field piping arrays, staff believes that the potential for a large conflagration does not exist at the Rio Mesa SEGF.

Emergency Medical Services Response

Staff conducted a statewide survey to determine the frequency of Emergency Medical Services (EMS) response to natural gas-fired power plants in California. The purpose of the analysis was to determine what impact, if any, power plants might have on local emergency services. Staff concluded that incidents at gas-fired power plants that require EMS response are infrequent and represent an insignificant impact on the local fire departments, except for instances where response times are high or a rural fire department has mostly volunteer fire-fighting staff. Experience with existing solar power plants, discussed above, suggests that solar power plants will not have a significantly higher emergency call frequency. The working environment of both natural gas fueled and solar power plants are similar industrial construction and operating environments, posing similar risks and hazards to workers. The proposed project would be located in an area where there are multiple fire stations within a 30-minute response time, and all are staffed continuously with professional EMT-trained crews. Thus, similar to natural gas power plant experience, staff does not expect that the proposed solar power plant would cause a significant impact on local EMS response services.

Additionally, staff has determined that the potential for both work-related and non-work-related heart attacks exists at all staffed 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.

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

A closure of the proposed Rio Mesa SEGF (either 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 (BS 2011a, § 2.5). 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 Rio Mesa SEGF. 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 Rio Mesa SEGF would be less than significant.

CUMULATIVE IMPACTS

Staff considered the potential for impacts due to construction and operation of the proposed Rio Mesa SEGF with other existing or foreseeable nearby facilities, noted in **Table 1** of the **Executive Summary**. Fire protection and emergency services demands caused by routine and emergency incidents at the proposed Rio Mesa SEGF would continue for the expected 25 to 30-year life of the project. Staff determines that given the amount of emergency response resources in the vicinity and the history of infrequent emergency calls required by existing thermal solar power plants, the proposed project would not cause a substantial adverse effect on local emergency services.

COMPLIANCE WITH LORS

Staff concludes that construction and operation of the Rio Mesa SEGF project with staff's proposed mitigation/conditions of certification 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.

CONCLUSIONS

Energy Commission staff (staff) has reviewed the Rio Mesa SEGF in accordance with the requirements of the California Environmental Quality Act (CEQA). With respect to CEQA, staff concludes that if the applicant for the proposed Rio Mesa SEGF 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 Conditions of Certification **WORKER SAFETY-3** through **-10** 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 agency before implementation. The conditions also require verification that the proposed plans adequately assure worker safety and on-site fire protection and comply with applicable laws, ordinances, regulations, and standards.

Staff has considered the position of the Riverside County Fire Department (RCFD) and all relevant information as well as past experience at other solar power plants in California. The RCFD has indicated that impacts upon emergency services resulting from increased demands resulting from construction and operation of the proposed project would be mitigated by the applicant's participation in the Riverside County Board of Supervisors Policy Number B-29 which pertains to solar power plants. Because Solar Policy B-29 is under court challenge, staff has not exclusively relied upon it for mitigation of impacts. Staff has proposed a backup plan in the form of Conditions of Certification **Worker Safety-9** and **-10**. Staff has determined that the likely emergency response requirements of the Rio Mesa SEGF would not create a significant public impact with the adoption of staff's proposed conditions of certification.

PROPOSED 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;
- a Construction Fire Prevention Plan that includes the above-ground fuel depot; and

- an Eyesight Protection from Retinal Damage Plan that is designed to insure that workers in the solar field receive and wear the appropriate protective sunglasses. This Eyesight Protection from Retinal Damage Plan would:

  (1) identify and acquire the appropriate eye protection (EP) equipment based on the IEC 62471 standards in sufficient numbers to provide safety glasses for the workers engaged in solar field work, and tower work where the potential exists for heliostat solar reflective exposure or SRSG exposure during operations,

  (2) establish the requirements and procedures for the donning and doffing of the EP by workers and provide training and,

  (3) monitor worker use of the PPE and compliance with the EP procedures.

The Personal Protective Equipment Program, the Exposure Monitoring Program, the Injury and Illness Prevention Program, the Heat Stress Protection Plan, and the Eyesight Protection from Retinal Damage Plan shall be submitted to the CPM for review and approval to document compliance of the program with all applicable safety orders. The Construction Emergency Action Plan and the Fire Prevention Plan shall be submitted to the Riverside 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, and a copy of the Riverside County Fire Department's response to the request for review and comment on the Fire Prevention Plan and the 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 (Cal. Code of Regs., tit. 8,§ 3395);
- a Best Management Practices (BMP) for the storage and application of herbicides and pesticides;
- an Emergency Action Plan;
- Hazardous Materials Management Program;
- Fire Prevention Plan that includes the fuel depot should the project owner elect to maintain and operate the fuel depot during operations (8 Cal Code Regs. § 3221);
- Personal Protective Equipment Program (Cal Code Regs.,tit. 8, §§ 3401—3411); and

- an Eyesight Protection from Retinal Damage Plan that is designed to insure that workers in the solar field receive and wear the appropriate protective sunglasses. This Eyesight Protection from Retinal Damage Plan would:

  (1) identify and acquire the appropriate eye protection (EP) equipment based on the IEC 62471 standards in sufficient numbers to provide safety glasses for the workers engaged in solar field work, and tower work where the potential exists for heliostat solar reflective exposure or SRSG exposure during operations,

  (2) establish the requirements and procedures for the donning and doffing of the EP by workers and provide training and,

  (3) monitor worker use of the PPE and compliance with the EP procedures.

The Operation Injury and Illness Prevention Plan, Heat Stress Protection Plan, BMP for Herbicides, and Personal Protective Equipment Program, and the Eyesight Protection from Retinal Damage Plan 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 Riverside County Fire Department for review and comment.

Verification: At least 30 days prior to commercial operation, the project owner shall submit to the CPM for approval a copy of the Project Operations and Maintenance Safety and Health Program, and a copy of the Riverside County Fire Department's response to the request for review and comment on the Fire Prevention Plan and the 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.

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.

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 of the departure of the previous CSS.

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,** implements 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 provide a second access gate for emergency personnel to enter the site. This secondary access gate shall be at least one-quarter mile from the main gate.

Plans for the secondary access gate and the method of gate operation shall be submitted to the Riverside 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 Riverside County Fire Department and the CPM preliminary plans showing the location of a second access gate to the site and a description of how the gate will be opened by the fire department. The final plan submittal shall also include a letter containing comments from the Riverside County Fire Department or a statement that no comments were received.

WORKER SAFETY-7 The project owner shall develop and implement an enhanced Dust Control Plan that includes the requirements described in **AQ-SC3** and additionally requires:

a) site worker use of dust masks (NIOSH N-95 or better) whenever visible dust is present;

b) implementation of methods equivalent to Rule 402 of the Kern County Air Pollution Control District (as amended Nov. 3, 2004); and

c) 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 or when PM10 measurements obtained when implementing b) (above) exceed 50 micrograms per cubic meter (µg/m3).

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.

WORKER SAFETY-8 The project owner shall comply with NFPA 56(PS) and not allow any fuel gas pipe cleaning activities on site, either before placing the pipe into service or at any time during the lifetime of the facility, that involve “flammable gas blows” where natural (or flammable) gas is used to blow out debris from piping and then vented to atmosphere. Instead, an inherently safer method involving a non-flammable gas (e.g. air, nitrogen, steam) or mechanical pigging shall be used. Pursuant to NFPA 56(PS), exceptions to this provision may be allowed only if no other satisfactory method is available, and then only with the approval of the CPM.

Verification: At least 30 days before any fuel gas pipe cleaning activities involving fuel gas pipe of four-inch or greater external diameter, the project owner shall submit a copy of the Fuel Gas Pipe Cleaning Work Plan which shall indicate the method of cleaning to be used, what gas will be used, the source of pressurization, and whether a mechanical PIG will be used, to the CBO for information and to the CPM for review and approval.

WORKER SAFETY-9 In the event that Riverside County Solar Policy B-29 is overturned, the project owner shall either:

(1) Reach an agreement with the Riverside County Fire Department (RCFD) regarding funding of its project-related share of capital and operating costs to improve fire protection/emergency response infrastructure and provide appropriate equipment as mitigation of project-related impacts on fire protection/emergency response services within the jurisdiction; ***or***

(2) If no agreement can be reached, the project owner shall fund a study (the "independent fire needs assessment and risk assessment") conducted by an independent contractor who shall be selected by the project owner and approved by the Energy Commission compliance project manager (CPM), in consultation with Riverside County Fire Department, and fulfill all mitigation identified in the independent fire needs assessment and a risk assessment. The study shall evaluate the project's proportionate funding responsibility for the above-identified mitigation measures, with particular attention to emergency response and equipment/staffing/location needs.

Should the project owner pursue option (2), above, the study shall evaluate the following:

(a) the project's proportionate (incremental) contribution to potential cumulative impacts on the RCFD and the project allocated costs of enhanced fire protection/emergency response services including the fire response, hazardous materials spill/leak response, rescue, and emergency medical services necessary to mitigate such impacts;

(b) the extent that the project's contribution to local tax revenue will reduce impacts on local fire protection and emergency response services; and

(c) recommend an amount of funding (and corresponding payment plan) that represents the project's proportional payment obligation for the above-identified mitigation measures.

Compliance Protocols shall be as follows:

(a) the study shall be conducted by an independent consultant selected by the project owner and approved by the CPM. The project owner shall provide the CPM with the names of at least three consultants, whether entities or individuals, from which to make a selection, together with statements of qualifications;

(b) the study shall be fully funded by the project owner.

(c) the project owner shall provide the protocols for conducting the independent study for review and comment by the RCFD and review and approval by the CPM prior to the independent consultant's commencement of the study;

(d) the consultant shall not communicate directly with the project owner or RCFD without express prior authorization from the CPM. When such approval is given, the CPM shall be copied on any correspondence between or among the project owner, RCFD, and the consultant (including emails) and included in any conversations between or among the project owner, RCFD and consultant; and

(e) the CPM shall verify that the study is prepared consistent with the approved protocols, *or*

(3) If the project owner and RCFD do not agree to the recommendations of the independent consultant's study, the Energy Commission or its designee shall, based on the results of the study and comments from the project owner and RCFD, make the final determination regarding the funding to be provided to the RCFD to accomplish the above-identified mitigation.

No construction shall occur until funding of mitigation occurs pursuant to either of the resolution options set forth above.

Verification: At least five (5) days before start of construction, the project owner shall provide to the CPM:

(1) A copy of the individual agreement with the RCFD; and evidence in each January Monthly Compliance Report that the project owner is in full compliance with the terms of such agreement; **or**

(2) A protocol, scope and schedule of work for the independent study and the qualifications of proposed contractor(s) for review and approval by the CPM; a copy of the completed study showing the precise amount the project owner shall pay for mitigation; and documentation that the amount has been paid.

Annually thereafter, the owner shall provide the CPM with verification of funding to the RCFD if annual payments were approved or recommended under either of the above-described funding resolution options.

WORKER SAFETY -10 In the event that Riverside County Solar Policy B-29 is overturned, the project owner shall:

Provide a $200,000 payment to Riverside County Fire Department prior to the start of construction. This funding shall off-set any initial funding required by **WORKER SAFETY-9** above until the funds are exhausted. This offset will be based on a full accounting by the Riverside County Fire Department regarding the use of these funds.

Verification: At least five (5) days prior to the start of construction the project owner shall provide documentation of the payment described above to the CPM. The CPM shall adjust the payments initially required by **WORKER SAFETY-9** based upon the accounting provided by the Riverside County Fire Department.

REFERENCES

BS 2011a – Bright Source/J. Woolard (tn 62584). Rio Mesa Application for Certification - Volumes 1, 2, and 3, dated October 14, 2011. Submitted to CEC Docket Unit on October 14, 2011.

RCFD 2012a – Riverside County Fire Department/J. Newman (tn 64453) Riverside County Fire Department Emergency Response Needs, dated March 14, 2012. Submitted to CEC Dockets Unit on March 28, 2012.

URS 2012a – URS/A. Leiba (tn 64060) Applicant's Data Response to Data Request Set 1A, dated March 8, 2012. Submitted to CEC Dockets Unit on March 8, 2012.

URS 2012e – URS/A. Leiba (tn 64814) Supplemental Response, dated April 16, 2012, Submitted to Dockets on April 16, 2012.

VF2010 – State of California—Health and Human Services Agency California, Department of Public Health, Coccidioidomycosis Yearly Summary Report, 2001 – 2010

ENGINEERING ASSESSMENT

FACILITY DESIGN

Shahab Khoshmashrab

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.

INTRODUCTION

Facility design encompasses the civil, structural, mechanical, and electrical engineering design of the Rio Mesa Solar Electric Generating Facility (Rio Mesa SEGF). The purpose of this analysis is 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 will 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 will be designed and constructed to ensure public health and safety and comply with all applicable engineering LORS.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Lists of LORS applicable to each engineering discipline (civil, structural, mechanical, and electrical) are described in the AFC (BS 2011a, AFC Appendices 2A through 2G). 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	2010 (or the latest edition in effect) California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations)
Local	Riverside 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)

Condition of Certification **MECH-2** requires the project owner to obtain approval of the pressure vessels from California Occupational Safety and Health Administration (Cal-OSHA) in order to satisfy Title 29 Code of Federal Regulations' safety requirements.

The following conditions of certification, located under the **PROPOSED CONDITIONS OF CERTIFICATION** heading of this section, require the project to comply with the California Building Standards Code and Riverside County regulations and ordinances to ensure that the project would be built to applicable engineering codes and ensure public health and safety.

For the project to be built in a manner that would ensure public health and safety and operational integrity of project equipment, the LORS listed above in **Facility Design Table 1** under the "**General**" heading, must also be met by the project. The LORS listed under this heading are only some of the key engineering standards applicable to the project; for a comprehensive list of engineering LORS, please see AFC Appendices 2A through 2G.

SETTING

The Rio Mesa SEGF would be built on approximately 3,805 acres of land located in southeastern Riverside 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, Appendices 2A through 2G (BS 2011a).

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 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 program that will 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 BS 2011a, Appendices 2A through 2G, 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. To ensure compliance, staff proposes the conditions of certification listed below and in the **Geology and Paleontology** section of this document.

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.

The Rio Mesa SEGF will be designed and constructed to the 2010 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 2010 CBSC takes effect, the 2010 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, 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 applicant 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 (BS 2011a, AFC § 2.4.4.3, Appendices 2A through 2G). Compliance with design requirements would be verified through specific inspections and audits. Implementation of this quality assurance/quality control (QA/QC) program will ensure that the Rio Mesa SEGF is actually designed, procured, fabricated, and installed as described in this analysis.

COMPLIANCE MONITORING

Under Section 104.1 of the 2010 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 103.3 of the 2010 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 may 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 for in 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 would invite Riverside 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 would 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 protection of public health and safety and compliance with engineering design LORS. Some of these conditions address the roles, responsibilities, and qualifications of the engineers who would 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) that could be difficult to reverse or correct could proceed without prior CBO approval. Elements of construction that would not be difficult to reverse could proceed without approval of the plans. The applicant would bear 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.

FACILITY CLOSURE

The removal of a facility from service (decommissioning) when it reaches the end of its useful life ranges from "mothballing," to the removal of all equipment and appurtenant facilities and subsequent restoration of the site. Future conditions that could affect decommissioning are largely unknown at this time.

In order to ensure that decommissioning would be completed in a manner that is environmentally sound, safe, and protects the public health and safety, the applicant would be required to submit a decommissioning plan to the Energy Commission for review and approval before the project's decommissioning begins. The plan would be required to include a discussion of:

- Proposed decommissioning activities for the project and all appurtenant facilities that were constructed as part of the project;
- All applicable LORS, local/regional plans, and proof of adherence to those applicable LORS and local/regional plans;
- The activities necessary to restore the site if the plan requires removal of all equipment and appurtenant facilities; and
- Decommissioning alternatives other than complete site restoration.

Satisfying the above requirements should serve as adequate protection, even in the unlikely event that the project is abandoned. Staff has proposed general conditions (see **General Conditions**) to ensure that these measures are included in the Facility Closure Plan.

CONCLUSIONS AND RECOMMENDATIONS

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 would likely comply with applicable engineering LORS.

3. The proposed conditions of certification would ensure that Rio Mesa SEGF is designed and constructed in accordance with applicable engineering LORS. This would be accomplished through design review, plan checking, and field inspections that would be performed by the CBO or other Energy Commission delegate. Staff would 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 would 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 2010 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.

PROPOSED CONDITIONS OF CERTIFICATION

GEN-1 The project owner shall design, construct, and inspect the project in accordance with the 2010 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 2010 CBSC is in effect, the 2010 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 the occurrence of any of the following: 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 drawings and master specifications list. The master drawings and master specifications list shall contain a list of proposed submittal packages of designs, calculations, and specifications for 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. The schedule shall contain the date of each submittal to the CBO. 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 and the master drawings and master specifications list of documents to be submitted to the CBO for review and approval. These documents shall be the pertinent design documents for the major structures, systems, and equipment defined above in Condition of Certification **GEN-2**. Major structures and equipment shall be added to or deleted from the list only with CPM approval. The project owner shall provide schedule updates in the monthly compliance report.

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 2010 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.

<u>Verification:</u> 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/are subsequently reassigned or replaced, the project owner has five days to submit the resume and registration number(s) of the newly assigned engineer(s) to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer(s) 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 2010 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 2010 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.

<u>Verification:</u> 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 2010 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 or newer version) 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. A construction storm water pollution prevention plan (SWPPP);

4. Related calculations and specifications, signed and stamped by the responsible civil engineer; and

5. Soils, geotechnical, or foundation investigations reports required by the 2010 CBC (or the successor in effect).

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 2010 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, the project owner shall submit plans, calculations and other supporting documentation to the CBO for design review and acceptance for all project structures and equipment identified in the CBO-approved master drawing and master specifications lists. The design plans and calculations shall include the lateral force procedures and details as well as vertical calculations.

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 the CBO-approved master drawing and master specifications list, 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 2010 CBC.

<u>Verification:</u> 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 2010 CBC (or the successor in effect), 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.

<u>Verification:</u> 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 2010 CBC (or the successor in effect) 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 the CBO-approved master drawing and master specifications list. 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);
- National Association of Corrosion Engineers (NACE) R.P. 0169-83;
- NACE R.P. 0187-87;
- NFPA 56;
- 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
- Riverside 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 the CBO-approved master drawing and master specifications list, 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 110 Volts or higher (see a representative list, below) 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 diagram for the 13.8 kV, 4.16 kV and 480 V systems;
2. system grounding drawings;
3. lightning protection system; and
4. hazard area classification plan.

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;
7. lighting energy calculations; and
8. 110 volt system design calculations and submittals showing feeder sizing, transformer and panel load confirmation, fixture schedules and layout plans.

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.

REFERENCES

BS 2011a – Bright Source/J. Woolard (tn 62584). Rio Mesa Application for Certification - Volumes 1, 2, and 3, dated October 14, 2011. Submitted to CEC Docket Unit on October 14, 2011.

GEOLOGY AND PALEONTOLOGY

Casey Weaver, CEG

SUMMARY OF CONCLUSIONS

The proposed Rio Mesa Solar Electric Generating Facility (Rio Mesa SEGF) site is located in southeastern California in a relatively inactive geologic area adjacent to the lower Colorado River approximately, 13 miles southwest of the City of Blythe, California (BS 2011a). The site is subject to moderate seismic shaking primarily caused by infrequent large seismic events on the San Andreas Fault located approximately 55 miles west of the site (CalTech 2011). Site soils are generally coarse grained and well drained, and suitable for project development (Ninyo 2011). A design-level geotechnical investigation required for the project by the California Building Code (CBC 2010), and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**, would present standard engineering design requirements for mitigation of seismic shaking and adequate foundation design.

There are no significant geologic hazards and no known viable geologic or mineralogical resources at the proposed Rio Mesa SEGF site. However, the site contains significant (high sensitivity) paleontological resources.

During the applicant's initial paleontological field survey of the project site, a previously unrecognized, widely distributed paleosol (fossil soil), now known as the Palo Verde Mesa Paleosol, was discovered. To date, nearly 800 vertebrate fossils have been collected from the surface of the paleosol (BS 2012k). In addition, the Chemehuevi formation equivalents and Late Pleistocene silts, sands and gravels are significant potential fossil bearing units identified on the site.

The paleosol is exposed at the ground surface over large areas of the project site. It is found on both sides of the road that parallels the southern border of the project, both sides of the road that parallels the Western Area Power Administration power line along the eastern part of the project, and along both sides of the proposed transmission line. It also underlies the entire "common area" (BS 2011a). It is undetermined where the paleosol is buried on the project site, how thick the unit is and the density of fossils contained within the deposit. The Chemehuevi formation equivalents and Late Pleistocene silts, sands and gravels have also been mapped at the surface of the site. Staff has informed the applicant that they have not adequately studied and delineated the limits of the fossiliferous sediments on the site and provided sufficient information for staff to complete an appropriate analysis of potential impacts. The applicant is currently in the process of finalizing a plan that will provide us with the information needed to complete the Final Staff Assessment. Staff notified the applicant that a Supplemental Paleontological Resources Delineation Report must be submitted no later than December 3, 2012, if the schedule for publication of the Final Staff Assessment is to be maintained (CEC 2012ar CEC 2012at).

In general, project-related ground disturbance could have adverse impacts on significant paleontological resources. Direct impacts associated with the construction activities include damage to previously undisturbed fossils and fossiliferous sediments, making those sediments and their paleontological resources unavailable for future scientific investigation (SVP 1995). Staff believes additional field study of the fossiliferous sediments should be completed to delineate the limits and concentrations of fossils on the site so a determination of significance can be made.

Depending on heliostat pedestal foundation design and installation method, staff believes the potential for significant adverse cumulative impacts to paleontological resources could be low to high. The applicant's proposed heliostat foundation construction methodology (predrilling and vibratory pedestal insertion) would destroy all fossils encountered where installation takes place in the high sensitivity fossil bearing sediments. Predrilling involves rotating and boring a solid steel drill auger into the ground to a specified depth into the subsurface. This construction method would crush or break any fossils that might be present within the soil column throughout the penetration depth interval. The subsequent vibratory insertion of the pedestal would not allow for any recovery of remaining fragments of fossils. This foundation construction method would preclude an opportunity for identification, recovery or scientific interpretation of these significant paleontological resources (SVP 1995, CCR 2008). Due to the lack of physical definition of the highly fossiliferous deposit, staff is unable to adequately assess the potential impacts from project construction on this valuable resource.

For those areas where the applicant is proposing to limit subsurface construction to standard conventional excavation techniques such as at the power blocks, roadways, and appurtenant facilities, potential impacts to paleontological resources due to construction activities would be mitigated through worker training and monitoring by qualified paleontologists, as required by proposed Conditions of Certification **PAL-1** through **PAL-7**.

Energy Commission staff believes that the potential for significant adverse cumulative impacts to project facilities from geologic hazards during the project's design life is low. Similarly, staff believes the potential for significant adverse cumulative impacts to potential geological and mineralogical resources from the construction, operation, and closure of the proposed project, is low.

INTRODUCTION

In this section, California Energy Commission (Energy Commission) staff discusses the potential impacts of geologic hazards on the proposed Rio Mesa SEGF as well as the Rio Mesa SEGF's potential impact on geologic, mineralogic, and paleontologic resources. Staff's objective is to identify resources that could be negatively affected, evaluate the potential of the project construction and operation to impact the resources and provide mitigation measures as necessary to ensure that there would be no consequential adverse impacts to significant geological and paleontological resources during the project construction, operation, and closure and to ensure that operation of the plant would not expose occupants to high-probability geologic hazards. A brief geological and paleontological overview is provided. The section concludes with staff's proposed monitoring and mitigation measures for geologic hazards and geologic, mineralogic, and paleontologic resources, with the proposed conditions of certification.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable laws, ordinances, regulations and standards (LORS) are listed in the application for certification (BS 2011a) and are presented below (**Geology and Paleontology Table 1**). The following briefly describes the current LORS for both geologic hazards and resources and mineralogic and paleontologic resources.

Geology and Paleontology Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
Federal	**Portions of the utility corridor are on federal land**
National Environmental Policy Act (NEPA) of 1969	NEPA establishes a public, interdisciplinary framework for Federal decision-making and ensures that federal agencies take environmental factors into account when considering Federal actions.
Antiquities Act of 1906	Protects and permits collection of paleontological resources on federal lands; requires inventory, assessment of effects, and mitigation if appropriate.
Omnibus Public Land Management Act of 2009, Title VI—Department of the Interior Authorizations, Subtitle D—Paleontological Resources Preservation	Causes the management and protection of paleontological resources on Federal land using scientific principles and expertise. Requires appropriate plans for inventory, monitoring, and the scientific and educational use of paleontological resources, in accordance with applicable agency laws, regulations, and policies.
State	
California Building Code (2010)	The California Building Code (CBC 2010) includes a series of standards that are used in project investigation, design, and construction (including seismicity, grading and erosion control). The CBC has adopted provisions in the International Building Code (IBC, 2009).
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.
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.
CEQA, Appendix G	Requires that impacts on paleontological resources be assessed and mitigated on all discretionary projects, public and private.
Local	
Riverside County General Plan (RCGP)	Compliance with the Public Safety Element of the RCGP.
Riverside County Code §§ 15.60 et seq.	Requires permit for development in earthquake fault areas and implements the Alquist-Priolo Earthquake Fault Zoning Act.
Riverside County Ordinance 457.103, §4.J.2.7	Requires a grading permit for earthwork in excess of 50 cubic yards.
Riverside County Code §§ 15.80, et seq.	Requires permits for development in flood hazard areas.
Riverside County Flood Hazard Zone, Ordinance 458.13	Describes Riverside County requirements for a development permit prior to any construction or other development within areas of special flood hazards and requires that flood capacity of any altered watercourse be maintained.
Standards	
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.

Applicable LORS	Description
Bureau of Land Management (BLM) Instructional Memorandum 2008-009	Provides up-to-date methodologies for assessing paleontological sensitivity and management guidelines for paleontological resources on lands managed by the Bureau of Land Management.

SETTING

The project site is located on the Palo Verde Mesa in Riverside County, California, approximately 13 miles southwest of Blythe (**Geology and Paleontology – Figure 1**). The community of Palo Verde is located approximately 2 miles southeast of the project site.

The site is generally bordered by undeveloped land to the north, west, and south. The site is primarily on a mesa that ends at a distinct erosional scarp on the east side of the site. Developed agricultural land is located in the Palo Verde Valley east of the site. Bradshaw Trail extends along the north portion of the site and the Riverside County and Imperial County border extends along the south boundary of the site. An unpaved access road extends along the Western Area Power Administration (WAPA) 115kV overhead power transmission line in a northeast to southwest direction through the eastern portion of the site. A buried high pressure gas line also extends through the site along the WAPA transmission line corridor.

The project site has been previously disturbed by military training operations during World War II, and investigative activities resulting from the proposed Sundesert Nuclear Power Plant by San Diego Gas and Electric (SDG&E) in the 1970s (BS 2011a). Additionally, existing transmission lines traverse the project site.

The Rio Mesa SEGF would consist of two separate power plants with shared common facilities. The first plant, a 250 megawatt (MW) (nominal) facility known as Rio Mesa I, would be constructed at the southeastern end of the project site. The second plant, another 250 MW (nominal) facility known as Rio Mesa II, would be located in the northwestern portion of the project site. Each 250 MW plant would require about 1,850 acres (or 2.9 square miles) of land to operate. The total area required for both plants, including the shared facilities, is approximately 3,805 acres (BS 2012v). The common facilities area, including a switchyard, would be located adjacent to the far northern reach of the Rio Mesa I solar field.

The Rio Mesa SEGF power plants would be constructed on land leased from the Metropolitan Water District of Southern California (MWD). Portions of the project gen-tie line, upgraded Bradshaw Trail access road, and 33kV construction/emergency backup power supply line are located on public lands managed by the U.S. Bureau of Land Management (BLM).

Each solar concentration thermal power plant would utilize a solar power boiler, located on top of a dedicated concrete tower, and solar field consisting of heliostat mirrors. Each power plant would generate electricity using solar energy as its primary fuel source. However, auxiliary boilers would be used to operate in parallel with the solar field during partial load conditions and occasionally in the afternoon when power is needed after the solar energy has diminished to a level that no longer will support solar-only generation of electricity. These auxiliary boilers would also assist with daily start-up of the power generation equipment and night time preservation to provide overnight heat to systems.

REGIONAL SETTING

The project is located on the Palo Verde Mesa, above and east of the Palo Verde Valley, an area on the west bank of the Colorado River in southeastern California. The Mule Mountains are to the west and the Palo Verde Mountains are to the south and southwest. The Rio Mesa SEGF is located in the southernmost Mojave Desert Geomorphic Province (**Geology and Paleontology – Figure 2**).

Bedrock outcrops in the mountainous areas to the west of the project site in the Big Maria, Little Maria, Riverside, McCoy, and Mule Mountains **(Geology and Paleontology – Figure 3)**. Bedrock consists of structurally complex bedrock that ranges in age from Proterozoic to Miocene. Proterozoic gneiss and amphibolite are overlain by Paleozoic to Early Jurassic metasedimentary rocks (mostly marble, quartzite, and schist) (Stone 2006). These rocks are overlain by metamorphosed Jurassic volcanic rocks (rhyolite, dacite, and amphibole) and are intruded by Jurassic plutonic rocks (granodiorite and quartz monzonite) that represent part of a regionally extensive, northwest-trending magmatic arc. The overlying McCoy Mountains Formation, a very thick sequence of weakly metamorphosed sandstone and conglomerate of Jurassic and Cretaceous age, accumulated in a rapidly subsiding depositional basin south of an east-trending belt of deformation and east of the north-trending Cretaceous Cordilleran magmatic arc. The McCoy Mountains Formation and older rocks were deformed, metamorphosed, and locally intruded by plutonic rocks in the Late Cretaceous. In Oligocene to Miocene time, sedimentary and minor volcanic deposits accumulated locally, and the area was deformed by faulting.

Sedimentary deposits overlying the bedrock range in age from late Miocene to Holocene. Among the oldest of these deposits are limestone and fine-grained clastic sediments of the late Miocene and (or) Pliocene Bouse Formation, which is commonly interpreted to represent an estuary or marine embayment connected to the proto-Gulf of California. Most of the surficial deposits younger than the Bouse Formation are composed of alluvium either derived from local mountain ranges or transported into the area by the Colorado River. The late Pleistocene Chemehuevi formation records the most recent major aggradation episode along the lower Colorado River valley (USGS 2009). The bulk of the formation consists of a sand-dominated facies, representing ancient sandy channel sediments, and a fine bedded, mud-rich facies, inferred to be the remnants of vertically accreting floodplains. The predominantly fine-grained aggradation package is overlain unconformably by a series of gravel-rich fluvial deposits that mantle terraces beveled in the Chemehuevi formation. These terrace gravels were deposited during temporary halts in the period of incision following the aggradation, and show that the bed of the incising river was coarser than that of the aggrading river. Large parts of the area, particularly near the northern margin, are covered by eolian sand, and small parts are covered by playa sediments.

FAULTING AND SEISMICITY

Compared to the majority of Southern California, the project area is located in a relatively seismically inactive area. However, the region has experienced seismic shaking from numerous earthquakes on distant faults in the past. Regional active faults and recorded earthquake epicenters are shown in relation to the project area on **Geology and Paleontology – Figure 4**.

According to the Alquist-Priolo Earthquake Fault Zone Maps (CGS, 2000), there are no active earthquake fault zones within the project area. In addition, no active fault zones are present within 20 miles of the project site. The majority of fault activity in the region is to the west of the project area. The nearest active fault (showing movement in the last 11,000 years) is the San Andreas Fault, located approximately 55 miles to the southwest. Inactive faults exist in the mountains that border the western edge of the project area but none are mapped within its boundaries. The nearest fault to have shown activity in the Quaternary period is the Blythe Graben located approximately 20 miles north of the project area. The tectonic significance and age of this fault is unknown (BS 2011a).

LOCAL GEOLOGY AND STRATIGRAPHY

Surficial mapping of the general project area has been performed by numerous geologists. Jennings (Jennings 1967) mapped the Needles 30’ by 60’ quadrangle at a scale of 1:100,000. Metzger et al. (Metzger 1973) mapped the geology of the Palo Verde Mesa at a scale of 1:125,000. Stone (Stone 1990) mapped the Blythe 30’ x 60’ quadrangle at a scale of 1:100,000, and later in 2006 he also mapped the west half of the Blythe 30’ by 60’ quadrangle also at a scale of 1:100,000 (Stone 2006).

Jennings mapped the sediments of the Palo Verde Mesa as Qc and Qal (Pleistocene nonmarine deposits and Quaternary alluvium). Metzger mapped them as QTa and Qa (older alluvium and younger alluvium). Subsequently, in 1977, Jennings mapped them as Qoa and Qal (older Quaternary alluvium and Quaternary alluvium). In 1990, Stone mapped them as QTa (alluvial fan and fluvial deposits) and later in 2006, he mapped them as Qpv (alluvial deposits of Palo Verde Mesa).

According to Metzger, the Palo Verde Mesa consists of five alluvial units (units A through E) (Metzger 1973). Unit B (subsurface) has Pliocene roundstone gravels of exotic provenance. The clasts are composed of various sedimentary, metamorphic, and igneous rock types.

As demonstrated above, the surficial geology of the Palo Verde Mesa has been described differently by various authors. All, however, agree that the lower Colorado River underwent an atypical period of deposition of fine-grained sediments during the late Pleistocene. Metzger divided the uppermost (aboveground) strata of the Palo Verde Mesa into units D and E (Metzger 1973). They considered units D and E to be roughly equivalent to the Chemehuevi Formation, although not of lacustrine origin. Unit D they defined to include a basal gravel layer overlain by characteristic muds. They designated very late Pleistocene terraces incised into unit D as unit E.

Howard and Malmon (Howard 2008) recognized the Chemehuevi Formation (in their usage, equivalent to unit D of Metzger et al. 1973) and late Pleistocene terrace gravels that formed when the river re-incised into the Chemehuevi Formation (presumably equivalent to unit E of Metzger et al. 1973) include elements from the nearby Pliocene conglomerate. Their term for these is young terrace gravels. As presented in the AFC, the Applicant's analysis, these units are designated as young terrace sediments, because they are not always comprised of gravel.

Lundstrom et al. (Lundstrom 2008) studied the fine grained sediments of the lower Colorado River and did not use the term "Chemehuevi Formation" to describe any of those sediments because of the variety of meanings that have accompanied that term. They found that up to 15 meters of coarse sand, rounded exotic gravel, and angular, locally derived gravel disconformably overlie more than 15 meters of finely bedded reddish mud, clay and silt.

As presented in the Geoarcheological Research Design (Geoarch Study) (URS 2012c, d), the geomorphology of the Palo Verde Mesa is primarily defined by inset Pleistocene alluvial terraces formed by the Colorado River. While preparing the Geoarch Study, URS determined that 8 separate surficial landforms occur on the site (URS 2012c). These include: Rock Outcrops, Upper Alluvial Fan Piedmont, Relict Colorado River Gravel Terrace, Lower Alluvial Fan Piedmont, Colorado River Terrace, Alluvial Flat, Active Washes and the Modern Alluvial Fan and Floodplain. Descriptions of these landforms taken from the Geoarch Study are provided below:

Rock Outcrops

Rock outcrops are present at the higher reaches of the piedmont, along the western side of the project area (**Geology and Paleontology – Figure 3**). These rock outcrops form the Mule and Palo Verde Mountains and are composed of highly dissected bedrock, which form steep, highly-eroded hills (inselbergs) sticking up out of the alluvial fans. Within the project area, rock outcrops are limited to the northwestern portions of the project Site (Section 16) and are comprised of Triassic quartz monzonite and monzodiorite; designated by map unit TRqm (Stone 2006). While other types of bedrock that form the Mule Mountains are not present within the boundaries of the project area, they are worth noting because they provide portions of the parent material that forms the fans of the alluvial fan piedmont. These other local rock types include gneiss and amphibolite (Pgn), diorite and gabbro (TRd), porphyritic granitics (granodiorite and quartz monzonite; Jp), and volcanics (including rhyolite, dacite, and amphibole; Jv).

Upper Alluvial Fan Piedmont

The fan piedmont, which makes up the majority of the western half of the project area and the slopes west of the project area (**Geology and Paleontology – Figure 3**), is actually a complex of component landforms composed of stable fans, erosional fan remnants, erosional sideslopes and gullies, and inset fans, which themselves have been further eroded and redeposited downslope. The fan piedmont can be subdivided into two broad categories, which are roughly correlative with relative age: the older upper alluvial fan piedmont and the younger lower alluvial fan piedmont.

The oldest major alluvial fan structure on the piedmont is also associated with the highest elevations of the fan piedmont. Map units QTa2 and QTmm (only a very small portion of which enters the Right of Way Corridor in the northern portion of the Project area) are very old remnant alluvial fan deposits. These units have steep gradients adjacent to the mountain fronts. Profiles observed on the sideslopes of these units showed significant over-thickened carbonate development (Stage III+), though the amount of carbonate accumulation may be less than the equivalent age of the landform, due to ongoing erosion. The Geoarch Study attributes to Stone (Stone 2006) that the units are probably equivalent to the geomorphic surface Q1which are presumed to have been deposited over 1.2 million years ago (Ma) (Bull 1991).

Relict Colorado River Gravel Terrace

Located within the fan piedmont, this landform in many ways resembles a remnant alluvial fan deposit, with very well formed desert pavement at the surface, and rounded erosional side slopes similar to the older fan units. However, this landform, designated by map unit QTmw, is composed of large well rounded gravels and cobbles. The clasts are almost exclusively non-local rock types, with a wide variability including cherts and other silicious rocks, to cryptocrystalline quartzites and mudstones, with only minor amounts of gravels derived from the Mule Mountains. This rounded cobble and gravel deposit is identical to the one identified in the McCoy Wash area approximately 12 miles north, and at almost the exact same elevation (approximately 135 to 145 meters AMSL) URS 2012g). The well rounded cobbles and their exotic origin clearly demonstrate that they were deposited by the paleo-Colorado River during an aggradational event when the river flowed at much higher elevations than today. Superposition above Palo Verde Mesa indicates that the formation predates the incision and subsequent emplacement of the Qpv river terrace. This relict Colorado River gravel terrace landform likely dates to the Pliocene or early Pleistocene (URS 2012g). As noted above, the surface characteristics of this landform appears similar to an older Pleistocene fan, suggesting that the original Colorado River gravel deposit was likely subjected to post-depositional erosion followed by stabilization sometime during the Pleistocene—perhaps correlative with the deposition of the Palo Verde Mesa (Qpv) alluvium. The rounded gravels and cobbles of the relict Colorado River terrace have been reworked and redeposited, to varying degrees, in the younger alluvial fan units of the lower fan piedmont. Some higher elevation portions of the Qa3 fans have mantled on top of the QTmw terrace, while other portions have eroded through and bisect the terrace, thus transporting the rounded cobble material further downslope.

Lower Alluvial Fan Piedmont

Within the project area, the lower portions of the alluvial fan piedmont are composed of Late Pleistocene to Holocene geologic units Qa3, Qa5, and Qa6 (URS 2012g). Each of these units represents a period of fan building, which have coalesced to form the fan piedmont. Compared to the older upper portions of the piedmont, these fans form a more gradual slope. Qa3 is the oldest of the lower piedmont fan units. These fans are typically covered with a smooth, well varnished desert pavement, composed primarily of angular to subangular locally derived gravels and cobbles. The landform generally lacks evidence of bar and swale topography, but is heavily dissected in places by erosional gullies and channels. Vegetation is largely absent except in the erosional gullies. Stage II to III carbonate development is evident in the limited subsurface profiles observed on the Qa3 fans within the project area. The Qa3 fans likely formed roughly coincident to the emplacement of the Palo Verde mesa alluvium (Qpv; see below) and prior to subsequent incision by the Colorado River. The Qpv alluvium was deposited as the floodplain of the river and, as such, acted as the local base level at the time the Qa3 fans were deposited. This is demonstrated by the interfingering of Qa3 and Qpv sediments. As such, the Qa3 fans were primarily deposited during the Pleistocene, prior to the incision of the Colorado River below the Qpv terrace deposits (see below). This correlates with Q2 fan units which date from 12 to 730 thousand years ago (ka) (Bull 1990). Qa5 is the next youngest fan unit present on the alluvial fan piedmont within the project area. The unit is not well represented within the project area, but is gradational to the older portions of the Qa6 fan unit (i.e., some minor areas mapped as Qa6 may be closer to Qa5 in both morphology and age).

Colorado River Terrace

Palo Verde Mesa forms the 70 foot high cliff along the edge of the western modern Colorado River floodplain (Palo Verde Valley), and is the result of a series of aggradation and progradation events by the paleo-Colorado River.

The Colorado River terrace deposits are characterized by a very thick deposit of stratified clays, silts, and sands, with minor gravels. The surface of the landform is characterized by tan to light-gray, sandy and pebbly alluvium. This overlies the cliff-forming unit of light-reddish-brown bedded fine-grained material. There is considerable variability in the surface expression of the terrace deposits, with some areas containing sand and pebbly sand with a mixture of local and river gravels. An extensive marker bed, consisting of well-developed blocky red clay, was observed in several of the larger wash profiles near the top of the Qpv strata. This bed is consistent with other locations along Palo Verde Mesa where vertebrate Pleistocene fossils have been found and which are interpreted as having been deposited in small shallow floodplain lakes (1973). Due to the unconsolidated, fine-grain nature of the surface of this landform, it is often very difficult to distinguish in the field from the distal margins of the Qa6 alluvial fans. In some locales the surface of the Qpv terrace deposits have begun to erode down into underlying pedogenic carbonate soil horizons. As a result, small carbonate pebbles have eroded out and been incorporated into the surface of the landform. These carbonate pebbles, or peds, are absent on the Qa6 fans.

Based on the presence of fossils within the Colorado River terrace deposits, they have been assigned a date of middle to Late Pleistocene in age (Metzger 1973). The only caveat to this assessment lays in the unconsolidated nature of much of the Qpv surficial deposits. While these unconsolidated fine-grain deposits are conducive to erosion and transport into the larger washes and off of the Palo Verde Mesa, it is also possible that some of this transported material has been redeposited on the mesa surface itself, in the form of thin eolian and/or alluvial deposits.

Active Wash

This landform, mapped as unit Qw, is comprised of unconsolidated sand, gravel, and boulder deposits of the larger active channels, as well as component landforms related to the active channel. While the active wash is primarily an erosional structure, small depositional features such as inset fans and terraces, and fine overbank deposits are the result of deposition by the channel and are subsumed in this map unit. The active washes are dominated by gravel bar and sandy channel surface morphology. Mapped areas include both large individual washes and closely spaced smaller washes.

Modern Alluvial Fan and Floodplain

These distinct landforms are discussed together here because of their close functional relationship and because they both have very limited presence within the project area. Modern alluvial fan deposits are mapped as Qm and represent the depositional equivalent of the active washes, where the washes debouche from the Palo Verde Mesa onto the modern alluvial floodplain of the Colorado River. The modern floodplain deposits are mapped as Qr. Both units are composed of unconsolidated clay, silt, and sand, and are largely undifferentiable in the field due to the interfingering of the deposits and the degree of agricultural disturbance across the Palo Verde Valley, up to the base of the mesa. For the purposes of this study, the modern alluvial fan landform was mapped from the edge of Palo Verde Mesa to the beginning of agricultural fields. Due to the young age (latest Holocene to modern) of both of these landforms, and their depositional nature, they are considered to have a high potential for containing paleosols (URS 2012g).

The modern floodplain deposits (Qr) represent the most recent aggradational cycle of the Colorado River, and are equivalent to Metzger and others' "younger alluvium" (Metzger 1973). To give an idea of the scale of the river's degradation and aggradation, charcoal from 57 ft. below the floodplain sediments near Blythe were dated to 5,400 B.P., and 8,600 B.P. at 110 ft. below surface (Metzger 1973). If the surface of the Palo Verde Mesa terrace deposits (Qpv) represent the Late Pleistocene floodplain surface, this means that well over 200 vertical ft. of sediment were eroded out of the Valley during the Late Pleistocene, and over 100 ft. of sediment have filled the entire Blythe-Palo Verde valley since the river began to aggrade again at the onset of the Holocene.

Several large ephemeral (typically dry) washes extend through the site in a roughly northwest to southeast direction (Ninyo 2011). These drainage washes are up to approximately 1,500 feet wide and 30 feet deep or more in certain areas. Field observations indicate that water runoff generally drains toward the east end of the mesa via sheet-flow and smaller natural drainage swales that feed into the larger drainage washes. A wash extending in an approximately north to south orientation through the central portion of the site feeds into one of the large washes that crosses the Western Area Power Administration (WAPA) transmission line access road in the southern portion of the project area.

The site is essentially undeveloped and covered with sparse native desert vegetation. This vegetation consists primarily of shrubs and grasses. Existing improvements in the site area include the unpaved Bradshaw Trail, which extends through the north portion of the site, and a utility corridor with overhead power transmission lines, a natural gas line, and associated unpaved access road.

As part of the preliminary on-site geotechnical investigation, exploratory borings drilled to maximum depths of 22 feet did not encounter groundwater (Ninyo 2011). Review of logs of exploratory borings drilled in 1977 (SDGE 1977) indicates that groundwater was reported at depths ranging from approximately 100 to 200 feet below the ground surface at the site (Ninyo 2011).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section assesses two types of impacts. The first is the potential impacts the proposed facility could have on existing geologic, mineralogic, and paleontologic resources in the area. The second is the potential geologic hazards, which could adversely affect the proper functioning of the proposed facility and create life/safety concerns.

METHOD FOR DETERMINING SIGNIFICANCE

The California Environmental Quality Act (CEQA) guidelines, Appendix G, provide a checklist of questions that lead agencies typically address when assessing impacts related to geologic and mineralogic resources, and effects of geologic hazards.

- 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 geologic hazards.
- Sections (XI) (a) and (b) concern the project's effects on mineral resources.

To assess potential impacts on unique geologic features and effects on mineral resources, staff has reviewed geologic and mineral resource maps for the surrounding area, as well as site-specific information provided by the applicant, to determine if geologic and mineralogic resources exist in the area (**Geology and Paleontology – Figure 3**).

To assess potential impacts on paleontological resources, staff reviewed existing paleontologic information and reviewed the information obtained from the applicant's requested records searches from the San Bernardino County Museum for the surrounding area. The University of California (at Berkeley) Museum of Paleontology's website, which gives generalized information for locality records of their collection, was consulted as well (UCMP 2008). Site-specific information generated by the applicant for the proposed Rio Mesa SEGF was also reviewed. All research was conducted in accordance with accepted assessment protocol (SVP 1995) to determine whether any known paleontologic resources exist in the general area. If present or likely to be present, conditions of certification which outline required procedures to mitigate adverse affects to potential resources are proposed as part of the project's approval.

The California Building Standards Code (CBSC) and CBC 2010 provide geotechnical and geological investigation and design guidelines, which engineers must follow when designing a facility. As a result, the criterion used to assess the significance of a geologic hazard includes evaluating each hazard's potential impact on the design, construction, and operation of the proposed facility. Geologic hazards include faulting and seismicity, liquefaction, dynamic compaction, hydrocompaction, subsidence, expansive soils, landslides, tsunamis, seiches, and others as may be dictated by site-specific conditions.

DIRECT/INDIRECT IMPACTS AND MITIGATION

An assessment of the potential impacts to geologic, mineralogic, and paleontologic resources, and from geologic hazards is provided below. The assessment of impacts is followed by a summary of potential impacts that may occur during construction and operation of the project and provides recommended conditions of certification that would ensure potential impacts are mitigated to a level that is less than significant. The recommended conditions of certification would allow the Energy Commission's compliance project manager (CPM) and the applicant to adopt a compliance monitoring scheme ensuring ongoing compliance with LORS applicable to geologic hazards and the protection of geologic, mineralogic, and paleontologic resources.

GEOLOGIC AND MINERALOGIC RESOURCES

Thirteen mineral resource sites within a two mile buffer of the project site were identified by the USGS Mineral Resource Data System (USGS 2011). Of these 13 sites, 10 are gold, one is uranium, one is agate, and one is sand and gravel. Two sites (gold), designated "Punch" and "Senate", are located within the project area, and one site, named "American Flag Mine" (gold) is within the gen-tie line right-of-way (ROW) (**– Geology and Paleontology – Figure 3**).

The Punch and Senate development status is designated as "occurrence" (e.g. grade and tonnage is unknown, no production has taken place and little/no activity has occurred since discovery, no economic significance.) The American Flag Mine is a "past producer" and has been closed. The other 10 sites within the two mile buffer are not producers or are past producers. The identified mineral resource sites are not considered active.

The mineral commodities near the project site include metallic and non-metallic mineral deposits. The primary metallic mineral deposit is gold, which is restricted mostly to the Mule Mountains. The primary non-metallic deposits near the project site are aggregate (e.g., sand, gravel) and agate (e.g., semiprecious gem stones) (USGS 2011). The Palo Verde Valley area has an aggregate production area of less than 0.5 million tons per year, as delineated by the 2006 Aggregate Availability Map (Kohler 2006).

Mineral Resource Zones (MRZs) are delineated in the area by the California Department of Conservation Division of Mines and Geology (CDMG 1994b). The majority of the project area is designated as MRZ- 4. These are areas of no known mineral occurrences where geologic information does not rule out either the presence or absence of significant mineral resources. However, portions of the Mule Mountains approximately one mile west of the project site are designated MRZ-3a. MRZ-3a areas contain known mineral occurrences of undetermined mineral resource significance. Further exploration work within these areas could result in the reclassification of specific localities into more significant categories. The mineral occurrences in these zones are identified within the mountainous terrain with the designated MRZ-3a areas extending east into the surrounding alluvial material. However, the MRZ-3a areas do not extend onto the project site.

No known oil or gas reserves have been identified in the project vicinity (DOGGR 2010).

Based on the information above, it is staff's opinion that the potential for significant adverse direct or indirect impacts from the project to potential geologic and mineralogic resources would be low.

PALEONTOLOGIC RESOURCES

It is the position of the Society of Vertebrate Paleontologists that a vertebrate fossil is considered scientifically important unless otherwise demonstrated (SVP 1995). This position is based on the relative rarity of vertebrate fossils. Vertebrate fossils are so uncommon that, in many cases, each recovered specimen will provide additional important information about the morphological variation or the geographic distribution of its species. The SVP recommendations also mention that certain invertebrate or botanical fossils are considered significant paleontological resources.

A rock unit is considered "sensitive" to adverse impacts if there is a high probability that grading, excavation, or other earth-moving activities will jeopardize significant fossil remains. Using criteria published by the SVP, the paleontological importance or sensitivity (high, low, or undetermined) of each rock unit exposed in a project site or surrounding area is the measure most amenable to assessing the significance of paleontological resources because the areal distribution of each rock unit can be delineated on a topographic or geologic map. The paleontological sensitivity of a stratigraphic unit reflects its potential paleontological productivity and sensitivity as well as the scientific significance of the fossils it has produced. This method of paleontological resource assessment is the most appropriate because discrete levels of paleontological importance can be delineated on a topographic or geologic map.

Reasons for considering an individual fossil specimen scientifically important include:

- if it is well preserved;
- if it can be identified;
- if it is more complete than most specimens for that species;
- if it preserves one or more elements not known in most specimens of that species;
- if it is indicative of a particular time period;
- if it has not been recorded from that sedimentary unit;
- if it provides information concerning the environment in which it lived;
- if it could be the basis for description of a new species or comes from a site that produced the type (definitive) specimen of its species; and/or
- if it belongs to a species rarely encountered.

For specimens meeting the above, the following criteria were considered in establishing the importance and paleontological sensitivity of each rock unit exposed in the project site or within the one-mile buffer zone.

1) Estimation of the potential paleontological productivity of each rock unit on the evidence of fossil localities in or near the proposed project on the basis of published and unpublished sources.

2) Consideration of the scientific significance of fossils from each of the rock units exposed within the proposed project area.

Categories of Paleontological Sensitivity

The potential for a geologic unit on a site to yield scientifically significant, nonrenewable paleontological resources is referred to as its paleontological sensitivity (SVP 1995). Paleontological sensitivity is a qualitative assessment made by a professional paleontologist taking into account the paleontological potential of the stratigraphic units present, the local geology and geomorphology, and any other local factors that may suggest a probability of encountering fossils.

Society of Vertebrate Paleontology Classification System

According to the Society of Vertebrate Paleontology standard guidelines, sensitivity comprises (1) the potential for a geological unit to yield abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, or paleobotanical remains, and (2) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecological, or stratigraphic data (SVP 1995). The SVP established three categories of sensitivity for paleontological resources in its standard guidelines for assessment and mitigation of adverse impacts to paleontological resources. The three categories are low, high, and undetermined.

Low sensitivity paleontological resources are categorized as rock units that are not sedimentary in origin. Likewise, sedimentary rock units that have been well examined and have not produced paleontological resources are considered to have low sensitivity. Monitoring is not usually recommended or needed during excavation in a rock unit with low sensitivity.

High sensitivity paleontological resources are categorized as rock units older than recent for which vertebrate or significant invertebrate fossils or a significant suite of plant fossils have been recovered. In areas of high sensitivity, full-time monitoring is recommended during any project-related ground disturbance.

Paleontological resources with undetermined sensitivity are categorized as sedimentary rock units for which little information is available. It is often possible for an experienced paleontologist to determine whether such a rock unit should be assigned a high or low sensitivity after he or she has performed a pedestrian survey and has made detailed observations of both natural and artificial exposures of the rock unit.

Bureau of Land Management Paleontology Classification System

The U.S. of Land Management (BLM) has developed a recommended, potential fossil yield classification system of evaluating the likelihood that a given geological unit may yield fossils (Chirstensen 2007). It is known as the Potential Fossil Yield Classification system (PFYC). This system makes further distinction between geologic units that may or may not contain sensitive paleontologic resources compared to the SVP standard guidelines. Excerpts from the classification system are summarized below.

Class 1 – **Very Low**. The probability for impacting any fossils is negligible. Assessment or mitigation of paleontological resources is usually unnecessary. The occurrence of significant fossils is non-existent or extremely rare.

These are geologic units that are not likely to contain recognizable fossil remains such as igneous or metamorphic rocks, excluding reworked volcanic ash units and/or units that are Precambrian in age or older. Management concern for paleontological resources in Class 1 units is usually negligible or not applicable. Assessment or mitigation is usually unnecessary except in very rare or isolated circumstances.

Class 2 – **Low**. The probability for impacting vertebrate fossils or scientifically significant invertebrate or plant fossils is low. Assessment or mitigation of paleontological resources is not likely to be necessary. Localities containing important resources may exist, but would be rare and would not influence the classification. These important localities would be managed on a case-by-case basis.

This class is characterized by sedimentary geologic units that are not likely to contain vertebrate fossils or scientifically significant nonvertebrate fossils. These units are generally younger than 10,000 years before present, or are recent eolian deposits or are sediments that exhibit significant physical and chemical changes (i.e., diagenetic alteration). Management concern for paleontological resources is generally low. Assessment or mitigation is usually unnecessary except in rare or isolated circumstances.

Class 3 – **Moderate** or **Unknown**. This classification includes a broad range of paleontological potential. It includes geologic units of unknown potential, as well as units having a moderate or infrequent occurrence of significant fossils. Management considerations cover a broad range of options as well, and could include pre-disturbance surveys, monitoring, or avoidance. Surface-disturbing activities will require sufficient assessment to determine whether significant paleontological resources occur in the area of a proposed action, and whether the action could affect the paleontological resources. These units may contain areas that would be appropriate to designate as hobby collection areas due to the higher occurrence of common fossils and a lower concern about affecting significant paleontological resources.

This class is characterized by fossiliferous sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence; or sedimentary units of unknown fossil potential. The units are often marine in origin with sporadic known occurrences of vertebrate fossils.

Class 3a – **Moderate Potential**. Sedimentary units are known to contain vertebrate fossils or scientifically significant nonvertebrate fossils, but these occurrences are widely scattered. Common invertebrate or plant fossils may be found in the area, and opportunities may exist for hobby collecting. The potential for a project to be sited on or impact a significant fossil locality is low. Management concern for paleontological resources is moderate or cannot be determined from existing data. Surface-disturbing activities may require field assessment to determine appropriate course of action.

Class 3b – **Unknown Potential**. Sedimentary units exhibit geologic features and preservational conditions that suggest significant fossils could be present, but little information about the paleontological resources of the unit or the area is known. This may indicate the unit or area is poorly studied, and field surveys may uncover significant finds. The units in this class may eventually be placed in another class when sufficient survey and research is performed. The unknown potential of the units in this class should be carefully considered when developing any mitigation or management actions.

Management concern for paleontological resources is moderate or cannot be determined from existing data. Surface-disturbing activities may require field assessment to determine appropriate course of action.

Class 4 – **High**. This classification is characterized by geologic units that contain a high occurrence of significant fossils. Vertebrate fossils or scientifically significant invertebrate or plant fossils are known to occur and have been documented, but may vary in occurrence and predictability. Surface disturbing activities may adversely affect paleontological resources in many cases. When considering disturbance of Class 4 units, the following should be noted:

- management concern for paleontological resources in Class 4 is moderate to high, depending on the proposed action;
- a field survey by a qualified paleontologist is often needed to assess local conditions;
- management prescriptions for resource preservation and conservation through controlled access or special management designation should be considered; and
- class 4 and Class 5 units may be combined as Class 5 for broad applications, such as planning efforts or preliminary assessments, when geologic mapping at an appropriate scale is not available. Resource assessment, mitigation, and other management considerations are similar at this level of analysis, and impacts and alternatives can be addressed at a level appropriate to the application. The probability for impacting significant paleontological resources is moderate to high, and is dependent on the proposed action. Mitigation considerations must include assessment of the disturbance, such as removal or penetration of protective surface alluvium or soils, potential for future accelerated erosion, or increased ease of access resulting in greater looting potential. If impacts to significant fossils can be anticipated, on-the-ground surveys prior to authorizing the surface disturbing action will usually be necessary. On-site monitoring or spot-checking may be necessary during construction activities.

Class 4a – The fossilifeous unit is exposed with little or no soil or vegetative cover. Outcrop areas are extensive with exposed bedrock areas often larger than two acres. Paleontological resources may be susceptible to adverse impacts from surface disturbing actions. Illegal collecting activities may impact some areas.

Class 4b – These are areas underlain by geologic units with high potential but have a reduced risk of human-caused adverse impacts and/or lowered risk of natural degradation due to moderating circumstances. The moderating circumstances include:

- the bedrock unit has high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts to the bedrock resulting from the activity;
- extensive soil or vegetative cover; bedrock exposures are limited or not expected to be impacted;
- areas of exposed outcrop are smaller than two contiguous acres;
- outcrops form cliffs of sufficient height and slope so that impacts are minimized by topographic conditions; and
- other characteristics are present that lower the vulnerability of both known and unidentified paleontological resources.

Class 5 – **Very High**. This classification is characterized highly fossiliferous geologic units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils, and that are at risk of human-caused adverse impacts or natural degradation.

The probability for impacting significant fossils is high. Vertebrate fossils or scientifically significant invertebrate fossils are known or can reasonably be expected to occur in the impacted area. On-the-ground surveys prior to authorizing any surface disturbing activities will usually be necessary. On-site monitoring may be necessary during construction activities. Management concern for paleontological resources in Class 5 areas is high to very high. A field survey by a qualified paleontologist is usually necessary prior to surface disturbing activities or land tenure adjustments. Mitigation will often be necessary before and/or during these actions. Official designation of areas of avoidance, special interest, and concern may be appropriate.

Class 5a – The fossilifeous unit is exposed with little or no soil or vegetative cover. Outcrop areas are extensive with exposed bedrock areas often larger than two contiguous acres. Paleontological resources are highly susceptible to adverse impacts from surface disturbing actions. The unit is frequently the focus of illegal collecting activities.

Class 5b – These are areas underlain by geologic units with very high potential but have a reduced risk of human-caused adverse impacts and/or lowered risk of natural degradation due to moderating circumstances. The bedrock unit has very high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts to the bedrock resulting from the activity.

The moderating conditions include:

- the bedrock unit has high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts to the bedrock resulting from the activity.
- extensive soil or vegetative cover; bedrock exposures are limited or not expected to be impacted.
- areas of exposed outcrop are smaller than two contiguous acres.

- outcrops form cliffs of sufficient height and slope so that impacts are minimized by topographic conditions.
- other characteristics are present that lower the vulnerability of both known and unidentified paleontological resources.

Literature and Records Review

An archival database search was executed by staff of the San Bernardino County Museum (SBCM) to determine whether any of the stratigraphic units found within the project vicinity had previously yielded significant paleontological resources and whether any known localities lie within or near the project site. SBCM concluded that excavation in conjunction with project development will have high potential to adversely impact significant nonrenewable paleontologic resources present within the boundaries of the proposed power plant property. It further stated that a qualified vertebrate paleontologist must be retained to develop a program to mitigate impacts to such resources (SBCM 2011). Staff concurs with this recommendation where subsurface construction is limited to standard conventional excavation techniques which would allow for recovery in areas such as the power blocks, roadways, and appurtenant facilities. Therefore, staff considers monitoring of construction activities in accordance with the proposed Conditions of Certification necessary. Proposed Conditions of Certification **PAL-1** to **PAL-7** are designed to mitigate any potential paleontological resource impacts caused by site excavations to a less than significant level. Essentially, these conditions would require a worker education program in conjunction with monitoring of proposed excavation activities by qualified professional paleontologists as directed by the paleontological resource specialist (PRS). Staff believes these conditions would also address the intent of the Riverside County General Plan, which places emphasis on the preservation of historic and prehistoric resources and values.

Paleontological Field Survey

A field survey for any visible fossil remains within the proposed project site and a one-mile radius was conducted from March 1 to June 17, 2011, by Joe D. Stewart (URS paleontologist), Michael Williams (URS paleontologist), Scott Musick (URS paleontologist) and Marjorie Hakel (Manpower paleontologist) (BS 2011a - Confidential Appendix 5.8A). A search was performed for exposures of sediment appropriate for producing fossils. During the field survey, attempts were made to detect the presence and nature of subsurface native sediments. Areas of younger alluvium were not surveyed because URS considered it to have a low sensitivity for paleontological resources according to SVP Guidelines . A separate field program to recover the discovered specimens and associated data began on July 6, 2011, and is ongoing (BS 2011a, BS 2012k).

During the paleontological field survey of the project site, a widely distributed paleosol (fossil soil) developed on Colorado River silts, sands, and gravels was encountered. Some horizons of the paleosol produced hundreds of vertebrate fossils. The surface of the paleosol usually shows polygonal joints. These are the surface manifestation of the prismatic structure of the underlying soil. Near the top of the paleosol, the joints are irregular, sporadic, or absent. The paleosol is sandy and less consolidated near the top, but more silty and more consolidated lower down. It consists of silt, sand, slight amounts of clay, and scattered gravel and cobbles. Calcium carbonate nodules occur near the base of the paleosol. The current mesa surface, where not covered by desert pavement, is deflating through this paleosol. The sediments beneath the paleosol are usually uncemented alluvium, often quite loose, and erode quite quickly when not protected by carbonate horizons.

Also present in the western part of the project site are alluvial fans issuing from the Mule Mountains. Where post-Pleistocene erosion has developed washes on the Mesa surface, modern (Holocene) wash sediments are present. Holocene eolian sands form irregular drifts onto the paleosol surface.

On January 4 and 5, 2012, URS paleontologists Joe Stewart and Mike Williams, and field paleontologist Marjorie Hakel, conducted an additional paleontological resources survey of two parcels totaling 207.4 acres (201.2 acres within the project site and 6.2 acres in buffer) (BS 2012k). This additional field study resulted in the identification of seven additional paleontological resource sites.

The combined field studies found that the site contains Holocene and Pleistocene sediments, some of which produce significant paleontological resources. These sediments include the Palo Verde Mesa Paleosol, Chemehuevi formation equivalents and Late Pleistocene silts, sands and gravels. A description of these sediments and their paleontological sensitivity can be found below. URS reported that fossils are particularly concentrated in the paleosol, which produced numerous Pleistocene vertebrate fossils, and that recovery, preparation, reporting, and curation of these fossils was ongoing. Approximately 75 percent of the fossils recovered are unidentified bone fragments. Tortoise fossils (bones and eggshell) constitute 21 percent; rabbit fossils account for only 3 percent. In addition to a badger skull and mandibles, there are lizard, snake, and bird bones as well as fragments of deer antler, proboscidean ivory, and horse teeth (BS 2011a). An Accelerator Mass Spectrometry (AMS) radiocarbon dating of fragments of tortoise eggshell yielded a 2 Sigma (95 percent confidence interval) result of 13,620 to 13,790 calendar years before present. This is an approximate date for the vertebrate fossils, not of the paleosol. According to URS, many of these fossil specimens were deposited in burrows dug into the paleosol. Thus, the paleosol should be somewhat older than some of the fossils. At the time of preparation of this preliminary staff assessment (PSA), the total number of vertebrate fossils found within the project footprint is 742 (BS 2012k).

The recovered fossils have been speciated where possible and are being curated by the applicant. The vast majority of the collected fossils have been recovered from the ground surface with a lesser number found protruding from erosional cut banks. It is likely that the fossiliferous paleosol contains numerous buried fossils. Buried paleontological resources that have not been previously identified could be encountered during the project construction phase and may be encountered during ground-disturbing activities.

Paleontological Sensitivity of Onsite Geologic Units

As discussed in the local geology and stratigraphy section above, seven geomorphic landforms occur on the project site. The applicant's consultant, Joe D. Stewart (URS paleontological resources specialist), further refined the lower three, or youngest, of these landforms (Colorado River Terrace, Active Wash and Modern Alluvial Fan and

Floodplain) into seven separate geological units and assigned paleontological sensitivity to them(BS 2012k, Appendix 5.8a). These units described by URS are Chemeuevi Formation equivalents; late Pleistocene sands, silts, and gravels; Palo Verde Mesa paleosol; alluvial fans; Holocene alluvium of the mesa; eolian sediments of the mesa; and alluvium of the current Colorado River floodplain. The following paragraphs provide the foundation for Mr. Stewart's determination.

Chemehuevi Formation equivalents. The finely bedded reddish mud, clay and silt assigned to the Chemehuevi Formation by some authors are visible on the lower parts of the bluffs of the Palo Verde Mesa, but rarely occur at the surface within the project footprint. A few exposures thought to be Chemehuevi Formation equivalents were encountered. They are probably present in the subsurface over much of the project site. Earlier work by Metzger (Metzger 1973) mentioned fossils of turtle, snake, lizard, bird, and proboscidian tusk from Unit D near Ehrenberg, Arizona, about 25 miles from the project area. Published uranium-thorium dates of 96,000 to 102,000 thousand years (ka) were determined from a proboscidean tusk found in the Chemehuevi Formation (Bell 1978). Infrared stimulated luminescence dates of 41-59 (ka) for Chemehuevi equivalents were determined by Lundstrom in the Cottonwood Landing area of the Colorado River in southern Nevada (Lundstrom 2008). They also reported thermoluminescence dates of 56-79 ka for the same section. URS paleontologists found a large fin spine of a ray-finned fish in a wash below an area where the Chemehuevi Formation outcrops. URS assumed that the fossil came from the Chemehuevi Formation equivalents (BS 2011a). This is the first reported fish fossil found on the Palo Verde Mesa (BS 2011a). Sensitivity rating in terms of the system proposed by SVP: High. Sensitivity in terms of the PFYC system: 4b.

Late Pleistocene silts, sands and gravels. Late Pleistocene silts, sands and gravels (overlying the Chemehuevi Formation equivalent) were laid down by the Colorado River over an erosional surface of the Chemehuevi Formation equivalent. They include exotic rounded cobbles reworked from a Pliocene conglomerate. These sediments are of appropriate age and lithology to have significant paleontological resources, but there are, as of yet, no records of such. Sensitivity rating in terms of the system proposed by SVP : High. Sensitivity in terms of the PFYC system: 3b.

Palo Verde Mesa paleosol. This paleosol is developed on sediments that were laid down by the Colorado River. It is an aridosol; there is no concentration of humic material in its upper horizon. The total depth is at least 12 feet. Within the paleosol are scattered clasts of local rocks as well as exotic rounded cobbles from the Colorado River. The middle part of the paleosol is characterized by prismatic structure because of desiccation cracks. This prismatic structure gives rise to a polygonal pattern on weathering surfaces of the paleosol. The prismatic part of the paleosol ranges from approximately five and one half to seven feet thick where not reduced by erosion or deflation. Carbonate can be dispersed flecks, small hard carbonate clumps, even large hard carbonate clumps, or even plates. The carbonate deposition is usually heavier toward the base of the paleosol (Bk horizon). This more heavily calichified basal part has an approximate thickness of five feet. At the base of the paleosol in some localities, rhizoliths (former roots now preserved as carbonate sleeves) and invertebrate trace fossils extend into the unconsolidated sands. To date, over 800 vertebrate fossils have been recovered from this unit. These fossils are the identified remains of birds, snakes, lizards, Gopherus sp. (desert tortoises), Hesperotestudo sp. Sylvilagus (cottontail), Lepus (jackrabbit), rodents, Taxidea (badger), probable bighorn sheep, deer, Equus (horse), and Mammuthus (mammoth). According to URS AFC Confidential Appendix 5.8a), it should be mentioned that the only way that fossils of large vertebrates can be found in paleosols is if rodents or carnivores drag pieces of the skeleton into their burrows. The mammoth is represented only by ivory fragments. The deer is represented only by antler fragments. The horse is represented only by tooth fragments. The only organisms represented by associated remains are tortoises, rabbits, rodents, and a badger. Multiple partial eggs also have been found; one occurrence is a presumed clutch with multiple eggs. One of the Gopherus partial skeletons appears to be in a burrow filled with silt and sand. The burrow is dug into a much harder carbonate horizon. This occurrence demonstrates that that carbonate horizon predates the tortoise and its burrow. It should be noted that the paleosol is exposed at the desert floor over large areas of the project. It is found on both sides of the road that parallels the southern border of the project, both sides of the road that parallels the WAPA power line along the eastern part of the project, and along both sides of the proposed transmission line. It also underlies the entire project “common area”. The paleosol will be impacted by construction. Sensitivity rating in terms of SVP: High. Sensitivity in terms of the PFYC system: 4a.

Alluvial fans. This geologic unit consists of clasts of Precambrian granitic rocks from the Mule Mountains. Near the west edge of the project site, these can be cemented by heavy caliche. Sensitivity rating in terms of SVP: Low. Sensitivity in terms of the PFYC system: 2.

Holocene alluvium of the mesa. Large eastward-draining arroyos have cut through the paleosol and at least some of the late Pleistocene silts, sands, and gravels. These carry sediments reworked from the various geologic units upstream. There can be reworked fossils in this alluvium, but they are of little significance. Sensitivity rating in terms of SVP: Low. Sensitivity in terms of the PFYC system: 2.

Eolian sediments of the mesa. In many areas, the paleosol is obscured by drifting sand. This sand is reworked from Pleistocene sediments. The only fossils found in these drifting sands are reworked. Near the northwestern terminus of the proposed power transmission line are large areas covered by dunes. Sensitivity rating in terms of SVP:Low. Sensitivity in terms of the PFYC system: 2.

Alluvium of the current Colorado River floodplain. The current flood plain of the Colorado River near the Project is used for agriculture. There are no reports of paleontological resources from these sediments, and they are generally too young to produce significant paleontological resources. Sensitivity rating in terms of SVP: Low. Sensitivity in terms of the PFYC system: 2.

While the AFC discussed the discovery of a previously unrecognized paleontological resource and provided proposed mitigation measures related to the discovery of fossils during construction excavations, there was no discussion regarding the potential significant impact to existing paleontological resources caused by heliostat pedestal installation. The Palo Verde Mesa paleosol and Chemehuevi equivalents are classified as highly sensitive units. Current field survey results indicate there is potential for a significant number of fossils to be encountered on the site in these units. The applicant has not sufficiently delineated the extent of these units on the site. Where predrilled and vibratory inserted heliostat pedestals are proposed, recovery of fossils would not occur and fossils encountered with this construction technique would be destroyed without obtaining any scientifically valuable information. Predrilling involves rotating and boring a solid steel drill auger into the ground a specified depth into the subsurface. This construction method would crush or break any fossils that might be present throughout the penetrated depths. The subsequent vibratory insertion of the pedestal would not allow for any recovery of remaining fragments of fossils. Without adequate delineation (horizontal extent and thickness) of these fossil bearing units, staff is unable to evaluate whether the insertion of heliostat pedestals using vibratory techniques would have a significant impact.

Staff has emphasized this position with the applicant on numerous occasions and requested that the applicant provide a plan to adequately delineate the resource (CEC 2012ar and CEC 2012at). Once delineated, staff could analyze the impacts to the resource caused by heliostat pedestal insertion. Staff provided the applicant with some guidance on the type of elements that should be addressed in an excavation plan (CEC 2012ar CEC 2012at). To date, the delineation of the paleontological resource in the project area is incomplete, though the applicant is finalizing a plan to obtain the information needed by staff. The lack of definition of the paleontological resource that would be adversely impacted by heliostat pedestal insertion precludes staff's ability to adequately assess the potential effects that the proposed project would have on the paleontological resources or to recommend a construction monitoring plan appropriate to the project. Staff notified the applicant that a Supplemental Paleontological Resources Delineation Report must be submitted no later than December 3, 2012, if the schedule for publication of the Final Staff Assessment is to be maintained (CEC 2012ar CEC 2012at)

The applicant proposes that where fossils are encountered in excavations associated with all project construction, earthwork would be halted and the Paleontological Resource Specialist (PRS) notified of the find. Steps to avoid significant adverse impacts to discovered fossils are clearly described in Conditions of Certification **PAL-1** through **PAL-7**. When properly implemented, the conditions of certification would 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 PRS would be retained for the proposed project by the applicant to produce a monitoring and mitigation plan, conduct the worker training, and provide the on-site monitoring. During the monitoring, the PRS could petition the Energy Commission for a change in the monitoring protocol. Most commonly, this would be 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. Staff believes these conditions would be appropriate to mitigate impacts to paleontologic resources where conventional grading excavation is conducted for roads, power blocks, and associated appurtenant facilities. Staff believes these conditions would ensure adequate protection of paleontologic resources for those areas because grading and excavation activities are conducted with heavy equipment that creates open excavations and spreads material thus providing adequate opportunities for observation and recovery. Staff needs additional information however, to analyze the impacts to the resource caused by heliostat pedestal predrilling and vibratory insertion, and determine whether the proposed mitigation is adequate to address impacts.

GEOLOGICAL HAZARDS

The AFC provides documentation of potential geologic hazards at the proposed Rio Mesa SEGF plant site (BS 2011a). The AFC and the Preliminary Geotechnical Report (Ninyo 2011), coupled with staff's independent research, indicate that the possibility of geologic hazards at the plant site, during its practical design life, would be low. However, geologic hazards, such as potential for seismic shaking, would need to be addressed in a project design geotechnical report per CBC 2010 requirements

Staff's independent research included the review of available geologic maps, reports, and related data of the proposed Rio Mesa SEGF plant site. Geological information from the California Geological Survey (CGS), California Division of Mines and Geology (CDMG), and other governmental organizations was reviewed. Staff's analysis of this information is provided below.

Faulting and Seismicity

The Alquist-Priolo Earthquake Fault Zoning Act of 1994 (formerly known as the Alquist-Priolo Special Studies Zone Act of 1972) stipulates that no structure for human occupancy may be built within an Earthquake Fault Zone until geologic investigations demonstrate that the site is free of fault traces that are likely to rupture with surface displacement. Earthquake Fault Zones as described in the Act include faults considered to have been active during Holocene time and to have a relatively high potential for surface rupture (CGS 2008). No active faults are shown on published maps as crossing the boundary of new construction on the proposed Rio Mesa SEGF power plant site or associated linear facilities.

In addition, no active fault zones are present within 20 miles of the Project (**Geology and Paleontology – Figure 4**). The majority of fault activity in the region is to the west of the project area. The nearest active fault (showing movement in the last 11,000 years) is the San Andreas fault, located approximately 55 miles to the southwest. Inactive faults exist in the mountains that border the western edge of the project area but none are mapped within its boundaries. The nearest fault to have shown activity in the Quaternary period is the Blythe Graben located approximately 20 miles north of the project area. The tectonic significance and age of this fault is unknown. The regional active faults and earthquake epicenters in relation to the project area are shown on **Geology and Paleontology – Figure 4**.

The project area is subject to an estimated peak ground acceleration (PGA) between approximately 0.10 percent of gravity (g) and 0.12g with a 10 percent probability of being exceeded in 50 years, and a PGA between 0.12g and 0.16g with a 2 percent probability of being exceeded in 50 years (Ninyo 2011).

Preliminary estimates of ground motion based on probabilistic seismic hazard analyses have been calculated for the project site using the USGS Earthquake Hazards application called the U.S. Seismic “DesignMaps” Web Application (**Geology and Paleontology Table 2**). This application produces seismic hazard curves, uniform hazard response spectra, and seismic design values. The values provided by this application are based upon data from the 2008 USGS National Seismic Hazard Mapping Project. These design parameters are for use with the 2012 International Building Code, the 2010 ASCE-7 Standard, the 2009 NEHRP Provisions, and their respective predecessors.

Geology and Paleontology Table 2
Planning Level 2010 CBC Seismic Design Parameters Maximum Considered Earthquake, ASCE 7 Standard

Parameter	Value
Assumed Site Class	D
Structure Risk Category	III - Substantial
SS – Mapped Spectral Acceleration, Short (0.2 Second) Period	0.486 g
S1 – Mapped Spectral Acceleration, Long (1.0 Second) Period	0.233 g
Fa – Site Coefficient, Short (0.2 Second) Period	1.411
Fv – Site Coefficient, Long (1.0 Second) Period	1.935
SDS – Design Spectral Response Acceleration, Short (0.2 Second) Period	0.457 g
SD1 – Design Spectral Response Acceleration, Long (1.0 Second) Period	0.300 g
SMS – Spectral Response Acceleration, Short (0.2 Second) Period	0.686 g
SM1 – Spectral Response Acceleration, Long (1.0 Second) Period	0.450 g

ASCE = American Society of Civil Engineers
Values from USGS 2010b

These parameters are project-specific and, based on Rio Mesa SEGF’s location, were calculated using latitude and longitude inputs of 33.466 degrees north and 114.777 degrees west, respectively. Other inputs for this application are the site “type” which is based on the underlying geologic materials and the “Structure Risk Category”. The assumed site class for Rio Mesa SEGF is “D”, which is applicable to stiff soil. These parameters can be updated as appropriate following the results presented in a project-specific geotechnical investigation report performed for the site. The assumed “Structure Risk Category” is “III”, which is based on its inherent risk to people and the need for the structure to function following a damaging event. Risk categories range from I (non essential) to IV (critical). Examples of risk category I include agriculture facilities, minor storage facilities, etc., while examples of category IV include fire stations, hospitals, nuclear power facilities, etc.

The ground acceleration values presented are typical for the area. Other developments in the adjacent area would also be designed to accommodate strong seismic shaking. Proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1** would ensure that the potential for strong seismic shaking during an earthquake is identified and mitigated as necessary through the production of a project-specific geotechnical report. Compliance with these conditions of certification would ensure the project is built to current seismic standards and potential impacts would be mitigated in accordance with current standards of engineering practice.

Liquefaction

Liquefaction is a phenomenon whereby loose, saturated, granular soils lose their inherent shear strength because of excess pore water pressure build-up, such as that generated during repeated cyclic loading from an earthquake. A low relative density of the granular materials, shallow groundwater table, long duration, and high acceleration of seismic shaking are some of the factors favorable to cause liquefaction.

The presence of predominantly cohesive or fine-grained materials and/or absence of saturated conditions can preclude liquefaction. Liquefaction hazards are usually manifested in the form of buoyancy forces during liquefaction, increase in lateral earth pressures due to liquefaction, horizontal and vertical movements resulting from lateral spreading, and post-earthquake settlement of the liquefied materials.

The depth to ground water on the proposed Rio Mesa SEGF site is greater than 100 feet below ground surface (BS 2011a, Ninyo 2011). Based on site observations and review of information presented in the preliminary geotechnical report (Ninyo 2011), subsurface conditions at the site are not likely to be conducive to liquefaction. However, ground water levels would be confirmed, and the liquefaction potential on the proposed Rio Mesa SEGF site would be addressed in a project-specific geotechnical report, per CBC 2010 requirements and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1.**

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, such as a nearby steep hillside or deeply eroded stream bank, but can also occur on gentle slopes. 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. The Rio Mesa SEGF site is underlain by predominantly unsaturated, cohesive, fine-grained materials that are not typically associated with liquefaction. However, ground water levels would be confirmed and the liquefaction potential of underlying beds beneath the proposed Rio Mesa SEGF site would be addressed in a project-specific geotechnical report, per CBC 2010 requirements and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1.**

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 in soil density). The decrease in volume can result in settlement of overlying structural improvements.

Proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1** would ensure that the potential for dynamic compaction of proposed site native and fill soils during an earthquake is identified and mitigated as necessary through the production of a project-specific geotechnical report. Common mitigation methods would include deep foundations (driven piles; drilled shafts) for severe conditions, geogrid reinforced fill pads for moderate severity and over-excavation and replacement for areas of minimal hazard.

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. The Preliminary Geotechnical Evaluation (Ninyo 2011) identified relatively loose near-surface soil, as well as slightly gypsiferous (potentially water soluble) soils, that could experience settlement when loaded, especially under saturated conditions (hydrocompaction). It was recommended that further design-level geotechnical evaluation be conducted to assess the presence of these materials relative to specific foundations and identify mitigation recommendations. Proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1** would ensure that the potential for hydrocompaction of site soils is identified and mitigated as necessary through the production of a project-specific geotechnical report. Typical mitigation measures would include over-excavation/replacement, mat foundations or deep foundations, depending on severity and foundation loads.

Subsidence

Subsidence can be caused by natural phenomena during tectonic movement, consolidation, hydro-compaction, liquefaction and seismic settlement, or rapid sedimentation. Subsidence can also result from human activities, such as withdrawal of groundwater and/or hydrocarbons in the subsurface soils. Based on the geologic setting, the potential for widespread subsidence is considered low inasmuch as there is no significant fluid withdrawal in the project area.

Proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1** would ensure that the potential for subsidence of site soils is identified and mitigated as necessary through the production of a project-specific geotechnical report. Typical mitigation measures would include over-excavation/replacement, mat foundations or deep foundations, depending on severity and foundation loads. Precipitation runoff control should be utilized to prevent infiltration of surface water into existing or suspected earth fissure areas. Analysis of and mitigation for subsidence potential caused by groundwater withdrawal is presented in the Water Resources and Supply section of this document.

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 soils to absorb water molecules into their structure, which in turn causes an increase in the overall volume of the soil. This increase in volume can correspond to excessive movement (heave) of overlying structural improvements. Based on the preliminary geotechnical evaluation, the soils in the project area are primarily composed of coarser grained material, such as sands and silty sands, with minor amounts of gravel (Ninyo 2011). In general, the potential for expansive soils in the main project area is low. Subsurface data is not available within the gen-tie line corridor. However, this area is mapped with similar geology as the main project area and is likely to have similar non-expansive soil characteristics. Similarly, geotechnical data is not available for the linear elements that extend eastward into the Colorado River Plain. There is considered to be some potential for finer grained-materials with expansive properties along these linear elements. Further geotechnical studies and the engineering design for the Project will consider the potential for expansive soil. Expansive soils, if present, can be mitigated by removing the soil and backfilling with non-expansive soil, instituting chemical stabilization of the soil, or designing foundations to resist uplift of the expansive soil.

Proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1** would ensure that the potential for expansive soils on the proposed site is identified and mitigated as necessary through the production of a project-specific geotechnical report. Mitigation would normally be accomplished by over-excavation and replacement of the expansive soils. For deep-seated conditions, deep foundations are commonly used. Lime-treated (chemical modification) is often used to mitigate expansive clays in pavement areas.

Reactive Soils

Laboratory testing of collected soil can indicate a soil's corrosivity potential and its compatibility as aggregate in concrete. Findings presented in the Preliminary Geotechnical Report (Ninyo 2011) indicate that (due to its elevated resistivity) site soils are moderately to severely corrosive to steel. Additionally, the sulfate content found in site soils could have a deleterious effect on concrete strength. Proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1** would ensure that the potential for reactive soils on the proposed site is identified and mitigated as necessary through the production of a project-specific geotechnical report.

Landslides

Landslides occur when masses of rock, earth, or debris move down a slope, including rock falls, deep failure of slopes, and shallow debris flows. Landslides are influenced by human activity (mining and construction of buildings, railroads, and highways) and natural factors (geology, precipitation, and topography). Frequently, they accompany other natural hazards. Although landslides sometimes occur during earthquake activity, earthquakes are rarely their primary cause.

The most common cause of a landslide is an increase in the down slope gravitational stress applied to slope materials (oversteepening). This may be produced either by natural processes or human activities. Undercutting of a valley wall by stream erosion is a common way in which slopes may be naturally oversteepened. Other ways include excessive rainfall or irrigation on a cliff or slope.

The site is relatively flat and located substantial distances from steep terrain. Therefore, the site is not subject to landslide hazards.

Tsunamis and Seiches

Tsunamis are large-scale seismic-sea waves caused by offshore earthquakes, landslides and/or volcanic activity. Seiches are waves generated within enclosed water bodies such as bays, lakes or reservoirs caused by seismic shaking, rapid tectonic uplift, basin bottom displacement and/or land sliding. The proposed power plant site is located approximately 200 miles inland from the coast. There are no water bodies located at an elevation above the project site within the project vicinity. Therefore, the site is not subject to either tsunami of seiche hazards. For further analysis see the **Soil and Surface Water** section.

The design-level geotechnical investigation required for the proposed project by the CBC 2010 and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1** would provide standard engineering design recommendations for mitigation of seismic shaking, ground subsidence (including fissuring), expansive clay soils, liquefaction and excessive settlement due to compressible soils or dynamic compaction, as appropriate.

OPERATION IMPACTS AND MITIGATION

Operation of the proposed plant facilities should not have any adverse impact on geologic, mineralogic, or paleontologic resources. Once the plant is constructed and operating, there would be no further disturbances that could affect these resources.

Potential geologic hazards, including strong ground shaking, ground subsidence (including fissuring), liquefaction settlement due to compressible soils, hydrocompaction, or dynamic compaction, and the possible presence of expansive clay soils can be effectively mitigated through facility design such that these potential hazards should not affect future operation of the facility. Compliance with Conditions of Certifications **GEN-1, GEN-5** and **CIVIL-1** in the **Facility Design** section would ensure the project is constructed to current seismic building standards and potential impacts would be mitigated in accordance with current standards of engineering practice.

CUMULATIVE IMPACTS AND MITIGATION

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 (Cal. Code Regs. Title 14, §150065(n)(3). Staff considered the projects listed in **Table 1** of the **Executive Summary** section of this PSA for cumulative analysis and provides the following analysis.

No geologic and mineralogic resources have been identified in the project area. The site has not been identified as containing a significant mineral deposit that should be protected and is several miles from the closest identified mineral resource (hard rock mines). Development of this project is not expected to lead to a significantly cumulative effect on geologic and mineralogic resources within the project area.

The site contains valuable (high sensitivity) paleontological resources. As discussed in the direct impacts section, if heliostat pedestals are inserted into the subsurface using vibratory techniques in areas underlain by sediments containing high sensitivity paleontological resources, any paleontological resources contained within these areas would be destroyed, precluding an opportunity to identify, recover, or interpret those resources causing an unmitigable adverse impact.

It is likely that other areas in the site vicinity with similar geologic conditions would also contain valuable paleontological resources. Reasonably foreseeable projects in the site vicinity are identified in **Table 1** of the **Executive Summary**. Assuming construction of the foreseeable projects would use conventional grading and excavation techniques that would allow for resource recovery, the projects are either:

- on federal lands where appropriate LORS requiring protection and preservation of paleontological resources would be enforced;
- on private lands, where if subject to Energy Commission certification, would be required to protect and preserve paleontological resources in accordance with Conditions of Certification **PAL-1** through **PAL-7**; or
- on private lands requiring local jurisdiction approval (i.e. cities and counties), where mitigation measures developed by those agencies (e.g. in existing Environmental Impact Reports or other LORS), or applied to project-specific impacts through subsequent environmental analysis, likely would ensure protection and preservation of paleontological resources.

Staff believes the LORS and conditions of certification discussed above would ensure adequate protection of paleontological resources. This conclusion is based on the fact that typical grading and excavation activities that are conducted with heavy equipment create open excavations and spread excavated materials thereby providing adequate opportunities for observation and recovery of uncovered paleontological resources and therefore would mitigate any potential cumulative impacts.

For projects requiring local approval (ie cities and counties), mitigation measures developed by those agencies would ensure paleontological resources would be protected.

FACILITY CLOSURE

Future facility closure activities would not be expected to impact geologic or mineralogic resources since no such resources are known to exist at either the project location or along its proposed linears. In addition, the decommissioning and closure of the proposed project should not negatively affect geologic, mineralogic, or paleontologic resources since the majority of the ground disturbed during plant decommissioning and closure would have been already disturbed, and mitigated as required, during construction and operation of the project.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has not received any agency or public comments regarding geologic hazards, geologic or mineral resources, or paleontology at this time.

CONCLUSIONS

The applicant would be able to comply with applicable LORS, provided that the proposed conditions of certification are followed. The proposed design and construction of the project would have no adverse impact with respect to geologic and mineralogic resources.

Staff proposes to ensure compliance with applicable LORS through the adoption of the proposed conditions of certification listed below. General conditions of certification which would mitigate potential impacts due to geologic hazards are proposed under Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **Facility Design** section.

Signficant paleontologic resources have been identified on the site. Proposed Conditions of Certification **PAL-1** through **PAL-7** would mitigate potential impacts to paleontologic resources where conventional grading and excavation construction is conducted.

Where predrilled and vibratory inserted heliostat pedestals are constructed, any opportunity for identification, recovery or scientific interpretation of these significant paleontological resources would be precluded. Due to the lack of physical definition of the paleontologic resources, staff is unable to adequately assess the potential impacts from heliostat pedestal construction. Staff has met with the applicant repeatedly to discuss further delineation of this resource. To date, the delineation of the paleontological resource in the project area is incomplete, though the applicant is finalizing a plan to obtain the information needed by staff. Staff notified the applicant that a Supplemental Paleontological Resources Delineation Report must be submitted no later than December 3, 2012, if the schedule for publication of the Final Staff Assessment is to be maintained (CEC 2012ar CEC 2012at).

ADDITIONAL INFORMATION STAFF REQUIRES FROM THE APPLICANT IN ORDER TO COMPLETE THE FSA

- The applicant is required to submit a copy of the Supplemental Paleontological Resources Delineation Report to provide the three dimensional orientation of the fossil bearing geological units that would be impacted by heliostat pedestal installation.
- The applicant is required to submit the Supplemental Paleontological Resources Delineation Report no later than December 3, 2012 if the schedule for publication of the Final Staff Assessment is to be maintained.

PROPOSED CONDITIONS OF CERTIFICATION

PAL-1 The project owner shall provide the compliance project manager (CPM) with the resume and qualifications of its Paleontological Resource Specialist (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 CPM approval of the replacement PRS. The project owner shall keep resumes on file for qualified Paleontological Resource Monitors (PRMs). If a PRM is replaced, the resume of the replacement PRM shall also be provided to the CPM for review and approval.

The PRS resume shall include the names and phone numbers of references. The resume shall also demonstrate to the satisfaction of the CPM the appropriate education and experience to accomplish the required paleontological resource tasks.

As determined by the CPM, the PRS shall meet the minimum qualifications for a vertebrate paleontologist as described in the Society of Vertebrate Paleontology (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. Paleontologic Resource Monitors (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 the CPM. The letter shall be provided to 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 the CPM for review and approval.

PAL-2 The project owner shall provide to the PRS, and the CPM for approval, maps and drawings showing the footprint of the power plant, 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 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 between 1 inch = 40 feet and 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 and CPM.

If construction of the project proceeds in phases, maps and drawings may be submitted prior to the start of each phase. A letter identifying the proposed schedule of each project phase shall be provided to the PRS and CPM. Before work commences on affected phases, the project owner shall notify the PRS 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: At least 30 days prior to the start of ground disturbance, the project owner shall provide the maps and drawings to the PRS and CPM.

If there are changes to the footprint of the project, revised maps and drawings shall be provided to the PRS and CPM at least 15 days prior to the start of ground disturbance.

If there are changes to the scheduling of the construction phases, the project owner shall submit a letter to the CPM within 5 days of identifying the changes.

PAL-3 The project owner shall ensure that the PRS prepares, and the project owner submits to 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 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 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, and the CPM.

The PRMMP shall be developed in accordance with the guidelines of the Society of Vertebrate Paleontology (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 geologic 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 that meets the Society of Vertebrate Paleontology's standards and requirements for the curation of paleontological resources;

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 the CPM for review and approval. 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 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 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 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 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 paleontologic 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 (see attached form); and

7. a sticker that shall be placed on hard hats indicating that environmental training has been completed.

Verification: At least 30 days prior to ground disturbance, the project owner shall submit the proposed WEAP to the CPM for review and approval. The WEAP shall include the brochure with the set of reporting procedures for workers to follow.

At least 30 days prior to ground disturbance, the project owner shall submit the script and final video to the CPM for approval if the project owner is planning to use a video for interim training.

If the owner requests the use of an alternate paleontological trainer, the resume and qualifications of the trainer shall be submitted to the CPM for review and approval prior to installation of an alternate trainer. Alternate trainers shall not conduct training prior to CPM authorization.

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 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 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 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 the CPM at any time.

3. The project owner shall ensure that the PRS notifies 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 the CPM within 24 hours, or by 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 shall include the name(s) of the PRS and 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 geologic units or subunits encountered, descriptions of samplings within each unit, and a list of identified fossils. A final section of the report shall address any issues or concerns about the project relating to paleontologic monitoring, including any incidents of non-compliance or any changes to the monitoring plan that have been approved by 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, 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 the 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 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 the CPM.

Certification of Completion
Worker Environmental Awareness Program
RIO MESA SOLAR ELECTRIC GENERATING FACILITY (11-AFC-04)

This is to certify these individuals have completed a mandatory California Energy Commission-approved Worker Environmental Awareness Program (WEAP). The WEAP includes pertinent information on cultural, paleontological, and biological resources for all personnel (that is, construction supervisors, crews, and plant operators) working on site or at related facilities. By signing below, the participant indicates that he/she understands and shall abide by the guidelines set forth in the program materials. Include this completed form in the Monthly Compliance Report.

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Cultural Trainer: ______________ Signature: ___________________ Date: ___/___/____

PaleoTrainer: _______________ Signature: ___________________ Date: ___/___/____

Biological Trainer: ______________Signature:________________ Date: ___/___/__

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GEOLOGY AND PALEONTOLOGY - FIGURE 1

Rio Mesa Solar Electric Generating Facility - Regional and Vicinity Map

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: AFC, Applicant's Supplemental Response to Data Request Set 1A, 6/7/2012, URS

GEOLOGY AND PALEONTOLOGY - FIGURE 2

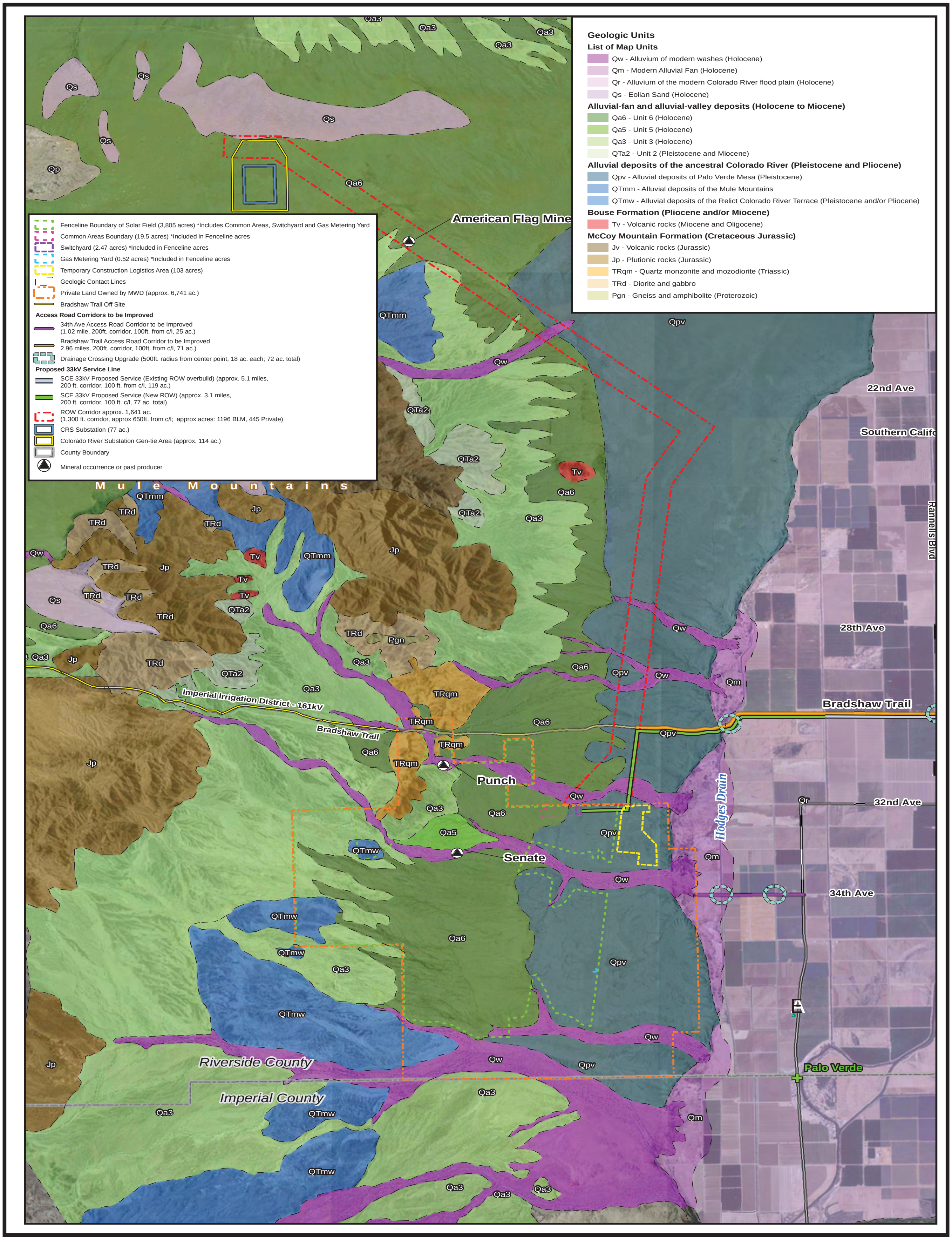
Rio Mesa Solar Electric Generating Facility (Rio Mesa SEGF) - Geomorphic Provinces

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Department of Conservation, California Geological Survey, 2002.

GEOLOGY AND PALEONTOLOGY - FIGURE 3

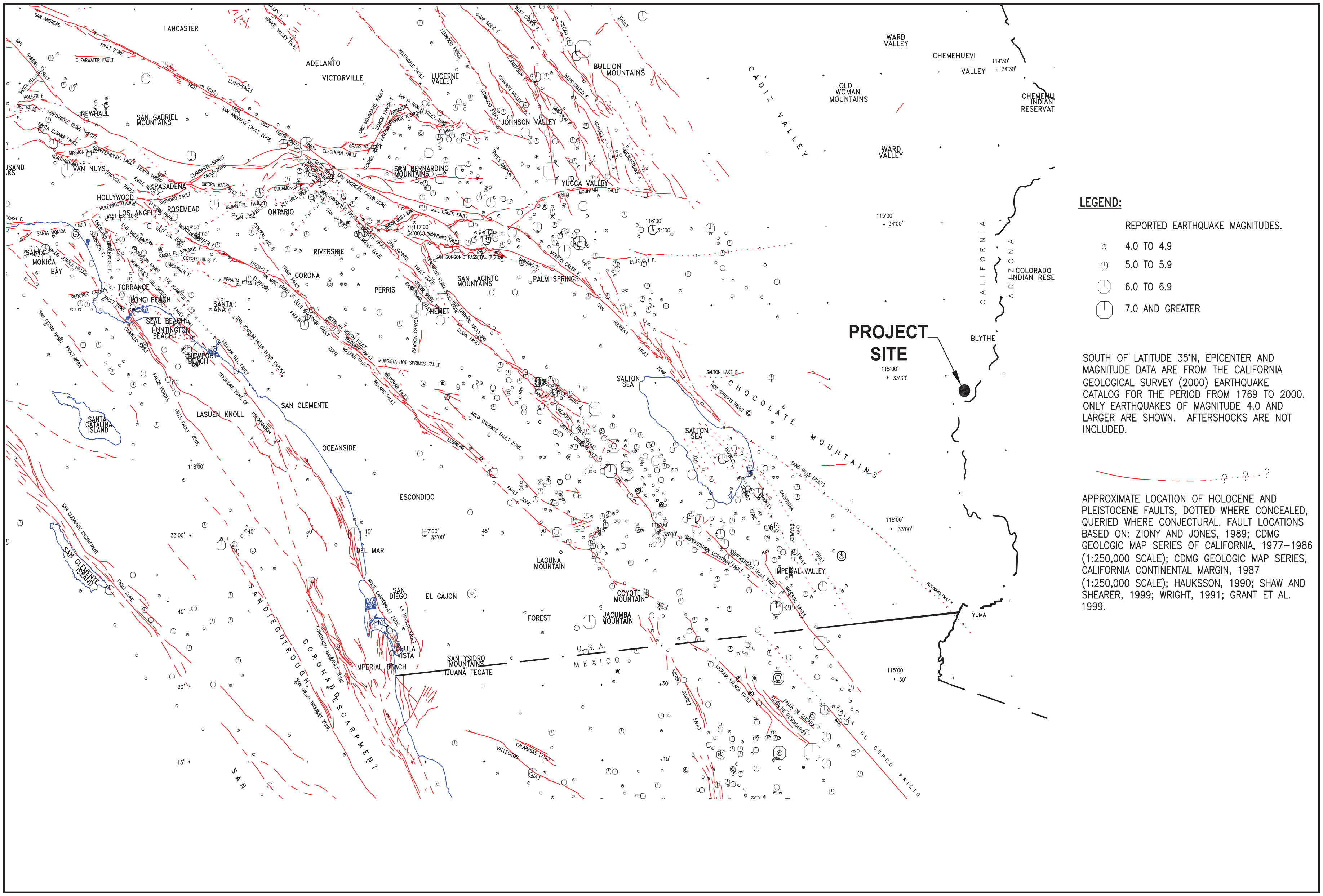
Rio Mesa Solar Electric Generating Facility - Geologic Map



SOURCE: AFC, Applicant's Supplemental Response to Data Request Figure 5.4-1, URS

GEOLOGY AND PALEONTOLOGY - FIGURE 4

Rio Mesa Solar Electric Generating Facility - Regional Fault and Epicenter Map



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: AFC, Applicant's Supplemental Response to Data Request Figure 5.4-2, URS

POWER PLANT EFFICIENCY

Edward Brady

SUMMARY OF CONCLUSIONS

The Rio Mesa SEGF 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 or 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 Rio Mesa SEGF would occupy approximately 7.6 acres per MW of power output, a figure higher than that of some other solar power technologies.

INTRODUCTION

The Rio Mesa SEGF would generate 500 megawatts (MW) (nominal net output) of electricity, operating as a solar thermal power plant in Riverside County, California. It would use solar energy to generate most of its electrical capacity. The project would use proprietary solar thermal power tower technology[1] 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 3,805 acres. Fossil fuel, in the form of natural gas, would be used to reduce startup time, to maintain system temperatures overnight, and for limited power augmentation during transient cloudy conditions.

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 would result in significant adverse impacts on the environment, as defined in the California Environmental Quality Act (CEQA). If the Energy Commission finds that a power plant'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.

[1] http://www.brightsourceenergy.com/technology

In order to develop the Energy Commission's findings and conclusions, this analysis examines:

- whether the facility would likely present any adverse impacts upon energy resources; and if so,
- whether these adverse impacts are significant; and if so,
- whether feasible mitigation measures or alternatives could eliminate those adverse impacts or reduce them to a level of less-than-significant.

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 nonrenewable 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 evaluates the land use efficiency of proposed solar power plant projects. This efficiency is expressed in terms of power produced, or MW per acre, and in terms of energy produced, or MW-hours (MWh) 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, not including offsite facilities (i.e.; offsite pipelines, roads, transmission lines and substations).
- Energy-based solar land use efficiency is calculated by dividing the annual net electrical energy production in MWh 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 maintaining system temperatures overnight (and some consume no gas at all), the quantities of natural gas consumed by each power plant is accounted for in this calculation. 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)**. This reduced energy output is then divided by acres impacted.

PROPOSED PROJECT

SETTING AND EXISTING CONDITIONS

The applicant proposes to build and operate Rio Mesa SEGF, a solar thermal power plant producing a total of 500 MW (nominal net output). The project would consist of two solar fields (Solar Plant I and Solar Plant II) using concentrating solar thermal tower technology, and would be located in Riverside County, California. Each solar field would consist of a large circular field of mirrors (called "heliostats") that reflect the sun's energy onto a central receiver tower to produce electrical power using a steam turbine generator fed from solar steam generators. The land that would be occupied by this project would be approximately 3,805 acres (see the **Project Description** section of PSA for more details). Each solar field would consist of arrays of approximately 85,000 heliostats, one solar receiver steam generator (SRSG), one steam turbine generator, one auxiliary boiler, one nighttime preservation boiler and an air-cooled condenser (BS 2011a, AFC §§ 1.1, 2.1, 2.2.5; BS 2011v, Table 5.1-19).

The project's power cycle would be based on a steam cycle (also known as the Rankine cycle) (BS 2011a, AFC §§ 2.1, 2.2.1). Solar energy is reflected by the heliostats onto the SRSG where the energy heats water into superheated steam. The steam is then routed via the main steam pipe to the steam turbine generator where the steam's energy is converted to electrical energy by the expansion of steam through the turbine.

Each solar plant would utilize two natural gas-fired boilers; one for overnight preservation (to maintain system temperatures overnight); and one to reduce startup time and to augment power production during transient cloudy conditions. On an annual basis, heat from natural gas for power generation would be limited to roughly 14,000 MWh or 1 percent of the heat from the sun (BS 2012v, Applicant's Environmental Enhancement Proposal, Table 2.1-1). The balance of the natural gas consumption would be used for overnight preservation to maintain system temperature and to reduce start up time (BS 2012v, Table 5.1-19).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

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" (Cal. Code Regs., tit. 14, § 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 wasteful, inefficient and unnecessary consumption of energy (Cal. Code Regs., tit. 14, § 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.

Project Energy Requirements and Energy Use Efficiency

The Rio Mesa SEGF would consume some fossil fuel for power generation. It would consume fossil fuel to reduce startup time, for overnight preservation, and to augment power production when solar energy diminishes or during transient cloudy conditions.

The annual natural gas consumption would be limited to approximately 746,355 million British thermal units (MMBtu) (BS 2012v, Table 5.1-19). This amount of natural gas would be used for overnight preservation to maintain system temperature, to reduce start up time, and to supplement power production during transient cloudy conditions. However, the annual natural gas consumption for power production would be limited to approximately 14,000 MWh (BS 2012v, § 2.1, Table 2.1-1); equal to roughly 1 percent of the heat input from the sun. Thus, most of the project's produced electricity would come from the sun (a renewable source of energy). Compared to a typical fossil fuel-fired power plant of equal capacity (500 MW net), and compared to the relatively considerable resources of fossil fuel in California (see below in **Adverse Effects on Energy Supplies and Resources**), the project's rate of natural gas consumption is not significant. Natural gas is a relatively efficient form of fossil fuel.

The project's steam cycle efficiency, based on the solar heat input alone which would be the bulk of the project's energy input on an annual basis, is expected to be approximately 44 percent; less than a typical combined cycle natural gas plant (see **Efficiency Appendix A**) (BS 2012v, Figure 2-4, enthalpy across the heat exchanger versus net electrical output). This efficiency figure compares favorably with conventional boilers with efficiencies ranging from 35 to 40 percent.

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

Natural gas would be used in natural gas boilers for startup, overnight freeze protection, and supplementary power production. The Natural gas supply pipeline for the Rio Mesa SEGF would connect to TransCanada Gas Transmission (TCGT) system's North Baja Pipeline (NBP) located at the eastern edge of the proposed solar fields. A tap station on the main NBP transmission pipeline would be installed. A gas metering station would be installed at that interconnection point to measure and record gas volumes from the NBP metering station (BS 2011a, §§ 2.1.5.2, 2.3.5, 4.0).

TCGT's natural gas supply system draws from extensive supplies originating in the Rocky Mountains. It draws from the oil and gas producing fields of southwestern Wyoming through Utah and Nevada to the San Joaquin Valley near Bakersfield, California, and is capable of delivering the required amount of gas for this project. Staff agrees with the applicant's prediction that there would be adequate natural gas supply and pipeline capacity to meet the project's needs.

Additional Energy Supply Requirements

Because TCGT's natural gas supply system is extensive and readily available as explained above (in **Adverse Effects on Energy Supplies and Resources**), and the project's natural gas consumption is relatively insignificant compared to supply capacity, staff believes there would be no likelihood that the Rio Mesa SEGF 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 the Rio Mesa SEGF for other non-cogeneration projects.

Alternatives to Reduce Wasteful, Inefficient, and Unnecessary Energy Consumption

Staff typically evaluates 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 and the alternative technologies discussions in the **Alternatives** section of this PSA for further information.

Alternative Generating Technologies

Alternative generating technologies for the Rio Mesa SEGF are considered in the AFC (BS 2011a, AFC § 6.7). For purposes of this analysis, natural gas, oil, coal, nuclear, geothermal, biomass, hydroelectric, wind, concentrating solar thermal tower technology with thermal energy storage, solar photovoltaic (PV), and parabolic trough solar thermal technologies were all considered. Because the Rio Mesa SEGF's consumption of fossil fuel would be insignificant, staff believes that the Rio Mesa SEGF 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.

To assess Rio Mesa SEGF's land use efficiency staff compares the land use efficiency of the solar projects licensed by, or currently before, the Energy Commission, to the Rio

Mesa SEGF. This comparison helps determine a range of viable land-use efficiencies and where Rio Mesa SEGF falls within that range.

At the time of this PSA's publication, there are 11 other solar power plant projects that are either going through the Energy Commission's siting or amendment process, or have been previously licensed by the Energy Commission for construction and operation[2]. These projects' power and energy output, and the extent of the land occupied by each, 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.

The Rio Mesa SEGF would produce power at the rate of 500 MW net, and would generate energy at the rate of 1,424,600 MWh per year, while occupying approximately 3,805 acres (Rio Mesa SEGF 2011a, AFC §§ 1.1, 1.2.1, Table 2.1-1and BS 2012v). Accordingly, staff calculates power-based and energy-based land use efficiencies thus:

<u>**Power-based efficiency**</u>: 500 MW ÷ 3,805 acres = **0.13 MW/acre** or **7.6 acres/MW**

<u>**Energy-based efficiency**</u>: 1,424,600 MWh/year ÷ 3,805 acres = **374 MWh/acre-year**

As seen in **Efficiency Table 1**, the Rio Mesa SEGF, employing the power tower technology, is less efficient in the use of land than the Beacon Solar Energy Project, which as licensed would have used the linear parabolic trough technology, but comparable to Genesis Solar Energy Project, which also uses the linear parabolic trough technology. Rio Mesa SEGF is comparable in land use efficiency to the Ivanpah SEGS project, which employs the same proprietary technology as the Rio Mesa SEGF. The Imperial Valley Solar project, which as licensed would have employed the Stirling Engine technology, demonstrates marginally higher land use efficiency than Rio Mesa SEGF.

The Calico Solar Project (Calico), which would have used the Stirling Engine technology as licensed, is now proposing to instead employ the photovoltaic (PV) technology. The applicant for this project proposes to employ both the fixed tilt and single axis tracking PV technologies, but has not yet determined how many of the panels would be fixed tilt and how many would be single axis tracking. Thus, for the purposes of this analysis, staff assumes 100 percent fixed tilt and 100 percent single axis tracking. As seen in **Efficiency Table 1**, if installing 100 percent fixed tilt panels, the Rio Mesa SEGF would be slightly more efficient than Calico. However, if installing 100 percent single axis tracking panels, the Rio Mesa SEGF would be less efficient than Calico.

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 goals.

[2] http://www.energy.ca.gov/siting/solar/index.html

Efficiency Table 1 — Solar Land Use Efficiency

Project	Generating Capacity (MW net)	Footprint (Acres)	Annual Energy Production (MWh net)	Annual Fuel Consumption (MMBtu LHV)	Land Use Efficiency (Power-Based) (MW/acre)	Land Use Efficiency (Energy – Based) (MWh/acre-year)	
						Total	Solar Only[1]
Rio Mesa SEGF (11-AFC-4)	**500**	**3,805**	**1,424,600**	**746,355**	**0.13**[2]	**374**	**357**
HHSEGS (11-AFC-2)	500	3,277	1,432,000	746,355	0.15[2]	436	416
Genesis Solar (09-AFC-8)	250	1,800	600,000	60,000	0.14[3]	333	329
Ridgecrest Solar (09-AFC-8)	250	1,440	500,000	44,818	0.17[3]	347	343
Beacon Solar (08-AFC-2)	250	1,321	600,000	36,000	0.19[3]	454	450
Ivanpah SEGS (07-AFC-5)	400	3,744	960,000	432,432	0.11[2]	256	238
Calico Solar (08-AFC-13C) Fixed Tilt	618	3,855	1,260,000	0	0.11[4]	457	457
Calico Solar (08-AFC-13C) Single Axis Tracking	618	3,855	1,700,000	0	0.16[4]	327	327
Imperial Valley Solar (08-AFC-5)	750	6,500	1,620,000	0	0.16[5]	249	249
Solar Millennium (Blythe) (09-AFC-6)	1000	5,950	2,100,000	172,272	0.17[3]	353	349
Solar Millennium (Palen) (09-AFC-7)	500	2970	1,000,000	89,636	0.17[3]	337	332
Abengoa Solar (09-AFC-5C)	250	1684	630,000	94,280	0.15[3]	374	366
Rice Solar (09-AFC-10)	150	1,410	450,000	0	0.11[2]	319	319
Avenal Energy (08-AFC-1)	600	25	3,023,388	24,792,786	24.0[6]	120,936	N/A

[1] Net energy output is reduced by natural gas-fired combined cycle proxy energy output; see **Efficiency Appendix A**.
[2] Solar Tower
[3] Solar Parabolic Trough
[4] Photovoltaic
[5] Stirling Engine
[6] Example of natural gas-fired combined cycle plant.

In summary, building a solar thermal power plant employing a different technology than the power tower technology would not considerably improve land use efficiency. Thus, staff believes the technology selected for the Rio Mesa SEGF is reasonable.

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 (BS 2011a, AFC §§ 1.7.8, 2.3.6.2, 6.7.1). 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 greater significant environmental impacts that could result from the consumption of larger quantities of water that would be required for wet cooling.

CUMULATIVE IMPACT 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 reasonable foreseeable future projects (Cal. Code Regs. Title 14, §150065(n)(3). Staff considered the projects listed in **Tables 2** and **3** of the **Executive Summary** section of this PSA for cumulative 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 the Rio Mesa SEGF would be insignificant compared to the considerable resources of fossil fuel, including natural gas, 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 the Rio Mesa SEGF 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 older fossil fuel burning power plants. The project would therefore cause a positive impact on the cumulative amount of fossil fuel consumed for power generation.

COMPLIANCE WITH LORS

No federal, state, or local/county laws, ordinances, regulations, and standards (LORS) apply to the efficiency of this project.

NOTEWORTHY PUBLIC BENEFITS

The Rio Mesa SEGF 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.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

CONCLUSIONS

Compared to the project’s expected overall production rate of approximately 1,424,600 MWh net on an average annual basis, and compared to a typical fossil fuel-fired power plant of equal capacity, the amount of the annual power production from fossil fuel is not significant as the Rio Mesa SEGF would use solar energy to generate most of its electricity.

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.

No cumulative impacts on energy resources are likely.

Rio Mesa SEGF would occupy approximately 7.6 acres per MW of power output, a figure comparable to some other solar power technologies. Building a solar power plant employing the power tower technology is reasonable in order to meet the project objective of generating electricity using a renewable source of energy.

Staff therefore concludes that this project would present no significant adverse impacts on energy resources.

REFERENCES

BS 2011a – Bright Source/J. Woolard (tn 62584). Rio Mesa Application for Certification - Volumes 1, 2, and 3, dated October 14, 2011. Submitted to CEC Docket Unit on October 14, 2011.

BS 2012v – Bright Source/ T. Stewart (tn 66292) Applicant's Environmental Enhancement Proposal dated July 23, 2012. Submitted to CEC Dockets Unit on July 23, 2012.

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 nighttime preservation. As a proxy, staff has used an average efficiency based on several baseload combined cycle power plant projects that have gone through the Energy Commission's 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**

POWER PLANT RELIABILITY

Edward Brady and Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

The applicant predicts an equivalent availability factor of 92–98 percent[1]. Staff believes this is achievable. Based on a review of the amended Application for Certification (AFC)(referenced as BS 2012v, Applicant's Environmental Enhancement Proposal), staff concludes that the Rio Mesa Solar Electric Generating Facility (Rio Mesa SEGF) would be built and operated in a manner consistent with industry norms for reliable operation. This should provide an adequate level of reliability. No conditions of certification are proposed.

INTRODUCTION

In this analysis, California Energy Commission (Energy Commission) staff addresses the reliability issues of the project to determine if the power plant is likely to be built in accordance with typical industry norms for reliability of power generation. Staff uses this level of reliability as a benchmark because it ensures that the resulting project would likely not degrade the overall reliability of the electric system it serves (see "Setting" 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 reliability of power generation. While the applicant has predicted an equivalent availability factor of 92-98 percent for the Rio Mesa SEGF (see below), staff uses typical industry norms as a benchmark, rather than the applicant's projection, to evaluate the project's reliability.

[1] The plant will be available 92-98 percent of the time when the source of energy (the sunlight) is available, which is when the plant is expected to be available to come on line. This availability factor mainly reflects maintenance and unplanned outages, and is a reflection of the maturity and capability of the technology.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

No federal, state, or local/county laws, ordinances, regulations, and standards (LORS) apply to the reliability of this project.

SETTING

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.

In September 2005, California AB 380 (Núñez, Chapter 367, Statutes of 2005) became law. This modification to the Public Utilities Code requires the California Public Utilities Commission to consult with the California ISO to establish resource adequacy requirements for all load-serving entities (basically, publicly and privately owned utility companies). These requirements include maintaining a minimum reserve margin (extra generating capacity to serve in times of equipment failure or unexpected demand) and maintaining sufficient local generating resources to satisfy the load-serving entity's peak demand and operating reserve requirements.

In order to fulfill this mandate, the California ISO has begun to establish specific criteria for each load-serving entity under its jurisdiction. These criteria guide each load-serving entity in deciding how much generating capacity and ancillary services to build or purchase, after which the load-serving entity issues power purchase agreements to satisfy these needs. According to the applicant, a power purchase agreement has been entered into with Southern California Edison.

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 500-megawatt (MW) (net power output) Rio Mesa SEGF, a solar thermal power plant facility employing an advanced solar power technology. This project, using mostly renewable solar energy, would provide dependable power to support the grid. This project would help serve the need for renewable energy in California, as 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.

ASSESSMENT OF IMPACTS

METHOD FOR DETERMINING RELIABILITY

The Energy Commission must make findings as to the manner in which the project is to be designed, sited, and operated to ensure 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 the project exhibits reliability at least equal to that of other power plants on that system.

The availability factor for a power plant is the percentage of the time that it is available to generate power; with both planned and unplanned outages subtracted from its availability. Measures of power plant reliability are based on the plant's actual ability to generate power when it is considered available and are based on 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 is accomplished by ensuring 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 they compare favorably, staff can conclude that the Rio Mesa SEGF would be as reliable as other power plants on the electric system and would therefore not degrade system reliability (see below for analysis).

EQUIPMENT AVAILABILITY

Equipment availability would be ensured by use of appropriate quality assurance/quality control (QA/QC) programs during 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

The applicant describes a QA/QC program (BS 2011a AFC § 2.4.4.3) typical of the power industry. Equipment would be purchased from qualified suppliers based on technical and commercial evaluations. The project owner would perform receipt inspections, test components, and administer independent testing contracts. Staff expects implementation of this program to yield typical reliability of design and construction. To ensure such implementation, staff has proposed appropriate conditions of certification under the portion of this document entitled **Facility Design**.

PLANT MAINTAINABILITY

Equipment Redundancy

A generating facility called on to operate in base-load service for long periods of time must be capable of being maintained while operating. A typical approach for achieving this is to provide redundant examples of those pieces of equipment most likely to require service or repair.

The applicant plans to provide appropriate redundancy of function for the project (BS 2012v, Applicant's Environmental Enhancement Proposal § 2.4.2.2). The project, as proposed in the amended AFC, would be able to operate mostly 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 arrangement of solar collector assemblies would allow for reduced output generation if one (or possibly several) rows of solar collectors were to require service or repair. This redundancy would allow service or repair to be done during sunny days when the plant is in operation, if required.

Furthermore, all plant ancillary systems are designed with adequate redundancy to ensure continued operation in the face of equipment failure. The balance of plant equipment would be provided with redundancy; examples include spare circulating pumps, feedwater pumps, condensate pumps, and air compressors (BS 2012v, Applicant's Environmental Enhancement Proposal Table 2.3.1)

Staff believes that equipment redundancy would be sufficient for a project such as this.

Maintenance Program

The applicant proposes to establish a preventive plant maintenance program typical of the industry (BS 2011a, AFC § 2.4.2.1). Equipment manufacturers provide maintenance recommendations with their products; the applicant would base its maintenance program on these recommendations. The program would encompass preventive and predictive maintenance techniques. Maintenance outages would be planned for periods of low electricity demand. In light of these plans, staff expects that the project would be adequately maintained to ensure acceptable reliability.

FUEL AND WATER AVAILABILITY

For any power plant, the long-term availability of fuel and of water for cooling or process use is necessary to ensure reliability. The need for reliable sources of fuel and water is obvious; lacking long-term availability of either source, the service life of the plant may be curtailed, threatening the supply of power as well as the economic viability of the plant.

Fuel Availability

Natural gas would be used in natural gas boilers for startup, overnight freeze protection, and supplementary power production. Natural gas supply pipeline for the Rio Mesa SEGF would connect to TransCanada Gas Transmission Company's (TCGT) Northern Baja Pipeline (NBP) located along the eastern edge of the proposed solar fields (**Project Description – Figure 8**). A tap station off the main transmission pipeline and a gas metering station would be installed to measure and record gas volumes (BS 2011a, AFC §§ 2.1.5.2, 2.3.5 and BS 2012v, Applicant's Environmental Enhancement Proposal § 4.0).

TCGT's natural gas supply system draws from extensive supplies originating in the Rocky Mountains. It draws from the oil and gas producing fields of southwestern Wyoming through Utah and Nevada to the San Joaquin Valley near Bakersfield, California, and is capable of delivering the required amount of gas for this project. Staff agrees with the applicant's prediction that there would be adequate natural gas supply and pipeline capacity to meet the project's needs.

Water Supply Reliability

The project would use groundwater from onsite wells for plant service needs, steam boiler makeup, heliostat washing, and fire protection. To save water in the site's desert environment, each solar plant would use a dry-cooled condenser. Turbine cooling would be provided by air-cooled condensers (BS 2012v, Applicant's Environmental Enhancement Proposal §§ 2.1.5.1, 2.3.6, 2.3.6.2). The applicant states that it has secured, through its land lease agreement, access to up to 600 acre-feet per year (afy) of water; this quantity is greater than the maximum quantity of water use by the project (400 afy during construction) (BS 2012v, Applicant's Environmental Enhancement Proposal §§ 2.3.6.2, 5.15.3.3). Staff believes the source of water for the project yields a reliable supply of water. (For further discussion of water supply, see the **Water Supply** section of this document.)

POWER PLANT RELIABILITY IN RELATION TO NATURAL HAZARDS

Natural forces can threaten the reliable operation of a power plant. High winds, tsunamis (tidal waves), seiches (waves in inland bodies of water), and flooding would not likely represent a hazard for this project, but seismic shaking (earthquake) may present a credible threat to reliable operation.

Seismic Shaking

The project site lies within Riverside County in the eastern part of California. These areas are considered to exhibit low seismic activity; see the “Faulting and Seismicity” portion of the **Geology and Paleontology** section of this document. The project would be designed and constructed to the latest applicable LORS (BS 2011a, AFC §§ 2.2, 2.4.1.1, Appendices 2A and 2B). 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.

Flooding

The site is flat. The project site is located in an area delineated currently by the California Department of Water Resources (DWR) as an “awareness flood plain”, which defaults its designation to a “100-year flood plain” based upon best available information (BS 2011a, AFC § 2.4.1.1). With proper plant design (ensured by adherence to the proposed **Facility Design** conditions of certification), staff believes there are no concerns with power plant functional reliability due to flooding. For further discussion, see the **Soil and Surface Water** and **Geology and Paleontology** sections of this document.

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 <http://www.nerc.com>. Because solar technology is relatively new, no statistics are available for solar power plants. The project’s power cycle is based on steam cycle. Because natural gas is the primary type of fossil fuel used in California, staff finds it reasonable to compare the project’s availability factor to the average availability factor of natural gas-fired fossil fuel units. Also, because the project’s total net power output would be 500 MW, staff uses the NERC statistics for 400–599 MW units. The NERC reported an availability factor of 82.46 percent as the generating unit average for the years 2006 through 2010 for natural gas units of 400–599 MW (NERC 2011).

The project would use non-reheat, condensing steam turbine technology. Steam turbines incorporating this technology have been on the market for many years now and are expected to exhibit typically high availability. Also, because solar-generated steam is cleaner than burnt fossil fuel (i.e., natural gas), the Rio Mesa SEGF steam cycle units would likely require less frequent maintenance than units that burn fossil fuel. Therefore, the applicant's expectation of an annual availability factor of 92 to 98 percent (BS 2012v, Applicant's Environmental Enhancement Proposal § 2.3.16) appears reasonable when compared with the NERC figures throughout North America (see above). In fact, these machines can well be expected to outperform the fleet of various turbines (mostly older and smaller) that make up NERC statistics. Additionally, because the plant would consist of two independent steam turbine generators and many rows of heliostats, maintenance could be scheduled during the times of the year when the full power output is not required to meet market demand, which is typical of industry standard maintenance procedures. Also, because the plant would operate mostly when the sun is shining, maintenance can also be performed during the nighttime hours. The applicant's estimate of plant availability, therefore, appears to be realistic. Stated procedures for assuring the design, procurement, and construction of a reliable power plant appear to be consistent with industry norms, and staff believes they are likely to ultimately produce an adequately reliable plant.

NOTEWORTHY PROJECT BENEFITS

This project would help serve the need for renewable energy in California and help to meet its peak demand for energy, as 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.

CONCLUSION

The applicant predicts an equivalent availability factor of 92-98 percent, which staff believes is achievable. Based on a review of the original and amended AFC, staff concludes that the project would be built and operated in a manner consistent with industry norms for reliable operation. This should provide an adequate level of reliability.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

REFERENCES

BS 2011a – Bright Source/J. Woolard (tn 62584). Rio Mesa Application for Certification - Volumes 1, 2, and 3, dated October 14, 2011. Submitted to CEC Docket Unit on October 14, 2011.

BS 2012v – Bright Source/ T. Stewart (tn 66292) Applicant's Environmental Enhancement Proposal dated July 23, 2012. Submitted to CEC Dockets Unit on July 23, 2012.

McGraw-Hill (McGraw-Hill Energy Information Services Group) 1994. Operational Experience in Competitive Electric Generation. Executive Report.

NERC (North American Electric Reliability Council) 2011. 2006–2010 Generating Availability Report.

TRANSMISSION SYSTEM ENGINEERING

Laiping Ng and Mark Hesters

SUMMARY OF CONCLUSIONS

The California Independent System Operator (California ISO) Queue Cluster 3/Queue Cluster 4 Phase II Interconnection Study (QC3/QC4 Phase II Study) is not available for staff to review at this time. The Phase II Study is required for staff to determine the potential need for downstream transmission facilities. Without the Phase II Study, staff cannot determine if the proposed interconnection facilities including the Rio Mesa Solar Electric Generating Facility (Rio Mesa SEGF) 230 kilovolt[1] (kV) switchyard, a single 230 kV overhead generator tie-line, and the termination at the proposed Southern California Edison (SCE) Colorado River Substation are adequate and in accordance with industry standards and good utility practices. Staff cannot determine if the Rio Mesa SEGF is acceptable according to engineering laws, ordinances, regulations, and standards (LORS).

In addition, if the study shows the project would cause any transmission line overloads which might require transmission line reconductoring or other significant downstream upgrades, a general CEQA analysis will be required. The environmental analysis of potential upgrades could cause a delay in the licensing process for the Rio Mesa SEGF project.

INTRODUCTION

STAFF ANALYSIS

This Transmission System Engineering (TSE) analysis examines whether or not the facilities associated with the proposed interconnection conform to all applicable LORS required for safe and reliable electric power transmission. Additionally, under the California Environmental Quality Act (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 (Cal Code Regs, tit 14, §15378). Therefore, the Energy Commission must identify the system impacts and necessary new or modified transmission facilities downstream of the proposed interconnection that are required for interconnection and that represent the “whole of the action.”

Energy Commission staff analyzes studies performed by the interconnecting authority, in this case the California ISO, to determine the impacts on the transmission grid from the proposed interconnection. Staff’s analysis also identifies new or modified facilities downstream of the first point of interconnection that may be required mitigation measures. The proposed project would connect to the SCE transmission network and requires analysis by SCE and approval of the California ISO.

[1] The Rio Mesa SEGF Application for Certification uses both 220 kV and 230 kV interchangeably.

ROLE OF SOUTHERN CALIFORNIA EDISON

SCE is responsible for ensuring electric system reliability on its transmission system with the addition of the proposed transmission modifications, and determines both the standards necessary to ensure reliability and whether the proposed transmission modifications conform to existing standards. The California ISO will provide analysis in its Phase I and Phase II Interconnection Studies, and its approval for the facilities and changes required in its system for addition of the proposed transmission modifications.

ROLE OF CALIFORNIA INDEPENDENT SYSTEM OPERATOR

The California ISO is responsible for dispatching generating units in California, ensuring electric system reliability for all participating transmission owners and for developing the standards and procedures necessary to maintain system reliability. The California ISO will review SCE's studies to ensure the adequacy of the proposed Rio Mesa SEGF transmission interconnection. The California ISO will also determine if the proposed transmission modifications of the SCE transmission system will impact overall system reliability. According to the California ISO tariff, it 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, perform the Phase I Interconnection Study and provide its analysis, conclusions, and recommendations. The Phase II Interconnection Study includes the California ISO conclusions and recommendations as well. If necessary, the California ISO will provide written and verbal testimony on its findings at the Energy Commission hearings.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

- California Public Utilities Commission General Order 95 (GO 95), *Rules for Overhead Electric Line Construction*, formulates uniform requirements for construction of overhead transmission 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 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.
- The Western Electricity Coordinating Council (WECC) Planning Standards are merged with the North American Electric Reliability Corporation (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, entitled *NERC and WECC Planning Standards with Table I and WECC Disturbance-Performance Table,* and on section I. D., entitled *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, its uncontrolled loss is not permitted (WECC 2002).

- 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. 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 with regard to power flow and stability simulations 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 adequacy, security, and reliability in the planning of the California ISO transmission grid facilities. The California ISO Standards incorporate the NERC/WECC and NERC standards. With regard to power flow and stability simulations, these standards are similar to the NERC/WECC or NERC standards for transmission system contingency performance. However, the California ISO standards also provide some additional requirements that are not found in the NERC/WECC or NERC standards. The California ISO standards apply to all participating transmission owners interconnecting to the grid controlled by California ISO. They also apply when there are any impacts to the California ISO grid due to facilities interconnecting to adjacent grids not operated by California ISO (California ISO 2002a).
- The California ISO/FERC (Federal Energy Regulatory Commission) Electric Tariff provides guidelines for construction of all transmission additions/upgrades within the grid controlled by California ISO. 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 2003a).

PROJECT DESCRIPTION AND INTERCONNECTION FACILITIES

The Rio Mesa SEGF is a solar concentrating thermal power generating facility that would be located on the Palo Verde Mesa in Riverside County, California. The Rio Mesa SEGF would consist of two solar thermal power plants and a common area for shared facilities. The maximum output of the Rio Mesa SEGF would be 540 megawatts (MW). The Rio Mesa SEGF would be interconnected to the SCE Colorado River Substation. The proposed project would be built in two phases. The proposed commercial operation date for the Phase I would be the fourth quarter of 2015. The Phase II would begin operation in the first quarter of 2016.

The Rio Mesa SEGF would be a solar concentrating thermal project which would use a solar heliostat mirror technology. The heliostat mirror fields would collect heat from the sun and focus the solar energy on solar receiver steam generator (SRSG) which converts the solar energy to superheated steam. The superheated steam is then fed to a steam turbine generator (STG) to generate electricity.

The Rio Mesa SEGF project would consist of two solar concentrating thermal power plants and a common area for shared facilities. Each plant would have its own solar field consisting of approximately 85,000 heliostats, one solar power tower approximately 760-feet tall, one SRSG, one night-time preservation boiler, one natural-gas fired auxiliary boiler, one air-cooled condenser, and various auxiliary equipment. Each solar plant at maximum generates 270 MW and would occupy approximately 1,850 acres. With the common area for the shared facilities, the Rio Mesa SEGF would require a total of approximately 3,805 acres. The generator auxiliary load is approximately 24 MW, two steam turbine generators are expected to generate at a nominal output of 516 MW.

Each solar receiver steam generator is rated at 300 MVA[2] with a power factor of 0.90. The SRSG would be connected through a 21 kV 8,700-ampere generator circuit breaker via a short 9,000-ampere isolated phase bus duct to the low side of its dedicated 183/244/305 MVA generator step-up (21/230 kV) transformer.

The auxiliary load, approximately 12 MW for each unit, would be provided through its dedicated back-fed, three-winding step-down transformer (21/4.16-4.16 kV) which is connected between the SRSG circuit breaker and the low side of the generator step-up transformer via a short 1,000-ampere isolated phase bus tap.

The high side of each transformer would be connected through a 230 kV 1,200-ampere disconnect switch via a 795 kcmil underground cable to the Rio Mesa SEGF switchyard in a ring bus arrangement. The three circuit breakers and two disconnect switches in the project switchyard are each rated at 2,000-ampere. A single 230 kV generator tie-line would connect the Rio Mesa SEGF through a 2,000-ampere disconnect switch to the

[2] See Definition of Terms at the end of this TSE section.

SCE Colorado River Substation which is located approximately 9.7 miles north of the Rio Mesa SEGF site.

The 230 kV generator tie-line, supported by single circuit concrete poles, would be built with 1590 kcmil ACSR conductor. The generator tie-line would leave the project switchyard and go north along the Imperial Irrigation District 161 kV and Western Area Power Administration 161 kV transmission corridor for approximately 4.5 miles, then turn northwest parallel to the SCE Devers-Palo Verde 500 kV line for approximately 5 miles to the Colorado River Substation. (BS 2012v, section 1, section 2, section 3, Figure 2-7 (REV), Figure 3.3-1 (REV), Figure 3.3-2 (REV), URS 2012a Figure B-2a). These proposed facilities are acceptable to staff and Conditions of Certification **TSE-1** through **TSE-7** ensure these facilities comply with LORS.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

For the interconnection of a proposed generating unit or transmission facility to the grid, the interconnecting utility (SCE in this case) and the control area operator (California ISO) are responsible for ensuring grid reliability. These entities determine the transmission system impacts of the proposed project, and any mitigation measures needed to ensure system conformance with performance levels required by utility reliability criteria, NERC planning standards, WECC reliability criteria, and California ISO reliability criteria. The Phase I and Phase II Interconnection Studies are used to determine the impacts of the proposed project on the transmission grid. Staff relies on these studies and any review conducted by the California ISO to determine the project's effect 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.

The Phase I and Phase II Interconnection Studies analyze the grid with and without the proposed project 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 through which grid reliability is determined. The studies must analyze the impact of the project for the first year of operation and thus are based on a forecast of loads, generation, and transmission. Load forecasts are developed by the interconnecting utility and the California ISO. Generation and transmission forecasts are established by an 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), and short circuit duties.

If the Phase I and Phase II Interconnection Studies show that the interconnection of the project causes the grid to be out of compliance with reliability standards, then the studies will identify mitigation alternatives or ways in which the grid could be brought into compliance with reliability standards. When a project connects to the grid controlled by California ISO, both the studies and mitigation alternatives must be reviewed and approved by the California ISO. If the mitigation identified by California ISO or interconnecting utility includes transmission modifications or additions that require CEQA review as part of the "whole of the action," the Energy Commission must analyze the environmental impacts of these modifications or additions.

CALIFORNIA INDEPENDENT SYSTEM OPERATOR STUDY

The California ISO has completed the Cluster 3 Phase I Interconnection Study Report (Phase I Interconnection Study) which included the Rio Mesa SEGF and other proposed generators in the same cluster. The Appendix A – Q #643AC, the individual project report for the Rio Mesa SEGF, was also completed at the same time. Only the Appendix A was submitted for staff to review.

SCOPE OF APPENDIX A – Q #643AC PHASE I INTERCONNECTION STUDY

The May 27, 2011, Queue Cluster 3 Phase I Final Report was prepared by the California ISO in coordination with SCE. The Queue Cluster 3 (QC3) Phase I Interconnection Study modeled the proposed generation project in the SCE area including the Rio Mesa SEGF project with a net output of 786 MW.

As stated in the Applicant’s Response to Data Requests, Set 1A, dated March 8, 2012, many originally analyzed generation projects drop out from the Queue Cluster 3. The California ISO combines the generation projects from the Queue Cluster 3 and Queue Cluster 4 (QC4) in their QC3/QC4Phase II Interconnection Study process. In addition, Rio Mesa SEGF submitted a supplemental filing dated July 23, 2012, to reduce the Rio Mesa SEGF generation from 786 MW to 500 MW.

Reducing the size of the cluster and the size of the Rio Mesa SEGF means the study results for the Queue Cluster 3 Phase I Interconnection Study (Phase I Study) are not a reasonable forecast of the reliability impacts of the proposed project or the other projects remaining in the cluster. Since the Phase I Study does not provide an accurate forecast of the reliability impacts of the cluster or the proposed Rio Mesa SEGF, staff cannot rely on the study results to show project compliance with LORS and to identify the transmission facilities required to reliably interconnect a generator to the existing transmission grid.

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 Rio Mesa SEGF 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 QC3 and the reduction of Rio Mesa SEGF generation reduce the study results to 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 dramatically. The revised QC3/QC4 projects including the 500 MW Rio Mesa SEGF will be analyzed in the Phase II Interconnection Study and will provide a much better forecast of the reliability impacts of the Rio Mesa SEGF and its associated cluster of generators (URS 2012a).

CUMULATIVE IMPACTS

The TSE analysis focuses on whether or not a proposed project will meet required codes and standards. At all times the transmission grid must remain in compliance with reliability standards, whether one project or many projects interconnect. Potential cumulative impacts on the transmission network are identified through the California

ISO and utility generator interconnection process. In cases where a significant number of proposed generation projects could affect a particular portion of the transmission grid, the interconnecting utility or the California ISO can study the cluster of projects in order to identify the most efficient means to interconnect all the proposed projects.

COMPLIANCE WITH LORS

The proposed interconnecting facilities include the Rio Mesa SEFG 230 kV switchyard, a single 230 kV overhead generator tie-line, and the termination at the proposed SCE Colorado River Substation. Since the QC3/QC4Phase II Interconnection Study is not available, staff cannot determine whether the proposed interconnecting facilities are adequate and in accordance with industry standards and good utility practices, and are acceptable to staff according to engineering LORS. Once the Phase II Interconnection Study is received, staff will incorporate the information into our analysis and provide the updated analysis and conclusions in the Final Staff Assessment.

Staff's proposed Conditions of Certification **TSE-1** through **TSE-7** would help ensure that construction and operation of the transmission facilities for the proposed Rio Mesa SEGF would comply with applicable LORS:

Staff proposed Condition of Certification **TSE-1** is recommended to ensure that the preliminary equipment is in place for construction of the transmission facilities of the proposed project to comply with applicable LORS.

1. Staff proposed Condition of Certification **TSE-2** is recommended to ensure the proper personnel are ready to manage and monitor the construction of the transmission facilities for the proposed project to comply with applicable LORS.

2. Staff proposed Condition of Certification **TSE-3** is recommended to ensure that any changes to the proposed transmission facilities would comply with applicable LORS.

3. Staff proposed Condition of Certification **TSE-4** is recommended to ensure the final design of the proposed transmission facilities would comply with applicable LORS.

4. Staff proposed Condition of Certification **TSE-5** is recommended to ensure that the proposed project would be properly interconnected to the transmission grid. **TSE-5** also ensures that the generator output would be properly delivered to the transmission system.

5. Staff proposed Condition of Certification **TSE-6** is recommended to ensure that the project would synchronize with the existing transmission system and the operation of the facilities would comply with applicable LORS.

6. Staff proposed Condition of Certification **TSE-7** is recommended to ensure that the proposed project has been built to required specifications and the operation of the facilities would comply with applicable LORS.

CONCLUSIONS AND RECOMMENDATIONS

The California ISO QC3/QC4 Phase II Interconnection Study will not be available for staff to review until November 2012 at the earliest. The Phase II Study is required for staff to determine the potential need for downstream transmission facility upgrades.

Without the Phase II Interconnection Study, staff cannot determine if the proposed interconnection facilities including the Rio Mesa SEGF 230 kV switchyard, a single 230 kV overhead generator tie-line, and the termination at the proposed SCE Colorado River Substation are adequate and in accordance with industry standards and good utility practices, and are acceptable to staff according to engineering LORS.

Also, if the study shows the project would cause any transmission line overloads that might require transmission line reconductoring or other significant downstream upgrades, the potential environmental impact of these upgrades would need to be analyzed pursuant to CEQA. Until this information is in hand, however, it is unclear how long the additional analysis would take to perform.

ADDITIONAL INFORMATION STAFF REQUIRES FROM THE APPLICANT IN ORDER TO COMPLETE THE FSA

- To complete the FSA, the applicant is required to submit a copy of the QC3/QC 4 Phase II Study for staff to determine the potential need for downstream transmission facility upgrades.

PROPOSED CONDITIONS OF CERTIFICATION

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 of transmission facilities, 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.

Table 1: Major Equipment List
Breakers
Step-up transformer
Switchyard
Busses
Surge arrestors
Disconnects
Take-off facilities
Electrical control building
Switchyard control building
Transmission pole/tower
Grounding system

TSE-2 Before the start of construction of transmission facilities, the project owner shall assign to the project an electrical engineer and at least one of each of the following:

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 and 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 either a civil engineer or a 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, or 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 as required by 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 earth work and require changes; if site conditions are unsafe or do not conform with the predicted conditions used as the basis for design of earth work 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 (2001 California Building Code, 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 refer to 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 the disapproval, along with 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 construction until plans for that increment of construction 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, and outlet line and termination, including a copy of the signed and stamped statement from the responsible electrical engineer verifying compliance with all 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 for review and CBO for 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) A copy of the executed LGIA signed by the California ISO and the project owner and approved by the Federal Energy Regulatory Commission.

Verification: Prior to the start of construction or 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"[3] 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 f);

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; and

f) a copy of the executed LGIA signed by the California ISO and the project owner and approved by the Federal Energy Regulatory Commission.

Prior to the start of construction 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

[3] Worst-case conditions for the foundations would include for instance, a dead-end or angle pole.

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.

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

REFERENCES

BS 2011a – Bright Source/J. Woolard (tn 62584). Rio Mesa Application for Certification - Volumes 1, 2, and 3, dated October 14, 2011. Submitted to CEC Docket Unit on October 14, 2011.

BS 2012v – Bright Source/ T. Stewart (tn 66292) Applicant's Environmental Enhancement Proposal dated July 23, 2012. Submitted to CEC Dockets Unit on July 23, 2012.

California ISO (Independent System Operator). 1998a. California ISO Tariff Scheduling Protocol posted April 1998, Amendments 1,4,5,6, and 7 incorporated.

California ISO (Independent System Operator). 1998b. California ISO Dispatch Protocol posted April 1998.

California ISO (Independent System Operator). 2002a. California ISO Grid Planning Standards, February 2002.

California ISO (Independent System Operator). 2003a. California ISO, FERC Electric Tariff, First Replacement Vol. No. 1, March 11, 2003.

NERC (North American Electric Reliability Council). 2006. Reliability Standards for the Bulk Electric Systems of North America, May 2 2006.

URS 2012a – URS/A. Leiba (tn 64060) Applicant's Data Response to Data Request Set 1A, dated March 8, 2012. Submitted to CEC Dockets Unit on March 8, 2012.

WECC (Western Electricity Coordinating Council). 2002. NERC/WECC Planning Standards, August 2002.

DEFINITION OF TERMS

AAC	All aluminum conductor.
ACSR	Aluminum conductor steel-reinforced.
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.
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	A scheduling protocol, which provides that dispatched generation and transmission loading (imports) will not violate criteria.
Double–contingency condition	Also known as emergency or N-2 condition, a forced outage of two system elements usually (but not exclusively) caused by one single event. Examples of an N-2 contingency include loss of two transmission circuits on a single tower line or loss of two elements connected by a common circuit breaker due to the failure of that common breaker.
Emergency overload	See single–contingency condition. This is also called an N-1 condition.
kcmil	One-thousand circular mil. A unit of the conductor's cross-sectional area divided by 1,273 to obtain the area in square inches.
Kilovolt (kV)	A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground.

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.

Megavar — One megavolt ampere reactive.

Megavars — Mega-volt-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 equal to 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.

N-0 condition — See normal operation/normal overload.

Normal operation/normal overload (N-0)

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 condition.

N-2 condition — See double–contingency condition.

Outlet — Transmission facilities (e.g., circuit, transformer, circuit breaker) 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 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, will trip a selected generating unit upon a circuit overload.

SF6 — Sulfur hexafluoride is an insulating medium.

Single–contingency condition

Also known as emergency or N-1 condition, occurs when one major transmission element (e.g., circuit, transformer, circuit breaker) 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.

Special protection scheme/system (SPS)

An SPS detects a transmission outage (either a single or credible multiple contingency) or an overloaded transmission facility and then trips or runs back generation output to avoid potential overloaded facilities or other criteria violations.

Switchyard — A power plant 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.

Tap — A transmission configuration creating an interconnection through a sort single circuit to a small- or medium-sized load or generator. The new single circuit line is inserted into an existing circuit by using 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.

GENERAL CONDITIONS
INCLUDING
COMPLIANCE MONITORING AND CLOSURE PLAN

Christine Stora

INTRODUCTION

The Rio Mesa Solar Electric Generating Facility's (Rio Mesa SEGF) 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 Rio Mesa SEGF 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 is composed of elements that:

- set forth the duties and responsibilities of 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 the requirements for periodic compliance reports and other administrative procedures that are necessary to verify the compliance status for all Energy Commission approved conditions of certification;
- establish requirements for facility closure 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 below a level of significance. Each specific condition of certification also includes a verification provision that describes the method of assuring that the condition has been satisfied.

DEFINITIONS

The following terms and definitions are used to establish when Conditions of Certification are implemented.

PRE-CONSTRUCTION SITE MOBILIZATION

Site mobilization is limited preconstruction activities at the site to allow for 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 is considered part of site mobilization. Walking, driving or parking a passenger vehicle, pickup truck and/or light vehicles is allowable during site mobilization.

CONSTRUCTION

Onsite work to install permanent equipment or structures for any facility.

Ground Disturbance

Construction-related ground disturbance refers to activities that result in the removal of top soil or vegetation at the site beyond site mobilization needs, and for access roads and linear facilities.

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 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.

START OF COMMERCIAL OPERATION

For compliance monitoring purposes, “commercial operation” begins after the completion of start-up and commissioning, 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.

COMPLIANCE PROJECT MANAGER RESPONSIBILITIES

The Compliance Project Manager (CPM) shall oversee the compliance monitoring and is responsible for:

1. ensuring that the design, construction, operation, and closure of the project facilities are in compliance with the terms and conditions of 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 instructions for filing petitions);

4. documenting and tracking compliance filings; and
5. ensuring that compliance files are maintained and accessible.

The CPM is the contact person for the Energy Commission and will consult with appropriate responsible agencies, Energy Commission, and staff when handling disputes, complaints, and amendments.

All project compliance submittals are submitted to the CPM for processing. Where a submittal required by a condition of certification requires CPM approval, the approval will involve all appropriate Energy Commission staff and management. All submittals must include searchable electronic versions (pdf or MS Word files).

PRE-CONSTRUCTION AND PRE-OPERATION COMPLIANCE MEETING

The CPM usually schedules 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 both the Energy Commission's and project owner's technical staff to review the status of all pre-construction or pre-operation requirements contained in the Energy Commission's conditions of certification. This is 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 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.

ENERGY COMMISSION RECORD

The Energy Commission shall maintain the following documents and information as a public record, in either the Compliance file or Dockets file, for the life of the project (or other period as required):

1. all documents demonstrating compliance with any legal requirements relating to the construction and operation of the facility;
2. all monthly and annual compliance reports filed by the project owner;
3. all complaints of noncompliance filed with the Energy Commission; and
4. all petitions for project or condition of certification changes and the resulting staff or Energy Commission action.

PROJECT OWNER RESPONSIBILITIES

The project owner is responsible for ensuring that the compliance conditions of certification and all other conditions of certification that appear in the Commission Decision are satisfied. The compliance conditions regarding post-certification changes specify measures that the project owner 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 the compliance conditions may result in reopening of the case and revocation of 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.

COMPLIANCE CONDITIONS OF CERTIFICATION

Unrestricted Access (COMPLIANCE-1)

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 the CPM will normally schedule site visits on dates and times agreeable to the project owner, the CPM reserves the right to make unannounced visits at any time.

Compliance Record (COMPLIANCE-2)

The project owner shall maintain project files on-site or at an alternative site approved by 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.

Energy Commission staff and delegate agencies shall, upon request to the project owner, 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 the CPM.

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 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. energy Commission staff audits of project records; and/or

4. 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 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 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 shall reference the date of the previous submittal and CEC submittal number.

The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether such condition was satisfied by work performed by the project owner or an agent of the project owner.

All hardcopy submittals shall be addressed as follows:

> **<u>Compliance Project Manager</u>**
> **(11-AFC-04C)**
> **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 the CPM.

If the project owner desires 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 to the CPM. This matrix will be included with the project owner’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.

Construction shall not commence until the pre-construction matrix is submitted, all pre-construction conditions have been complied with, and the CPM has issued a letter to the project owner authorizing construction. Various lead times for submittal of compliance verification documents to the CPM for conditions of certification are established to allow sufficient staff time to review and comment and, if necessary, allow the project owner 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 anticipates commencing project construction as soon as the project is certified, it may be necessary for the project owner 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 must understand that the submittal of compliance documents prior to project certification is at the owner's own risk. Any approval by Energy Commission staff is subject to change, based upon the Commission Decision.

Compliance Reporting

There are two different compliance reports that the project owner must submit to assist the CPM in tracking activities and monitoring compliance with the terms and conditions of the Energy Commission Decision. During construction, the project owner 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 the CPM in the monthly or annual compliance reports.

Compliance Matrix (COMPLIANCE-5)

A compliance matrix shall be submitted by the project owner to the CPM along with each monthly and annual compliance report. The compliance matrix is intended to provide 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), 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-6)

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 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 these General Conditions.

During pre-construction and construction of the project, the project owner 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. Monthly Compliance Reports shall be clearly identified for the month being reported. 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;

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 shall notify 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 the CPM.

Annual Compliance Report (COMPLIANCE-7)

After construction is complete, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports. The reports are for each year of commercial operation and are due to the CPM each year at a date agreed to by the

CPM. Annual Compliance Reports shall be submitted over the life of the project, unless otherwise specified by 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 approved by the Energy Commission or cleared by 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 addressed later in this section); 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-8)

Any information that the project owner 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.

Annual Energy Facility Compliance Fee (COMPLIANCE-9)

Pursuant to the provisions of Section 25806(b) of the Public Resources Code, the project owner 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 of the Business Meeting at which 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-10)

Prior to the start of construction, the project owner 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 a 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 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 the CPM, who will update the web page.

In addition to the monthly and annual compliance reporting requirements described above, the project owner shall report and provide copies to 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 attached to this section (Attachment A).

FACILITY CLOSURE

At some point in the future, the project will cease operation and close down. At that time, it will be necessary 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.

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.

Unplanned Permanent Closure

An unplanned permanent closure occurs if the project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unplanned closure where the owner implements the on-site contingency plan. It can also include unplanned closure where the project owner fails to implement the contingency plan, and the project is essentially abandoned.

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 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) prior to the commencement of closure activities. The project owner shall file 120 copies (or other number of copies agreed upon by the CPM) of a proposed facility closure plan with the Energy Commission.

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 remnants that will remain at 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. identify any facilities or equipment intended to remain on site after closure, the reason, and any future use; and

4. 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.

Prior to submittal of the proposed facility closure plan, a meeting shall be held between the project owner 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 plan's approval, or if the desires of local officials or interested parties are inconsistent with the plan, the CPM shall hold one or more workshops and/or 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 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 the Energy Commission approves the facility closure 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 shall submit an on-site contingency plan for CPM review and approval. The plan shall be submitted no less than 60 days (or other time agreed to by the CPM) prior to commencement of commercial operation. The approved plan must be in place prior to commercial operation of the facility and shall be kept at the site at all times.

The project owner, in consultation with the CPM, will update the on-site contingency plan as necessary. 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 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 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 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 in the **Hazardous Materials Management** and **Waste Management** sections)

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 shall notify 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 shall keep the CPM informed of the circumstances and expected duration of the closure.

If the CPM determines that an unplanned temporary closure is likely to be permanent, or for a duration of more than 12 months, a closure plan consistent with the requirements for a planned closure shall be developed and submitted to the CPM within 90 days of the CPM's determination (or other period of time agreed to by 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 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 shall notify 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 shall keep the CPM informed of the status of all closure activities.

A closure plan, consistent with the requirements for a planned closure, shall be developed and submitted to the CPM within 90 days of the permanent closure or another period of time agreed to by the CPM.

Post Certification Changes to the Energy Commission Decision: Amendments, Ownership Changes, Staff Approved Project Modifications and Verification Changes (COMPLIANCE-14)

The project owner 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. **It is the responsibility of the project owner to contact the CPM to determine if a proposed project change should be considered a project modification pursuant to section 1769.** Implementation of a project modification without first securing 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 is sufficient. In all cases, the petition or letter requesting a change should be submitted to 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 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 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 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 final decision, which requires public notice and review of the Energy Commission staff analysis and approval by the full 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 a sample petition to use as a template.

Change of Ownership

Change of ownership or operational control also requires that the project owner file a petition pursuant to section 1769 (b). This process requires public notice and approval by the full Commission. The petition shall be in the form of a legal brief and fulfill the requirements of Section 1769(b). Upon request, the CPM will provide a sample petition to use as a template.

Staff Approved Project Modification

Modifications that do not result in deletions or changes to conditions of certification, that are compliant with laws, ordinances, regulations and standards and will not have significant environmental impacts may be authorized by the CPM as a staff approved project modification pursuant to section 1769(a)(2). Once staff files an intention to approve the proposed project modifications, any person may file an objection to staff's determination within 14 days of service on the grounds that the modification does not meet the criteria of section 1769 (a)(2). If a person objects to staff's determination, the petition must be processed as a formal amendment to the decision and must be approved by the full commission at a noticed business meeting or hearing.

Verification Change

A verification may be modified by the CPM without requesting an amendment to the decision if the change does not conflict with the conditions of certification and provides an effective alternate means of verification.

Notification to CPM of a Situation Requiring an Unplanned Response from an Emergency Services Agency (COMPLIANCE 15)

In the event of any incident that requires a response from fire, hazardous materials, medical, or police emergency services (as a result, for example, of personal injury, hazardous materials spill, flood, fire, or explosion, etc), the project owner shall notify the CPM within two hours of the initiation of the event by telephone, fax, or e-mail, to report the circumstances of the event, its current status, and its expected duration.

The project owner shall provide the CPM with all reports that have been prepared regarding any such incident within 10 days of preparation of those documents. This requirement covers any incident reports prepared by the project owner, as well as reports prepared by 3rd parties to which the project owner has access. Such reports shall be unredacted and in their original form.

CHIEF BUILDING OFFICIAL DELEGATION AND AGENCY COOPERATION

In performing construction and operation monitoring of the project, Energy Commission staff acts as, and has the authority of, the Chief Building Official (CBO). Energy Commission staff may delegate CBO responsibility to either an independent third party contractor or the local building official. Energy Commission staff retains CBO authority when selecting a delegate CBO, including enforcing and interpreting state and local codes, and use of discretion, as necessary, in implementing the various codes and standards.

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.

ENFORCEMENT

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.

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, 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, 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 an informal investigation, the CPM shall promptly notify the project owner of the allegation by telephone and letter. All known and relevant information of the alleged noncompliance shall be provided to the project owner 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 will be asked to promptly investigate the matter. Within seven working days of the CPM's request, 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 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'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. Such request shall be made within 14 days of the project owner'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, 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; and

4. after the conclusion of such a meeting, promptly prepare and distribute copies to all in attendance and to the project file, 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.

COMPLIANCE TABLE 1
SUMMARY of COMPLIANCE CONDITIONS OF CERTIFICATION

KEY EVENTS LIST

PROJECT: ____

DOCKET #: ____

COMPLIANCE PROJECT MANAGER: ______________________________

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	

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-1	Unrestricted Access	The project owner shall grant Energy Commission staff and delegate agencies or consultants unrestricted access to the power plant site.
COMPLIANCE-2	Compliance Record	The project owner shall maintain project files on-site. Energy Commission staff and delegate agencies shall be given unrestricted access to the files.
COMPLIANCE-3	Compliance Verification Submittals	The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether such condition was satisfied by work performed or the project owner 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, • the CPM has issued a letter to the project owner authorizing construction.
COMPLIANCE-5	Compliance Matrix	The project owner 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 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.
COMPLIANCE-7	Annual Compliance Reports	After construction ends and throughout the life of the project, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports.

COMPLIANCE TABLE 1
SUMMARY of COMPLIANCE CONDITIONS OF CERTIFICATION

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-8	Confidential Information	Any information the project owner deems confidential shall be submitted to the Energy Commission's Executive Director with a request for confidentiality.
COMPLIANCE-9	Annual fees	Payment of Annual Energy Facility Compliance Fee
COMPLIANCE-10	Reporting of Complaints, Notices and Citations	Within 10 days of receipt, the project owner shall report to the CPM, all notices, complaints, and citations.
COMPLIANCE-11	Planned Facility Closure	The project owner shall submit a closure plan to 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 shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation.
COMPLIANCE-13	Unplanned Permanent Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned permanent closure, the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation.
COMPLIANCE-14	Post-certification changes to the Decision	The project owner must petition the Energy Commission 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.
COMPLIANCE-15	Notification to CPM of Unplanned Response from Emergency Services	The project owner shall notify the CPM within two hours to report the circumstances of the event. The project owner shall provide the CPM with all unredacted, original form reports that have been prepared regarding any such incident within 10 days of preparation of those documents.

COMPLAINT LOG NUMBER:______________________ DOCKET NUMBER:_______________________

PROJECT NAME:____

COMPLAINANT 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 A CEC REQUIREMENT? ☐ YES ☐ NO

DATE COMPLAINANT CONTACTED TO DISCUSS FINDINGS:____

DESCRIPTION OF CORRECTIVE MEASURES TAKEN OR OTHER COMPLAINT RESOLUTION:___________________

____

____

DOES COMPLAINANT AGREE WITH PROPOSED RESOLUTION? ☐ YES ☐ NO

IF NOT, EXPLAIN:____

____

CORRECTIVE ACTION

IF CORRECTIVE ACTION NECESSARY, DATE COMPLETED:____

DATE FIRST LETTER SENT TO COMPLAINANT (COPY ATTACHED):__________________________________

DATE FINAL LETTER SENT TO COMPLAINANT (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)

RIO MESA SOLAR ELECTRIC GENERATING FACILITY (11-AFC-4)
PRELIMINARY STAFF ASSESSMENT – Part A
PREPARATION TEAM

Executive Summary .... Pierre Martinez, AICP

Introduction .... Pierre Martinez, AICP

Project Description .... Pierre Martinez, AICP

Environmental Assessment

Air Quality .... Wenjun Qian, Ph.D. and David Vidaver

~~Biological Resources ....~~

~~Cultural Resources ....~~

Hazardous Materials Management .... Geoff Lesh, PE and Rick Tyler

~~Land Use...~~

Noise and Vibration .... Shahab Khoshmashrab

Public Health .... Huei-An (Ann) Chu, Ph.D.

Socioeconomics .... James Adams

Water Supply……………………………… Christopher Dennis, CHG and Abdel-Karim Abulaban, P.E.

Soil and Surface Water .... Abdel-Karim Abulaban, P.E.

Traffic and Transportation .... Andrea Koch and Gregg Irvin, Ph.D.

Transmission Line Safety and Nuisance .... Obed Odoemelam, Ph.D.

Visual Resources .... William Kanemoto and Gregg Irvin, Ph.D.

Waste Management .... Ellie Townsend-Hough, REA

Worker Safety and Fire Protection .... Geoff Lesh, P.E. and Rick Tyler

Engineering Assessment

Facility Design .... Shahab Khoshmashrab

Geology and Paleontology .... Casey Weaver, CEG

Power Plant Efficiency .... Edward Brady

Power Plant Reliability .... Edward Brady and Shahab Khoshmashrab

Transmission System Engineering .... Laiping Ng and Mark Hesters

~~Alternatives...~~

General Conditions .... Christine Stora

Project Assistant…………………………………………………………… Alicia Campos

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 RIO MESA SOLAR ELECTRIC GENERATING FACILITY

DOCKET NO. 11-AFC-04
PROOF OF SERVICE
(Revised 8/14/12)

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DECLARATION OF SERVICE

I, Alicia Campos, declare that on September 28, 2012, I served and filed a copy of the attached document Preliminary Staff Assessment – Part A dated September 28, 2012. This document is accompanied by the most recent Proof of Service list, located on the web page for this project at: http://www.energy.ca.gov/sitingcases/riomesa/index.html.

The document has been sent to the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit or Chief Counsel, as appropriate, in the following manner:

(*Check all that Apply*)

For service to all other parties:

_X_ Served electronically to all e-mail addresses on the Proof of Service list;

____ Served by delivering on this date, either personally, or for mailing with the U.S. 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 mailing on that date to those addresses marked *"**hard copy required**" or where no e-mail address is provided.

AND

For filing with the Docket Unit at the Energy Commission:

_X_ by sending electronic copies to the e-mail address below (preferred method); *OR*

____ by depositing an original and 12 paper copies in the mail with the U.S. Postal Service with first class postage thereon fully prepaid, as follows:

CALIFORNIA ENERGY COMMISSION – DOCKET UNIT
Attn: Docket No. 11-AFC-04
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.ca.gov

OR, if filing a Petition for Reconsideration of Decision or Order pursuant to Title 20, § 1720:

____ Served by delivering on this date one electronic copy by e-mail, and an original paper copy to the Chief Counsel at the following address, either personally, or for mailing with the U.S. Postal Service with first class postage thereon fully prepaid:

California Energy Commission
Michael J. Levy, Chief Counsel
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I declare under penalty of perjury under the laws of the State of California 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.

Originally Signed By:
Alicia Campos
Siting, Transmission and Environmental Protection Division

*indicates change