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TRAFFIC AND TRANSPORTATION

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SUMMARY OF CONCLUSIONS

This section of the Final Staff Assessment (FSA) analyzes the potential effects on traffic and transportation that would occur from the construction and operation of the proposed Hidden Hills Solar Electric Generating System Project (referred to as HHSEGS or proposed project). California Energy Commission staff has analyzed the traffic-related information provided in the Application for Certification (AFC) and acquired from other sources to determine the potential for the Hidden Hills Solar Electric Generating System Project to have significant adverse traffic and transportation-related impacts. Staff has also assessed the availability of mitigation measures that could reduce or eliminate the significance of these impacts.

On October 1, 2012, Hidden Hills Solar I, LLC and Hidden Hills Solar II, LLC submitted an Updated Workforce Analysis identifying new commute assumptions; a new peak month; an increase of the peak construction workforce and an increase in the construction workforce traffic that would utilize State Route 127 within both Inyo County and San Bernardino County, California. Staff has incorporated the revised data and proposes revised conditions of certification.

As currently proposed, construction and operation of the Hidden Hills Solar Electric Generating System Project has the potential to cause significant impacts to ground traffic and aviation. 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. Staff concludes that with implementation of proposed Conditions of Certification **TRANS-1** through **TRANS-8**, the proposed project would not cause significant impacts to traffic and transportation. Staff concludes that glint and glare effects from a traffic and transportation perspective would be less than significant with implementation of staff's proposed Condition of Certification **TRANS-8**.

INTRODUCTION

In compliance with the California Environmental Quality Act (CEQA) and Energy Commission requirements, this traffic and transportation analysis identifies the HHSEGS's potential impacts to the surrounding transportation systems and proposed conditions of certification that would avoid or lessen these impacts. It also addresses the project's consistency with applicable federal, state, and local transportation-related laws, ordinances, regulations, and standards (LORS).

The proposed project is located in Inyo County, California, along the California-Nevada border. The transmission and natural gas pipeline alignments would be located in the State of Nevada, primarily on federal land managed by the U.S. Bureau of Land Management (BLM), except for small segments of the transmission lines for both options in the vicinity of the Eldorado Substation, which would be located within Boulder

City, Nevada. Because the proposed facilities would be located on public land managed by BLM, the Valley Electric Association Hidden Hills Transmission Project (VEAHHTP) is considered a federal action requiring review under and compliance with the National Environmental Policy Act (NEPA).

A Draft Environmental Impact Statement (DEIS) of the transmission and natural gas pipeline alignments will be prepared by BLM. ¹Therefore, staff has not addressed the direct impacts of the project’s transmission line and natural gas pipeline on transportation systems within the State of Nevada.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Traffic and Transportation Table 1 provides a general description of adopted federal, state, and local LORS pertaining to traffic and transportation that apply to this project.

**TRAFFIC AND TRANSPORTATION Table 1
Laws, Ordinances, Regulations, and Standards**

Applicable Law	Description
Federal	
Code of Federal Regulations (CFR) Title 14, Aeronautics and Space, Part 77 – Objects Affecting Navigable Airspace 77.13	This regulation requires the project owner to notify the Federal Aviation Administration (FAA) of construction structures with a height greater than 200 feet from grade or greater than an imaginary surface extending outward and upward at a slope of 100 to 1 for a horizontal distance of 20,000 feet from the nearest point of the nearest runway of an airport with at least one runway more than 3,200 feet in length
Code of Federal Regulations (CFR) Title 49 Subtitle B, Parts 171-173, 177-178, 350-359, 397.9 and Appendices A-G	Addresses safety considerations for the transport of goods, materials and substances. Governs the transportation of hazardous materials including types of materials and marking of the transportation vehicles.
State	
California Vehicle Code, sections 13369, 15275, 15278	Requires licensing of drivers and the classification of license for the operation of particular types of vehicles. A commercial driver’s license is required to operate commercial vehicles. An endorsement issued by the Department of Motor Vehicles (DMV) is required to drive any commercial vehicle identified in section 15278.
California Vehicle Code, sections 31303-31309	Requires transportation of hazardous materials to be on the state or interstate that offers the shortest overall transit time possible.
California Vehicle Code, sections 31600-31620	Regulates the transportation of explosive materials.
California Vehicle Code, sections 32100-32109	Requires shippers of inhalation hazards in bulk packaging to comply with rigorous equipment standards, inspection requirements, and route restrictions.
California Vehicle Code, sections 34000-34100	Establishes special requirements for vehicles having a cargo tank and for hazardous waste transport vehicles and containers, as defined in section 25167.4 of the Health and Safety Code.
California Vehicle Code, section 35550-35551	Provides weight guidelines and restrictions vehicles traveling on freeways and highways.

¹ On October 11, 2011, BLM published a Notice of Intent to prepare an Environmental Impact Statement (EIS) for the proposed Valley Electric Association Hidden Hills Transmission Project (NVN-089669), Clark and Nye Counties, Nevada in the *Federal Register – Volume 76, Number 196*.

Applicable Law	Description
California Vehicle Code, section 35780	Requires a single-trip transportation permit to transport oversized or excessive loads over state highways.
California Health and Safety Code, section 25160	Addresses the safe transport of hazardous materials.
Nevada Administrative Code – Hazardous Materials, Chapter 459, section 459.9785	Lists prerequisites to transportation of hazardous materials for which federal safety permit is required.
Nevada Administrative Code – Hazardous Materials, Chapter 459, section 459.986	Requires Inspection of vehicles; verification of drivers' qualifications.
Nevada Administrative Code-Traffic Laws, section 484.500	Requires a transportation permit for the operation of an oversized or overweight vehicle to travel a determined route with a designated load for a designated period.
Local	
Inyo County Regional Transportation Plan	The Inyo County Regional Transportation Plan, adopted April 22, 2009 by the Inyo County Local Transportation Commission, serves as the planning blueprint to guide transportation investments in the County involving local, state, and federal funding over the next twenty years.
Inyo County Regional Transportation Plan: Goal 2: A Transportation system which is safe, efficient and comfortable which meets the needs of people and goods and enhances the lifestyle of the county's residents.	Objective 2.1: Maintain and Improve Roadway Level of Service – Maintain or improve existing Level of Service on roadways within the county. Policy 2.2.1: Proper access – Provide proper access to residential, commercial and industrial areas.
Inyo County Regional Transportation Plan: Goal 3: Maintain adequate capacity on State Routes (SR's) and Local Routes in and Surrounding Inyo County and the City of Bishop.	Objective 3.3: Improve County routes. Policy 3.3.1: Support roadway improvements to optimize public safety – Improve county roads through specific safety improvements and maintenance.
Inyo County General Plan Circulation Element – Section 7	The Circulation Element, approved by the Inyo County Board of Supervisors on December 11, 2001, addresses the movement of people, products and materials using a variety of conveyances, from roads to railroads, bicycle paths to transmission lines. The Circulation Element presents goals, policies and implementation measures for roadways and highways; scenic highways; public transportation; bicycles and trails; railroads; aviation; canals, pipelines and transmission cables; parking and information technology/telecommuting.
Section 7.2.4 Roadways and Highways - Policy RH-1.4 Level of Service.	Maintain a minimum of Level of Service (LOS) "C" on all roadways in the County of Inyo. For highways within the County of Inyo, LOS "C" should be maintained except where roadways expansion or reconfigurations will adversely impact the small community character and economic viability of designated Central Business Districts.
Section 7.2.4 Roadways and Highways Policy RH-1.5 Proper Access.	Provide proper access to residential, commercial and industrial uses.
Section 7.2.4 Roadways and Highways Policy RH-1.6 Minimize Environmental Impacts.	Ensure that all transportation projects minimize adverse effects on the environment of the County.

Applicable Law	Description
<p>County of San Bernardino General Plan – Section IV - Circulation and Infrastructure Element – Desert Region Goals and Policies of the Circulation and Infrastructure Element - Goal D/CI 1 – Ensure a safe and effective transportation system that provides adequate traffic movement while preserving the rural desert character of the region.</p>	<p>Policy D/CI 1.14 – The County should implement a traffic evaluation and monitoring program as follows:</p> <p>a. The following evaluation and monitoring program/criteria may be used to determine changes in the traffic level of service and the potential changes that may be caused by development within the project area. The program/criteria outlines below may also be used as guidelines for evaluating traffic changes and the level of service on project area roads:</p> <p>v. Unsignalized intersection mitigation may be required if the unsignalized intersection level of service, as defined in the 1985 Highway Capacity Manual, decreases one level of service to LOS B on the major, nonstopped street. Mitigation may also be required if the level of service on the minor, stopped street decreases two levels of service or drops below LOS C in accordance with the 1985 Highway Manual.</p>

PROJECT DESCRIPTION

HHSEGS would comprise of two solar fields and associated facilities: the northern solar plant (Solar Plant 1) and the southern solar plant (Solar Plant 2). Each solar plant would generate 270 megawatts (MW) gross (250 MW net), for a total net output of 500 MW. Solar Plant 1 would occupy approximately 1,483 acres (2.3 square miles), and Solar Plant 2 would occupy approximately 1,510 acres (2.4 square miles). Refer to Figure 2.2-R1- Power Block Plot Plan (CH2 2012d).

A 103-acre common area would be established on the southeastern corner of the site to accommodate an administration building; warehouse; maintenance complex; an onsite 138kV switchyard and a natural gas metering station; asphalt-paved visitor and employee parking; landscape areas; temporary construction parking; construction trailers; a tire cleaning station and other construction support facilities (HHSG 2011a Figure 2.1-3 Site Plan of Common Area).

A 180-acre temporary construction laydown area would be located on the west side of the site and would be utilized for equipment laydown; construction parking; construction trailers; a tire cleaning station; heliostat assembly buildings and other construction support facilities.

Transmission Lines

The HHSEGS would interconnect to the Valley Electric Association (VEA) system². The interconnection would require an approximately ten mile long generation tie-line (gen-tie line) from the HHSEGS site to the proposed Crazy Eyes Tap Substation³, where the project would interconnect to the VEA electric grid. The gen-tie line would originate at

² In January 2013, VEA will become a participating transmission owner (PTO) and will turn operational control of its facilities over to the California Independent System Operator.

³ In the HHSEGS Application for Certification (AFC), this substation was referred to as the Tap Substation.

the HHSEG's onsite switchyard, cross the state line, avoiding the mesquite vegetation to the south, and continue east for approximately 1.5 miles until reaching Tecopa Road.⁴ At Tecopa Road, the route would head northwest paralleling Tecopa Road until it reaches the Crazy Eyes Tap Substation, which would be located immediately east of the Tecopa Road/State Route 160 intersection. The Crazy Eyes Tap Substation would interconnect to the existing VEA Pahrump-Bob Tap 230kV line.

Natural Gas Pipeline

A 12-inch diameter natural gas pipeline would be required for the HHSEGS project. Kern River Gas Transmission Company (KRG T) proposes to construct the pipeline from the HHSEGS meter station, to be located in the HHSEGS Common Area, extending 32.4 miles to KRG T's existing mainline system north of Goodsprings in Clark County, Nevada.

SETTING

The proposed HHSEGS would be located on approximately 3,277⁵ acres of privately-owned land, leased in unincorporated southeastern Inyo County. The project site is triangular in shape and is bounded by the paved Old Spanish Trail Highway to the south, unpaved Quartz Street to the west, the California-Nevada border to the east, and an unpaved road along the northern border. Refer to Vicinity Map, Figure 2.1-1 (HHSG 2011a).

The project area in the vicinity of the HHSEGS site is sparsely populated. The following communities are within close proximity to the project site:

- The Town of Pahrump, Nevada, is located approximately 8 miles north (with a driving distance of approximately 28 miles via Old Spanish Trail Highway and State of Nevada Route 160) of the project site;
- The community of Sandy Valley, Nevada is approximately 19 miles to the southeast;
- The community of Tecopa, California is approximately 21 miles southwest;
- The city of Las Vegas, Nevada, is approximately 45 miles east of the project site; and
- The city of Los Angeles, California is approximately 180 miles southwest.

The project site and the surrounding private lands are characterized by a grid pattern of unpaved roads that were established when the area was subdivided in the 1960s for residential development. **Traffic and Transportation Figure 6** depicts the grid pattern of roads within the project area. Although the residential development was not constructed, the grid pattern roadways remain. This grid pattern also extends into the area of developed private land to the south of the project site and Old Spanish Trail

⁴ The road is also referenced as Old Spanish Trail Highway. Both names – Tecopa Road and Old Spanish Trail Highway are generally used interchangeably.

⁵ This number consists of Solar Plant 1 (1,483 acres); Solar Plant 2 (1,510 acres); Administration/Warehouse (4.8 acres); Substation (3.0 acres); Gas Metering Station (0.7 acre); Remaining construction area (94.5 acres) and the construction laydown area (180 acres).

Highway. Inyo County, in previous correspondence regarding County land use and planning issues (INYO 2012c) and the Preliminary Staff Assessment (PSA) comments (INYO 2012j) has stated to accommodate HHSEGS, the roads north of Old Spanish Trail Highway that crisscross the proposed project site would have to be abandoned.

Regional vehicular access to the project site would be provided by: Interstate 15 within the State of California and the State of Nevada; State Route 127 within the State of California⁶ and State Route 160 within the State of Nevada⁷. **Traffic and Transportation Figure 1** depicts the regional street network surrounding the project site.

Primary access to the project site would be from the Old Spanish Trail Highway to the project entrance road on the east side of the project. Secondary access would also be from Old Spanish Trail Highway along the west side of HHSEGS, then along the paved road between the two solar plants. The internal roadway and utility corridors for each heliostat field and its power block would contain a 20-foot-wide paved or hardscape access roads from the entrance of the solar plant site to the power block, and then around the power block. **Traffic and Transportation Figure 2** depicts the access roads and internal roadways.

Within the heliostat fields, 20-foot wide “drive zones”⁸ would be located concentrically around the power block to provide access to the heliostat mirrors for maintenance and cleaning. The drive zones would be located approximately 152 feet apart and would be grubbed to remove vegetation and smoothed. A 12-foot-wide unpaved path would be constructed on the inside perimeter of the project boundary fence for use by HHSEGS personnel to monitor and maintain perimeter security and tortoise exclusion fencing. These paths would also be grubbed, bladed, and smoothed to facilitate safe use with minimal grading where necessary to cross washes.

CRITICAL ROADS AND FREEWAYS

The transportation network within the project area consists primarily of local roadways that are generally rural in nature with limited access and state-maintained freeways.

Travel in Inyo County is primarily by automobile due to the rural nature of the local communities, low development densities, and limited options for using alternative modes of travel. The roadway network serving Inyo County is comprised of

⁶ State Route 127 traverses through San Bernardino and Inyo County, State of California.

⁷ State Route 160 traverses through Clark County and Nye County, State of Nevada.

⁸ The AFC Project Description Section describes that within the heliostat fields, 20-foot wide “drive zones” would be located concentrically around the power block to provide access to the heliostat mirrors for maintenance and cleaning. The Soils & Surface Water Section of this FSA, however, states these concentric drive zones would be 10-foot wide roads based on the Applicant’s Post-Construction Hydrologic and Hydraulic Analysis and the Preliminary Draft Construction Drainage, Erosion and Sedimentation Control Plan/Stormwater Pollution Prevention Plan – Appendix 5.15A – Civil Overall Site Plan – C-1000. Refer to the Soils & Surface Water section for additional information. However, whether these “drive zones” are 10 feet wide or 20 feet wide does not affect the proposed Findings of Fact for this Traffic and Transportation analysis.

approximately 3,520 miles of streets, roads, and highways. Many existing county roads and city streets have extremely light use, and many roads receive only minimal or emergency maintenance because of funding constraints (ICRTP 2009).

The construction workforce travel that would occur within San Bernardino County would also be primarily by automobile due to the sheer size of the County⁹. The roadway network serving San Bernardino County is comprised of approximately 10,000 miles of roads falling within oversight of three governmental agencies responsible for the construction and maintenance of the roadway infrastructure. The California Department of Transportation (Caltrans) is responsible for maintaining approximately 1,240 miles of roadway throughout the County. This total includes six federal (Interstate) freeways, two federal (U.S.) highways, and 18 state highways. The San Bernardino County Department of Public Works is responsible for maintaining approximately 2,830 miles of both paved and unpaved roadways primarily located in unincorporated areas of the County. These facilities range in classification from major arterial highways to local streets. The remaining 5,930 miles of roadways within San Bernardino County fall under the jurisdiction of the numerous incorporated municipalities located across the County (CSB 2007).

Existing Regional and Local Transportation Facilities

Traffic and Transportation Figures 1 and 3 shows the regional transportation setting and the local transportation features as described in the Application for Certification (AFC) and the Updated Workforce Analysis (UWA). The following information about critical roadways is based on the Traffic and Transportation section of the AFC (HHS 2011a); UWA (CH2 2012jj) as well as traffic data from the California Department of Transportation (Caltrans); Inyo County Public Works Department; County of San Bernardino Department of Public Works and the State of Nevada Department of Transportation (NDOT).

Interstate 15

Interstate 15 (I-15) is located to the southeast of HHSEGS and crosses into the State of Nevada (from San Bernardino County) approximately 37 miles southeast of the project site.

I-15 is a north-south highway that extends more than 1,470 miles through the states of California, Nevada, Arizona, Utah, Idaho and Montana. This highway's southern terminus is in San Diego, California. The northern terminus is in Sweetgrass, Montana at the international border between the United States and Canada, where it becomes Alberta Highway 4. I-15 is predominately an eight-lane freeway at the south end in San Diego. Between Escondido (San Diego County) and I-40 in Barstow (San Bernardino County) a distance of 156 miles, I-15 is a six to eight lane freeway. North from Barstow I-15 is primarily a rural four-lane freeway that continues into the State of Nevada.

The majority of the I-15 through Nevada is a six lane freeway from Primm to the I-215 Beltway around Las Vegas. Between the Southern Beltway (I-215) and the I-15/US 93

⁹ San Bernardino County is the largest County in the United States with a land area of 20,106 square miles and is divided into three planning areas – Valley Planning Region; Mountain Planning Region and Desert Planning Region (CSB 2007).

(Spaghetti Bowl) interchange at the north end of the Las Vegas urban area, I-15 becomes four lanes. The freeway continues to the northeast towards Arizona (I-15 CSMP 2011). According to the California Department of Transportation (Caltrans) 2008 average annual daily traffic (AADT)¹⁰ counts, I-15 at the Nevada State line¹¹ carried approximately 37,000 vehicles. According to the Nevada Department of Transportation (NDOT) 2008 average annual daily counts I-15 at the north bound on-ramp of the Blue Diamond Interchange “Exit 33” carried approximately 20,000¹² vehicles. **Traffic and Transportation Figure 4** depicts the street network ADT.

State Route 160

State Route 160 (SR 160) is located approximately 10 miles east of the project site and connects to HHSEGS via the Old Spanish Trail Highway. Due to the limited number of interchanges off SR 160 in the vicinity of HHSEGS, access to the project site is provided only from the SR 160/Old Spanish Trail Highway intersection, which can be accessed by both eastbound and westbound traffic. SR 160 is an east-west highway that connects the southern Las Vegas Valley to U.S. Route 95 northwest of Las Vegas via the Pahrump Valley.

The highway is known as Blue Diamond Road within the Las Vegas area and the Pahrump Valley Highway for the remainder of the route. Near the project site, SR-160 is a divided highway with two lanes in each direction, shoulders, and a Class II bike lane.

The intersection at SR 160/Old Spanish Trail Highway is a T-intersection¹³, with a stop-sign on Old Spanish Trail Highway. A separate westbound left turn lane is provided on SR 160. According to the 2008 Nevada Department of Transportation traffic counts, SR 160 carried approximately 8,900¹⁴ vehicles west of the Old Spanish Trail Highway turnoff and approximately 40,000¹⁵ vehicles at .3 miles north of Dean Martin Road. **Traffic and Transportation Figure 4** depicts the street network ADT.

¹⁰The California Department of Transportation (Caltrans), Traffic and Vehicle Data Systems Unit, defines AADT as “Annual average daily traffic is the total volume for the year divided by 365 days. The traffic count year is from October 1st through September 30th. Very few locations in California are actually counted continuously. Traffic Counting is generally performed by electronic counting instruments moved from locations throughout the State in a program of continuous traffic count sampling. The resulting counts are adjusted to an estimate of annual average daily traffic by compensating for seasonal influence, weekly variation and other variables which may be present. Annual ADT is necessary for presenting a statewide picture of traffic flow, evaluating traffic trends, computing accident rates, planning and designing highways and other purposes.”

¹¹ The California Department of Transportation (Caltrans) Postmile 186.238.

¹² The Nevada Department of Transportation Traffic Count Stations – Station Number 0030040.

¹³ A juncture where a minor road connects to a larger road and forms the shape of the letter T.

¹⁴ The State of Nevada Department of Transportation Traffic Count Stations – Station Number 0033180.

¹⁵ The State of Nevada Department of Transportation Traffic Count Stations – Station Number 0030044.

State Route 127¹⁶

State Route 127 (SR 127), also known as Death Valley Road, is a paved two-lane conventional highway¹⁷ that traverses southeast Inyo County. The route is part of the Interregional Road System (IRRS) connecting southern California to Nevada and other rural highways. SR 127 is the closest major facility to the project site that connects to I-15 to the south of HHSEGS. SR 127 is classified as a Class II Highway¹⁸, originates in San Bernardino County at Interstate 15 in Baker, San Bernardino County and terminates at the California/Nevada border where it converts to Nevada State Route 373 (CDOT 2011).

SR 127 is 91.03 miles and divided into four segments. **Traffic and Transportation Figure 8** depicts the four segments. Segment 1 (41.61 miles) begins at the interchange of I-15 at the 127/15 Separation Bridge¹⁹ in the Community of Baker (San Bernardino County) and ends at the San Bernardino County line. In the Community of Baker speed limits range from 25 mph to 45 mph. From north of Baker, the speed limit is 55 mph. Segment 2 (16.43 miles) begins on the San Bernardino/Inyo County Line and ends at SR 178 West, the Jubilee Pass entrance to the Death Valley National Park (DVNP). Speed limits range from 35 mph in the Community of Shoshone to 65 mph outside of Shoshone. This Segment provides access to SR 178 East, also known as the Charles Brown Highway.

Segment 3 (25.72 miles) begins at SR 178 West, the Jubilee Pass entrance to DVNP and ends at its junction with SR 190, Death Valley Junction. Speed limits range from 35 mph to 65 mph. Segment 4 (7.27 miles) begins at the junction with SR 190, Death Valley Junction and ends at the California/Nevada State Line. Speed limits range from 55 mph to 65 mph. The unpaved shoulders vary in width from 0 to ten feet the length of SR 127 (CDOT 2011). SR 127 intersects Old Spanish Trail Highway approximately 50 miles north of I-15 and continues along the eastern edge of Death Valley and eventually terminates at the California /Nevada border, where State Route 373 begins. (HHSG 2011a, Page 5.12-10).

¹⁶ State Route 127 is codified in the California Streets and Highways Code, Division 1, Chapter 2, Article 3, Section 427 "Route 127 is from Route 15 near Baker to the Nevada state line via the vicinity of Death Valley Junction."

¹⁷ The California Department of Transportation (Caltrans), State Route 127 Transportation Concept Report (published October 2011) defines conventional highway as "A highway without controlled access. Grade separations at intersections and access control may be used when justified."

¹⁸ The Highway Capacity Manual 2010 defines Class II as "Class II two-lane highways where motorists do not necessarily expect to travel at high speeds. Two-lane highways functioning as access routes to Class I facilities, serving as scenic or recreational routes (and not as primary arterials), or passing through rugged terrain (where high-speed operations would be impossible) are assigned to Class II. Class II facilities most often serve relatively short trips, the beginning or ending portions of longer trips, or trips for which sightseeing plays a significant role."

¹⁹ Bridge number 54.0610 built in 1965; Postmile L000.01; Structure Type: Steel and stringer/Multi-beam or Girder; Bridge Length 74.1 meters (243 feet); Width: 10.4 meters (34.12 feet); Permit Rating: Purple permit capacity (CDOT 2012).

According to the California Department of Transportation (Caltrans) 2008 average annual daily traffic (AADT) counts²⁰, SR 127 carried approximately 780 vehicles south of the SR-127/Old Spanish Trail Highway intersection.

Old Spanish Trail Highway²¹/Tecopa Road

Old Spanish Trail Highway, also referenced as Tecopa Road, is a paved two-lane north south road approximately 39 miles long connecting SR 127 in California (Inyo County) to State Route 160 in the State of Nevada. Primary access to the project site would be from Old Spanish Trail Highway to the project entrance road on the east side of the project. The majority of the project traffic would travel through the Old Spanish Trail Highway/SR 160 intersection located in the State of Nevada to access the regional road network. The existing paved width for this roadway is approximately 22 feet (INYO 2012b). The posted speed limit is 55 mph and the roadway lacks bicycle or pedestrian lanes.

According to the Inyo County Public Works Department 2007 average daily traffic counts (ADT), Old Spanish Trail Highway²² carried an average of approximately 258 vehicles traveling west and 275 vehicles traveling east a day in 2007.

Baker Boulevard

Baker Boulevard²³ is a paved two-lane, major collector road located in the Community of Baker, in San Bernardino County. The road is accessed by the northbound and southbound traffic from the I-15 Death Valley/Kelbaker Road Interchange²⁴. The road runs parallel to I-15 and is approximately 2.6 miles long. Baker Boulevard intersects SR 127 approximately 1,600 feet from the northbound offramp and approximately 305 feet from the southbound offramp. The intersection of SR 127/Baker Boulevard is controlled by a four way stop sign.

According to the County of San Bernardino Department of Public Works 2012 Average Daily Counts (ADT) Baker Boulevard carried an average of 5,541 vehicles west of SR 127 and 7,829 vehicles east of SR 127 (CSB 2012).

Level of Service

When evaluating the project-related impacts on the local transportation system, staff bases its analysis on Level of Service (LOS) determinations. Level of service is a

²⁰ The California Department of Transportation (Caltrans) Postmile 6.510.

²¹ The Old Spanish Trail Highway is not the same infrastructure as the Old Spanish Trail. As discussed in the Cultural Resources Section "The Old Spanish Trail Recognition Act of 2002 (Act) defines the trail as "an approximately 2,700 mile long trail extending from Santa Fe, New Mexico, to Los Angeles, California, that served as a major trade route between 1829 and 1848...including the Armijo Route, Northern Route, North Branch, and Mojave Road" and refers to maps in the 'Old Spanish Trail National Historic Trail Feasibility Study', dated July 2001, (16 USC 1241). The Old Spanish Trail-Mormon Road, as documented by the Act, is located on the south side and just outside of the project site."

²² The location of the traffic count was approximately .2 miles west of the State of Nevada line.

²³ The County of San Bernardino, Department of Public Works, identifies Baker Boulevard as Road Number 150500.

²⁴ Exit Number 246 as assigned by the Department of Transportation (Caltrans), California Numbered Exit Uniform System (Cal-NEXUS).

generally accepted measure used by traffic engineers, planners, and decision-makers to describe and quantify the congestion level on a particular roadway or intersection in terms of speed, travel time, and delay.

The Highway Capacity Manual 2010, includes six levels of service for roadways or intersections ranging from LOS A - the best operating conditions - to LOS F - the worst, most congested operating conditions.

To quantify the existing baseline traffic conditions, the study area state highways, roadways, and intersections were analyzed in the AFC to determine their operating conditions. Based on the traffic volumes, the turning movement counts, and the existing number of lanes at each intersection, the LOS) have been determined for each intersection.

LOS is a qualitative measure describing operational conditions within a traffic stream. It is used to describe and quantify the congestion level on a particular roadway or intersection and generally describes these conditions in terms of such factors as speed or vehicle movement. **Traffic and Transportation Table 2** summarizes intersections LOS criteria based on seconds of delay.

**Traffic and Transportation Table 2
Level of Service Criteria for Intersections**

Level of Service	Control Delay (seconds/vehicles)	Description
A	≤10	Free flow; insignificant delays
B	>10 and <15	Stable operation; minimal delays
C	>15 and <25	Stable operation; acceptable delays
D	>25 and <35	Approaching unstable flow; queues develop rapidly but no excessive delays
E	>35 and <50	Unstable operation; significant delays
F	>50	Forced flow; jammed conditions

Source: Transportation Research Board, 2010, Highway Capacity Manual

Current Roadway Segment Conditions - Level of Service

Level of service standards for the roadways in the vicinity of the HHSEGS project are established by and under the jurisdiction of the County of Inyo; County of San Bernardino and the California Department of Transportation. Staff used the County of Inyo and County of San Bernardino LOS standards to evaluate potential HHSEGS generated traffic impacts. The following is a list of the applicable California Department of Transportation, Inyo County and San Bernardino County LOS standards.

The LOS for the State of Nevada I-15 segment and SR 160 are established by the State of Nevada. Information regarding the LOS for Clark and Nye counties has also been included.

In the State of California, volumes of traffic are measured in terms of peak hour estimates for actual vehicles and annual average daily traffic (AADT) for both lanes of travel (i.e., ahead and back). The State of Nevada published AADT numbers do not differentiate between travel directions, or do they record specific numbers for peak travel times.

State of California

California Department of Transportation-The State Route 127 Transportation Concept Report²⁵ (TCR) is a long range planning document that describes the current characteristics of the SR 127 transportation corridor and establishes a twenty-year planning concept. The TCR defines the California Department of Transportation (Caltrans) goals for the development of the corridor in terms of facility type and Level of Service (LOS), while broadly identifying the improvements needed to reach those goals.

The TCR covers the 91.03 miles of SR 127 addressed in the four segments. **Traffic and Transportation Figure 8** depicts the four segments. The AADT varies along the route from 255 to 1,050 vehicles. Truck traffic and recreational vehicles make up approximately 12 percent of AADT. The Concept LOS for SR 127 for all four segments is LOS C. The SR 127/Old Spanish Trail Highway intersection falls within Segment 2 which is currently operating at LOS A. Segments 1, 3 and 4 are also currently operating at LOS A (CDOT 2011).

Inyo County - The Inyo County General Plan - Circulation Element Policy RH-1.4, Level of Service, requires a minimum of "Level of Service (LOS)²⁶ C" be maintained on all roadways in the County of Inyo. For highways within the County of Inyo, LOS "C" should be maintained except where roadways expansion or reconfigurations will adversely impact the small community character and economic viability of designated Central Business Districts.

San Bernardino County – Where Baker Boulevard, a County roadway, intersects SR 127, the County of San Bernardino accepts the Department of Transportation (Caltrans) criteria, which is a delay of no more than 45 seconds (LOS E)(CEC 2012II).

State of Nevada

Nevada Department of Transportation (NDOT) - The minimum LOS for SR 160 is LOS C (CEC 2012v).

Clark County – The Clark County Transportation Element²⁷ is intended to provide information to the public on future transportation needs in the context of projected growth and development. The transportation goals and policies are grouped into six subject areas: Public Process; Connecting Land Use; Access and Safety; Protecting the Environment; Designing the Transportation System; Implementing the Transportation System.

²⁵ Published October 2011 by California Department of Transportation (Caltrans) District 9, System Planning.

²⁶ Inyo County defines Level of Service (LOS) as "A method to describe how well a roadway is operating. Based on a roadway's volume to capacity (V/C) ratio, a letter designation is assigned that represents the traffic flow conditions. The letter designations A through F represent progressively declining conditions, with A indicating excellent maneuverability and stable speeds and F indicating a breakdown of flow and unstable, erratic speeds".

²⁷ Adopted by the Clark County Board of County Commissioners on July 16, 2003; Last Amendment December 3, 2008.

Policy T-5.3 of the *Designing the Transportation System Goal* requires “Level of Service (LOS) D should be the design objective for non-residential local, collector and arterial streets. LOS C should be the design objective for residential local, collector and arterial streets. The design year to be used by all developers should be the build-out year of the development’s final phase” (CCTE 2008).

Nye County – The Streets and Highways Capital Improvement Plan²⁸ (CIP) FY 2006-2015 evaluates the existing transportation infrastructure and provides planning for Nye County residents to satisfy the local and regional mobility needs. The plan addresses both the improvement of existing streets as well as the construction of new roadways designed to accommodate future traffic from existing and proposed development.

The majority of the existing roadways consist of two lane rural streets. The existing capacity of the identified arterial roadways slated for improvements operate below capacity, at LOS A, B and C. In addition, no roadway improvements were identified in and around HHSEGS project area (SHCIP 2005).

Traffic and Transportation Table 3 includes information regarding the existing LOS for the potentially affected intersections in the project area. The AFC and PSA analyzed the SR 160/Old Spanish Trail Highway intersection located within the State of Nevada as it was assumed approximately 95 percent of the project traffic (100% truck-trips and 95% automobiles) would use this intersection to access HHSEGS.

The UWA, however, has identified two additional potentially affected intersections located within the State of California: SR 127/Old Spanish Trail Highway located in Inyo County and SR 127/Baker Boulevard located in San Bernardino County. **Traffic and Transportation Figure 3** depicts SR 160/Old Spanish Trail Highway and the two additional intersections of SR 127/Old Spanish Trail Highway and SR 127/Baker Boulevard.

LOS A represents free-flowing traffic; whereas LOS F represents slow-moving or stalled traffic (overcapacity operation). The SR 160/Old Spanish Trail Highway intersection (State of Nevada) currently operates at LOS A; the SR 127/Old Spanish Trail Highway intersection (Inyo County, California) currently operates at LOS A (LOS B for the PM peak hour westbound right) and SR 127/Baker Boulevard (San Bernardino County) currently operate at LOS A (LOS B for the PM peak hour).

²⁸ Approved by the Pahrump Regional Planning District July 20, 2005.

**Traffic and Transportation Table 3
Existing Intersection Level of Service
State of Nevada and State of California**

Intersection	Approach/Movement	Existing Conditions			
		AM Peak Hour		PM Peak Hour	
SR 160/Old Spanish Trail Highway (State of Nevada)	Northbound left/right	9.3 ¹	A	9.7 ¹	A
	Westbound left	8.1 ¹	A	7.9 ¹	A
SR 127/Old Spanish Trail Highway (State of California, Inyo County)	Southbound left	7.4 ²	A	7.4 ²	A
	Westbound left	9.4 ²	A	9.4 ²	A
	Westbound right	8.8 ²	A	8.8 ²	B
SR 127/Baker Boulevard (State of California, San Bernardino County)	Eastbound	7.6 ³	A	10.2 ³	B
	Westbound	8.4 ³	A	10.7 ³	B
	Northbound	8.2 ²	A	12.0 ²	B
	Southbound	8.2 ²	A	10.1	B

Source: Hidden Hills Solar Electric Generating System Application for Certification, Table 5.12-3; Updated Workforce Analysis Table 5.12-3R1 and Technical Memorandum Table 2 (CH2 2012rr).

1 - The intersection level of service (LOS) was calculated using the Highway Capacity Software (HCS+ McTrans, version 5.21). Since the focus of the analysis was on unsignalized intersections, the LOS was determined using seconds of delay (CEC 2012n).

2 - The intersection level of service (LOS) was calculated using the Highway Capacity Software (HCS+ McTrans, version 5.5).

3 - The intersection level of service (LOS) was calculated using Synchro (Version 8.0)(CH2 2012rr).

PUBLIC TRANSPORTATION

Public transportation consists of bus service, bicycle and pedestrian facilities, airports and rail service. Information about these forms of public transportation follows.

Bus Service

The Eastern Sierra Transit Authority (ESTA) provides public transit service for Inyo and Mono Counties. ESTA began operating transit services on July 1, 2007, assuming control of all the services, staff and capital formerly known as Inyo Mono Transit. The ESTA provides four types of mass transit services to the region: Fixed Routes, Seasonal, Dial-a-Ride and Vanpool.

The nearest transit line to the project site is the Tecopa-Pahrump Fixed Route²⁹ which provides services to the Tecopa Senior Center, Shoshone Medical Center and the Pahrump Walmart. The Tecopa-Pahrump bus operates the first Thursday after the 3rd calendar day of the month and two weeks later (ESTA 2012).

Nation-wide bus service is not provided in Inyo County. Greyhound discontinued bus service in 2001 which resulted in Inyo and Mono counties forming the Carson Ridgecrest Eastern Sierra Transit (CREST) bus service. CREST provides service from Lancaster, California to Reno, Nevada. Nation-wide bus service is provided by Greyhound at the terminus of the CREST bus line.

Bicycle and Pedestrian Facilities

The Inyo County Collaborative Bikeways Plan (Plan)³⁰ is the bicycle transportation plan for Inyo County, the city of Bishop and the Bishop Paiute Tribe. The Plan's goal is developing a safe, convenient and effective bikeway system that promotes bicycle travel as a viable transportation mode and connects to work, schools, residential and recreation areas.

Due to the remoteness of the area there are no designated bicycle lanes in the area (other than SR 160) or adjacent to HHSEGS. Bicycles on rural highways and roads travel on paved shoulders where they are present, sufficiently wide, unobstructed by vegetation and of good pavement quality. On low-volume rural roads without paved shoulders, bicyclist travel one or more feet from the pavement edge depending on pavement quality (ICCBP 2008).

The Plan has identified upgrades of eight bicycle facilities within the Tecopa area (Appendix 5A). However, the HHSEGS site is located outside of these proposed upgrades; therefore, no bicycle facilities are planned for the study area.

In addition, due to the remoteness of the area, pedestrian facilities, such as sidewalks and walkways do not exist in the area or adjacent to HHSEGS.

Airports

The closest commercial operational airport to HHSEGS is the McCarran International Airport in Las Vegas, Nevada approximately 45 miles to the east. The closest proposed commercial airport to HHSEGS would be the Pahrump Valley General Aviation Airport located approximately 10 miles northwest in Nye County, Nevada. The airport would primarily serve small aircraft less than 12,500 pounds, with wingspans of 49 feet or less (HHS 2011a). The Town of Pahrump (Town) has requested Federal Aviation Administration (FAA) assistance to establish a public use, general aviation airport in the Town of Pahrump to serve the Town and the surrounding Pahrump Valley in Nye County, Nevada.

²⁹ Fixed routes are town to town and in-town routes with fixed schedules and fixed stops.

³⁰ The Inyo County Collaborate Bikeways Plan was approved by the Inyo County Board of Supervisors on November 18, 2008; on November 19, 2008 by the Inyo County Local Transportation Commission; the City of Bishop on November 24, 2008 and the Bishop Paiute Tribe on December 4, 2008.

Pahrump has received Airport Improvement Program grant funds to assist in the cost of preparing an Environmental Impact Statement (EIS) for the proposed project, which would be constructed on Bureau of Land Management (BLM) owned property. The Town is in the process of establishing a cost recovery account with BLM for their participation in the EIS. Once that account is established, the FAA and the BLM anticipate entering into a Memorandum of Understanding for preparation of the EIS for the proposed airport. The EIS process is expected to take several years. After completion of the EIS the FAA and the BLM could proceed to take federal agency actions regarding the proposed airport project.

Military Airports

There are two nearby United State Air Force Bases: Nellis Air Force Base and Edwards Air Force Base. An Obstacle Evaluation Study (August 16, 2010), was prepared for the HHSEGS project to identify obstacle clearance surfaces established by the Federal Aviation Administration (FAA) that would limit the height or location of proposed solar towers within the defined study area (HHSO 2011a). As a part of this study, the Department of Defense (DOD) was contacted for their review and input to determine whether there would be an impact from the solar power tower development with regard to military mission operations.

The response from the DOD stated that the proposed project would not have any military mission impacts and the towers are not under the military training routes (CEC 2012I).

Freight and Passenger Rail

There is no freight or passenger rail service in the County of Inyo. The Union Pacific Railroad provides a mainline freight service from southern California to Mojave in Kern County. At Mojave, several spur lines branch from the main line. The Searless branch heads east from Mojave, then a spurline branches off at Searless (near Trona) heading north and terminating in Lone Pine (ICRTP 2009).

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 which 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 risk;
8. Produce a thermal plume in an area where flight paths are expected to occur below 1,000 feet from the ground³¹; or
9. Have individual environmental effects which, 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.

DIRECT/INDIRECT IMPACTS AND MITIGATION

The direct and indirect impacts of the proposed HHSEGS on traffic and transportation system are discussed in this section and based on an analysis comparing pre-HHSEGS and post-HHSEGS conditions. Staff evaluated the HHSEGS's impacts for two separate future scenarios: the peak construction period (when construction activity and employment would be maximized) and the first year of full operation.

Study Location

The below roadway segments, located within the State of Nevada and the State of California, were selected for evaluation because they provide the most direct route to the project site and would most likely be affected by project traffic during project construction and operation.

Roadway Segments:

- The intersection of State Route 160/Old Spanish Trail Highway located in the State of Nevada.

³¹ The FAA recommends that pilots avoid overflight of plume-generating industrial sites below 1,000 feet AGL (FAA 2006).

- The intersection of State Route 127/Old Spanish Trail Highway located in the State of California (Inyo County).
- The intersection of SR 127/Baker Boulevard located in the State of California (San Bernardino County).

Construction Period Impacts and Mitigation

Staff analyzed the proposed HHSEGS's potential traffic impacts by evaluating state route segments, roadway segments, and intersections in the vicinity of the project site. Staff compared existing traffic volumes and levels-of-service (LOS) to traffic volumes and LOS projected after addition of HHSEGS construction workforce and truck traffic.

The analysis of HHSEGS construction impacts focuses on the peak construction period, which would generate the most vehicle trips and result in the worst-case scenario for traffic and transportation impacts.

Construction Workforce Traffic

A large regional workforce would commute daily from locations relatively near the project site and would supply the majority of construction labor. To reach the HHSEGS site, construction traffic would use I-15, SR-160, SR-127 and the Old Spanish Trail Highway.

The Application for Certification, Traffic and Transportation Section and the Preliminary Staff Assessment analyzed the following approximate percentage of construction trips by route:

- 95 percent of the project trips, (100% truck trips and 95% automobiles), would use a route from the east or west within the State of Nevada via SR-160, then south on Old Spanish Trail Highway and then east to the project site; and
- 5 percent of the project trips, automobiles only, would use a route from the north or south within the State of California via SR-127 in Inyo County, then to Old Spanish Trail Highway and then to the project site.

Subsequent to the PSA, the applicant submitted an Updated Workforce Analysis (UWA) on October 1, 2012 (CH2 2012jj). These updated workforce assumptions were based primarily on new workforce numbers associated with the draft Project Labor Agreement, as well as experience acquired from the development of the Ivanpah Solar Electric Generating System project. The UWA contains the following assumptions:

- 100 percent of the California workforce (that returns home) would drive their own vehicles between home (in the State of California) and their hotel at the start of their work week;
- 70 percent of the workforce is assumed to be from California and 30 percent of the workforce is assumed to be from Nevada;
- The State of California workforce (dayshift) would carpool from their hotels Tuesday through Thursday, when travelling between their place of lodging and the site at a rate of 1.5 people per car;

- 50 percent of the State of California workforce would return home on Friday afternoon, directly from the site, because it is the end of their 5-day work week;
- 40 percent of the State of California workforce would return home on Saturday afternoon after they complete an additional Saturday shift;
- 90 percent of the State of California swing shift workforce would drive directly to the work site on Monday in their own vehicles and 10 percent would remain over the weekend and would commute between the work site and their hotel;
- 80 percent of the State of California dayshift workforce would arrive at their hotel on Sunday evening and 20 percent would commute from home directly to the site on Monday morning;
- From their place of lodging (State of California workers) or their residences (State of Nevada workers) to the work site, day shift ridership would average 1.2 persons per vehicle (on an average basis, vehicle use was calculated at 100 workers/1.2 workers per vehicle= 83 vehicles per 100 workers);
- As the day shift workforce approaches 1,000 workers, 15-passenger vans would be used to increase the day shift ridership to 1.5 persons per vehicle for California workers (during the peak months of construction, vehicle use was calculated at 100 workers/1.5 workers per vehicle = 67 vehicles per 100 workers);
- The ridership for State of Nevada workers would remain at 1.2 persons per vehicle throughout the project construction period; and,
- The California and Nevada swing shift carpool rate would average 1.2 persons per vehicle regardless of the size of the swing shift workforce.

Work-week durations were also updated for both day shift and swing shift:

- 50 percent of the workforce was assumed to work a 5-day, 10-hour-per-day work week (Monday through Friday for day shift; Monday night through Saturday morning for swing shift).
 - Of those workers:
 - The California workforce was assumed to drive their cars to the work site on Friday and leave to return home following their shift.
 - The Nevada workforce was assumed to carpool averaging 1.2 persons per vehicle.
- 40 percent of the workforce would stay and work an additional 10-hour shift on Saturday, returning home at the end of their shift.
- 10 percent of the State of California workforce would stay over the weekend.
- 100 percent of truck traffic would still use a route from the east or west within the State of Nevada via SR 160, then south on Old Spanish Trail Highway and east to the project site.

All phases of construction for HHSEGS (from perimeter fencing, site preparation, grading and commercial operation) would be completed over an approximately 29-month period, from the second quarter of 2013 to the fourth quarter of 2015. The common area facilities would be constructed during construction of Solar Plant 1. The

construction workforce would peak during Month 19 with approximately 2,293 workers (1,682 dayshift and 611 swing shift). By month 17, 1,879 workers are projected - 82 percent of the peak month. Overall, there is a 5-month period, Months 17 through 21, when the number of workers would be within approximately 20 percent of the peak. In addition, a peak of approximately 66 workers would be required to construct the gas and transmission line which would occur during month 16. However, the construction of these facilities would not coincide with the peak of the plant site construction employment.

The weekly project construction schedule is anticipated to be two, 10-hour shifts; a Monday through Friday Day Shift (5:00 am to 3:30 pm), and a Monday night to Saturday morning Swing Shift (6:00 pm to 4:30 am). During the summer season, the daily work hours would be adjusted earlier (in half hour increments) in order to take advantage of the cooler temperatures and promote worker safety.

The potential traffic impacts have been analyzed for the day shift (5:00 am to 3:30 pm) during the peak construction month. Although the employee trips would occur outside of typical peak hours (generally 7:00 am to 9:00 am and 4:00 pm to 6:00 pm), this shift represents the greatest number of employees arriving and departing the site at one time (1,682 employees). Given the remote location of the project site, the high cost of gas, and the type of construction being conducted, the UWA estimates that the baseline carpool rate for the State of Nevada workforce would be 1.2 percent and for the State of California it would be 1.5 percent.

Based on the UWA assumptions, HHSEGS would generate a total of 4,000 daily construction related trips (3,820 daily automobile trips and 180 truck trips) during the peak construction month. Of the 3,820 daily automobile trips, 1,411 (1,401 automobile and 10 truck) trips would occur during the morning peak hour and 1,411 (1,401 automobile and 10 truck) trips would occur during the afternoon peak hour.

The total project trip generation, which is now delineated by a Monday, Tuesday-Thursday and Friday commute, including the construction truck traffic, during the peak construction month is summarized in **Traffic and Transportation Table 4**. The peak construction workforce trips per shift for Month 19 are summarized in **Traffic and Transportation Table 5**.

The peak construction workforce trips for the day shift and swing shift are summarized in **Traffic and Transportation Table 6** and the peak construction workforce trips depicting the workforce and carpool rate is summarized in **Traffic and Transportation Table 7**.

**Traffic and Transportation Table 4
Peak Construction Trip Generation (Month 19)**

	Daily Trips*			Peak Hour Trips		
	Monday	Tuesday-Thursday	Friday	Monday	Tuesday-Thursday	Friday
Automobiles	3,714	3,430	3,820	1,284	1,206	1,401
Trucks**	180	180	180	10	10	10
Total	3,894	3,610	4,000	1,294	1,216	1,411

Source: Hidden Hills Solar Electric Generating System Updated Workforce Analysis Table 5.12-4R1.

*Daily trips include combined trips generated by dayshift and swing shift.

** Assumes truck trips are spread equally throughout the day from 6:00 a.m. to 6:00 p.m.

**Traffic and Transportation Table 5
Peak Construction Workforce (Month 19)**

Project Site Workforce	Day Shift (5:00am to 3:30pm)	Swing Shift (6:00pm to 4:30am)	TOTAL
Craft	1,192	511	1,703
Non-Craft	490	100	590
Total Workforce	1,682	611	2,293

Source: Hidden Hills Solar Electric Generating System Updated Workforce Analysis Table 5.12-5R1

**Traffic and Transportation Table 6
Peak Construction Workforce Trips (Month 19)**

	Day Shift		Swing Shift		Combined
	One-Way Trips	Daily Trips	One-Way Trips	Daily Trips	Daily Trips
Monday	1,284	2,568	573	1,146	3,714
Tuesday-Thursday	1,206	2,412	509	1,018	3,430
Friday	1,401	2,802	509	1,018	3,820

Source: Hidden Hills Solar Electric Generating System, Updated Workforce Analysis Table TT-1.

**Traffic and Transportation Table 7
Peak Construction Workforce Trips (Month 19, Day Shift)**

Workforce/Carpool Rate	State of California	State of Nevada	Total
State of California/State of Nevada Workforce Split	70%	30%	100%
Dayshift Construction Workforce	1,177	505	1,682
Baseline Carpool Rate (people per vehicle)	1.5	1.2	
Monday Commute			
• Carpools	628 ^{B,B1}	421 ^{A, A1}	1,049
• Single Occupant Vehicles	235 ^B		235
• Total Vehicles	863	421	1,284
• Trips In/Out ^E	1,726	842	2,568
Weekday Commute (Tuesday-Thursday)			
• Carpools	785 ^{C, C1}	421 ^{A, A1}	1,206
• Trips In/Out ^E	1,570	842	2,412
Friday Commute			
• Carpools	392 ^{D, D1}	421 ^{A,A1}	813
• Single Occupant Vehicles	588 ^D		588
• Total Vehicles	980	421	1,401
• Trips In/Out ^E	1,960	842	2,802

Source: Hidden Hills Solar Electric Generating System Updated Workforce Analysis – CH2 2012jj, Table TT-2

- A. The Nevada workforce would carpool at a rate of 1.2 people per car, Monday through Friday.
- B. On Monday, 80 percent of the California workforce would carpool at a rate of 1.5 people per car and 20 percent would drive alone. Not all of the 80 percent would be “carpools,” but the overall average would be 1.5 people per car for this group, so the line is described as “Carpools.”
- C. The California workforce would carpool at a rate of 1.5 people per car, Tuesday through Thursday.
- D. On Friday, 50 percent of the California workforce would carpool at a rate of 1.5 people per car and 50 percent would drive alone.

E. Assumes one incoming trip per vehicle during AM peak and one outgoing trip per vehicle during PM peak.

A1 – (505)(Dayshift Construction Workforce)/(1.2) = 421 carpools.

B1 - (0.80)(1,177)=941.6 carpooling workers/1.5 carpooling workers/vehicle = 628 carpools.

C1 – (1,177)/(1.5 workers/vehicle) = 785 carpools.

D1 – (1,177)/(0.50) = 588.5 carpooling workers = (588.5)/(1.5 workers per vehicle) = 392 carpools.

Based on the UWA, regional street network, current travel patterns, lodging locations, and anticipated employee origins (70 percent of the workforce is assumed to be from California, and 30 percent of the workforce is assumed to be from Nevada), it is anticipated that HHSEGS construction traffic (for the dayshift) would be distributed as shown in **Traffic and Transportation Table 8** and **Traffic and Transportation Table 9**. The tables combine both the State of California and State of Nevada workforce and also depict the carpool rates and commute pattern assumptions. As shown below, separate distributions were conducted for the Monday commute, Tuesday through Thursday (weekday commute) and for the Friday commute.

**Traffic and Transportation Table 8
State of California and State of Nevada
AM Peak Hour Project Trip Distribution- Month 19 Day Shift**

Road	Direction	Origin/Destination	Monday		Weekday		Friday	
			Trips	Percent	Trips	Percent	Trips	Percent
State Route 160	Northwest	Pahrump, Nevada	210	17%	241	20%	280	20%
Old Spanish Trail Highway	South	Tecopa, Shoshone, I-15 - California	286	22%	63	5%	79	6%
State Route 160	East	Las Vegas, Nevada	788	61%	902	75%	1,042	74%
Total			1,284	100%	1,206	100%	1,401	100%

Source: Hidden Hills Solar Electric Generating System Updated Workforce Analysis Table 5.12-7AR1

**Traffic and Transportation Table 9
State of California and State of Nevada
PM Peak Hour Project Trip Distribution – Month 19 Day Shift**

Road	Direction	Origin/Destination	Monday		Weekday		Friday	
			Trips	Percent	Trips	Percent	Trips	Percent
State Route 160	Northwest	Pahrump, Nevada	257	20%	241	20%	163	12%
Old Spanish Trail Highway	South	Tecopa, Shoshone, I-15 – California	69	5%	63	5%	619	44%
State Route 160	East	Las Vegas, Nevada	958	75%	902	75%	619	44%
Total			1,284	100%	1,206	100%	1,401	100%

Source: Hidden Hills Solar Electric Generating System Updated Workforce Analysis Table 5.12-7BR1

Refer to **Traffic and Transportation Figure 5** for the AM project trip distribution percentages and **Traffic and Transportation Figure 9** for the PM project trip distribution percentages. **Traffic and Transportation Table 10** and **Traffic and Transportation Table 11** depicts the existing intersection LOS conditions plus HHSEGS for SR 160/ Old Spanish Trail Highway; SR 127/Old Spanish Trail Highway and SR 127/Baker Boulevard.

Traffic and Transportation Table 10
State of Nevada and State of California
Comparison of State Route 160/Old Spanish Trail Highway; State Route 127/Old Spanish Trail Highway and State Route 127/Baker Boulevard Intersections
Existing Conditions Plus HHSEGS LOS
AM Peak Hour – Day Shift

		Existing Conditions With HHSEGS AM Peak							
		Existing AM Peak		Monday		Tuesday-Thursday		Friday	
Intersection	Approach/Movement	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
SR 160/Old Spanish Trail Highway (State of Nevada)	Northbound left/right	9.3	A	9.9	A	10.0	A	100+	F
	Westbound left	8.1	A	24.3	C	60.6	F	100+	F
SR 127/Old Spanish Trail Highway (State of California, Inyo County)	Southbound left	7.4	A	7.9	A	N/A ¹	N/A ¹	N/A ¹	N/A ¹
	Westbound left	9.4	A	9.4	A	N/A ¹	N/A ¹	N/A ¹	N/A ¹
	Westbound right	8.8	A	10.1	B	N/A ¹	N/A ¹	N/A ¹	N/A ¹
SR 127/Baker Boulevard (State of California, San Bernardino County)	Eastbound	7.6	A	8.7	A	N/A ²	N/A ²	N/A ²	N/A ²
	Westbound	8.4	A	9.6	A	N/A ²	N/A ²	N/A ²	N/A
	Northbound	8.2	A	12.9	B	N/A ²	N/A ²	N/A ²	N/A ²
	Southbound	8.2	A	8.7	A	N/A ²	N/A ²	N/A ²	N/A ²

Source: Hidden Hills Solar Electric Generating System Application for Certification, Table 5.12-8 and and Hidden Hills Solar I, LLC and Hidden Hills Solar II, LLC Preliminary Staff Assessment Comments (CH2 2012ee); Updated Workforce Analysis Table 5.12-8AR1 and Technical Memorandum Table 2 (CH2 2012rr).

1 - Not Applicable – The intersection was not analyzed for Weekday/Friday morning peak hour because there would not be any project trips added to the intersection during this period.

2 – Not Applicable – Turning movement counts were collected on two Mondays (October 22, 2012 and October 29, 2012) from 5:00a.m. – 8:00a.m.

The Traffic and Transportation Section of the PSA stated the SR 160/ Old Spanish Trail Highway would operate at LOS A during the morning peak hour, and LOS F during the afternoon peak hour under the existing plus project conditions. During the AM peak period, the LOS changes primarily on the eastbound left-turn from SR 160 to Old Spanish Trail Highway. During the PM peak period, the turning movement issues are for the northbound movements—both left- and right turns (HHSG 2011a, page 5.12-19). LOS F is not an acceptable level of service on State of Nevada highways.

As a result of the updated workforce traffic, additional potential traffic impacts have been identified for the SR 160/Old Spanish Trail Highway intersection during the morning peak hour (impacts were previously identified for the afternoon peak hour only).

Traffic and Transportation Table 11
State of Nevada and State of California
Comparison of State Route 160/Old Spanish Trail Highway; State Route 127/Old Spanish Trail Highway and State Route 127/Baker Boulevard Intersections
Existing Conditions Plus HHSEGS LOS
PM Peak Hour – Day Shift

		Existing Conditions with HHSEGS PM Peak							
		Existing PM Peak		Monday		Tuesday-Thursday		Friday	
Intersection	Approach/Movement	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
SR 160/Old Spanish Trail Highway (State of Nevada)	Northbound left/right	9.7	A	100+	F	100+	F	100+	F
	Westbound left	7.9	A	7.9	A	7.9	A	7.9	A
SR 127/Old Spanish Trail Highway (State of California, Inyo County)	Southbound left	7.4	A	N/A ¹	N/A ¹	N/A ¹	N/A ¹	7.4	A
	Westbound left	9.4	A	N/A ¹	N/A ¹	N/A ¹	N/A ¹	19.9	C
	Westbound right	8.8	A	N/A ¹	N/A ¹	N/A ¹	N/A ¹	8.8	A
SR 127/Baker Boulevard (State of California, San Bernardino County)	Eastbound	10.2	B	N/A ²	N/A ²	N/A ²	N/A ²	14.4	B
	Westbound	10.7	B	N/A ²	N/A ²	N/A ²	N/A ²	14.5	B
	Northbound	12.0	B	N/A ²	N/A ²	N/A ²	N/A ²	16.0	C
	Southbound	10.1	B	N/A ²	N/A ²	N/A ²	N/A ²	67.2	F

Source: Hidden Hills Solar Electric Generating System Application for Certification, Table 5.12-8 and and Hidden Hills Solar I, LLC and Hidden Hills Solar II, LLC Preliminary Staff Assessment Comments (CH2 2012ee); Updated Workforce Analysis Table 5.12-8BR and Technical Memorandum Table 2 (CH2 2012qq).

1 - Not Applicable – The intersection was not analyzed for Monday/Weekday afternoon peak hour because there would not be any project trips added to the intersection during this period.

2 – Not Applicable – Turning movement counts were collected on two Fridays (November 2, 2012 and November 9, 2012) from 4:00p.m. –7:00p.m.

Refer to **Traffic and Transportation Figure 10** for the existing conditions plus HHSEGS AM peak hour volumes and **Traffic and Transportation Figure 11** for the existing conditions plus HHSEGS PM peak hour volume for SR 160/Old Spanish Trail Highway.

Refer to **Traffic and Transportation Figure 12** for the existing peak hour intersection volumes and **Traffic and Transportation Figure 13** for the existing conditions plus HHSEGS AM/PM peak hour intersection volumes for SR 127/Baker Boulevard.

Refer to **Traffic and Transportation Figure 14** for the existing conditions plus HHSEGS Monday AM peak hour intersection volume and **Traffic and Transportation Figure 15** existing conditions plus HHSEGS Friday PM peak hour volume for SR 127/Old Spanish Trail Highway.

As shown in **Traffic and Transportation Table 10** and **Traffic and Transportation Table 11**, the SR 160/Old Spanish Trail Highway would operate at LOS F during the AM Tuesday through Friday commute and LOS F during the PM peak hour for the Monday through Friday commute under the existing plus project conditions. Up to 95 percent of the project construction traffic is estimated to travel through the SR 160/Old Spanish Trail Highway intersection during peak hours. During the AM peak period, the LOS changes primarily on the westbound left-turn from SR 160 to Old Spanish Trail Highway. During the PM peak period, the turning movement issues are for the northbound movements (both left- and right-turns) as discussed in the PSA. LOS F is not an acceptable level of service on State of Nevada highways.

The SR 127/Old Spanish Trail Highway intersection (Inyo County) would operate at LOS C or better during the Monday, Tuesday through Thursday and Friday commute under the existing plus project conditions. LOS C is an acceptable level of service on Old Spanish Trail Highway and SR 127.

Also, potential impacts have been identified for the SR 127/Baker Boulevard intersection (San Bernardino County) during the Monday morning peak hour and the Friday afternoon peak hour based on the updated project trip distribution pattern.

Based on a review of the peak hour roadway volumes on SR 127 and Baker Boulevard, the SR 127/Baker Boulevard intersection is estimated to be operating at or near capacity during peak hours. HHSEGS is projected to add 235 northbound vehicles to the intersection on Monday morning and 588 southbound vehicles³² to the intersection on Friday afternoon. It is likely that the project-related trips that would be added to this

³² It is assumed 100 percent of the California workforce that returns home would drive their own vehicles and use Old Spanish Trail Highway to SR 127 to I-15 for the Friday commute. The California day shift during the peak month is estimated to be 1,177 workers (this number represents the 70% assumed to come from California – 70% of 1,682 (peak dayshift)- (1,177)(.50) = 588 vehicles.

intersection would further degrade the intersection operations. The SR 127/Baker Boulevard intersection would operate at LOS B or better during the Monday AM commute under the existing plus project conditions and LOS F during the Friday PM commute. LOS F is not an acceptable level of service at this intersection.

The change in LOS at the SR 160/Old Spanish Trail Highway intersection is consistent with the proposed construction traffic patterns as it is anticipated that the majority of the project construction traffic is estimated to travel through the SR 160/Old Spanish Trail Highway intersection. Seconds of delay would increase from 9.7 seconds to 100 plus. As a result of this increase, vehicles could become stacked on Old Spanish Trail Highway as drivers merge onto SR 160.

To reduce traffic impacts on Old Spanish Trail Highway and the SR 127/Baker Boulevard intersection staff recommends Condition of Certification **TRANS-5**, which would require development and implementation of a Traffic Control Plan (TCP) to reduce construction traffic impacts to LOS; ensure sufficient parking and emergency access to the site.

The applicant's proposed mitigation measures as listed below, are generally the same as contained in the AFC and the Preliminary Staff Assessment (PSA). However, with the increase in the workforce traffic and new assumptions for dayshift workers, workforce traffic would result in additional impacts to the SR 160/Old Spanish Trail Highway intersection during the morning peak hour (impacts were previously identified for the afternoon peak hour only). In addition, the identification of increased traffic volumes to the SR 127/Baker Boulevard intersection during the Monday morning peak hour and Friday afternoon peak hour, additional mitigation is proposed beyond what was listed in the AFC and PSA.

Traffic Monitoring Program

Traffic operations at the study intersections (SR 160/Old Spanish Trail Highway; SR 127/Old Spanish Trail Highway, and SR 127/Baker Boulevard) would be visually monitored by the applicant's representative once per week, during the morning and afternoon peak hour during peak construction months. It is recommended that the monitoring begin in Month 12 when 1,176 workers are projected (approximately 51 percent of the peak) and continue through the end of Month 24 when 1,293 workers are projected (approximately 56 percent of the peak). Because the construction workforce would increase gradually over the 29-month construction period, with a peak workforce occurring during Month 19, traffic conditions would be observed as the workforce increases over time, and adjustments would be made as needed.

Carpooling

Rideshare Program

If the traffic monitoring program identifies LOS D, E or F conditions specific measures would be implemented to reduce the number of trips to the site. This analysis already includes an assumption that 15-passenger vans would be used to achieve a baseline carpool rate of 1.5 for the California workforce. However, given the high cost of gas and the remote location of the site, there are opportunities to increase the occupancy (number of people per vehicle). Improvements should target a carpool rate of 2.5 people

per car to maintain LOS D at the SR 160/Old Spanish Trail Highway intersection (consistent with the Clark County, Nevada thresholds).

Two steps are included in this mitigation measure:

- **Rideshare Program.** As part of the rideshare program, employees would be encouraged to take advantage of the existing Club Ride Program sponsored by the Regional Transportation Commission of Southern Nevada. Club Ride offers a free ridematching service that matches individuals who live and work in proximity to one another and have a similar work schedule. The program also assists in forming vanpools when demand is met.
- **Employer Sponsored Van Program.** As a supplement to the voluntary rideshare program, participation in a mandatory van program (using additional 15-passenger vans beyond the 15-passenger vans when the day shift workforce reaches 1,000 employees) may be needed to obtain the 2.5 occupancy rate for carpools. Because employees will be grouped in several hotels in their lodging areas (Pahrump and Las Vegas area), the vans could pick up and drop off employees at their hotels, significantly reducing the number of vehicles travelling to the site.

Staggered Work Shifts

If LOS E or F conditions occur at the intersections even with ridesharing and passenger vans, and temporary traffic control is not implemented, additional work shifts may need to be staggered so workers not using the rideshare program would arrive and leave the site over a longer period of time thereby reducing the potential for queues at the intersections.

Surface Restoration

An increase in traffic flow or an increase in heavy equipment on the surrounding roads may degrade the quality of the road surfaces and increase maintenance costs. Roads are designed to handle the weights of a number of vehicles for a specific period (the design life). A road's design life may diminish with increased traffic and heavy travel loads over time, resulting in a worn down road surface. In general, any construction activities that could affect existing surfaces or roadway components shall be mitigated by restoring the facility to its original condition.

Traffic Control Plan

Where project construction would require the use of traffic control (signage, flaggers, lead vehicles, etc.), a detailed traffic control plan will be prepared prior to the start of construction for review by the Compliance Project Manager (CPM), Caltrans, NDOT, Inyo County, San Bernardino County, Clark County and Nye County, and prepared in accordance with the Manual of Uniform Traffic Control Devices (MUTCD) and the California Supplement of the MUTCD. Project ingress and egress routes will be designated, and project-related vehicle traffic outside these routes would not be allowed. Nearby intersections would be evaluated to determine whether large trucks could complete turning maneuvers through the intersections.

Staff agrees with the applicant's proposed, carpooling, traffic monitoring program, staggered work shifts, surface restoration and traffic control plan. Staff recommends these proposed traffic control measures be included in Condition of Certification

TRANS-5 which would require development and implementation of a traffic control plan and Condition of Certification **TRANS-3** which would require restoration of public roads.

Construction Truck Traffic

Construction equipment deliveries and construction-related truck traffic would contribute additional trips during the construction period. The peak construction delivery periods would occur during Months 3 through 7 when materials for the concrete batch plant would be delivered for the solar tower foundations and towers. Monthly truck deliveries would peak at 717 trucks during Month 6. Peak daily truck deliveries have been estimated using delivery records from construction at Ivanpah SEGS. During the period October 2010 through April 2012, the highest number of daily truck deliveries at Ivanpah SEGS was 72. Adding a 25 percent contingency for HHSEGS would yield a maximum of 90 delivery trucks on a peak day.

The analysis of construction deliveries for the **Air Quality** assessment of this **FSA** used a more-conservative method to determine the peak daily number of delivery trucks, using a calculation based on truck volumes during the highest 12 consecutive months. The result was a conservative estimate of 384 deliveries per day, or 768 one-way truck trips per day. To be conservative and consistent with the Air Quality analysis, this larger value was used in the revised traffic analysis (CH2 2012ee).

It was assumed that the delivery truck trips would be spread evenly throughout the day, (ten trucks per day) beginning at 6:00 am and ending at 6:00 pm. Also, it was assumed that all inbound deliveries would occur in the first nine hours and all exiting delivery truck trips would occur in the last nine hours. The resulting estimate was 45 trips during the morning peak hour and 45 trips during the afternoon peak hour. **Traffic and Transportation Table 12** depicts the construction delivery schedule.

**Traffic and Transportation Table 12
Monthly Construction Delivery Schedule (Number of Trucks/Trips by Month)**

Month	Equipment and Materials	Heliostat Components	Total Truck Deliveries/Month	Monthly Trips (In/Out)
0	0	0	0	0
1	35	0	35	70
2	55	0	55	110
3	480	0	480	960
4	420	245	665	1330
5	407	245	652	1304
6	472	245	717	1434
7	438	245	683	1366
8	411	245	656	1312
9	112	245	357	714
10	120	246	366	732
11	148	246	394	788
12	141	246	387	774
13	137	246	383	766
14	165	246	411	822
15	171	246	417	834
16	155	245	400	800
17	137	245	382	764
18	132	245	377	754
19	108	245	353	706
20	104	245	349	698
21	96	245	341	682
22	70	0	70	140
23	55	0	55	110
24	43	0	43	86
25	36	0	36	72
26	28	0	28	56
27	28	0	28	56
28	10	0	10	20
29	0	0	0	0

Hidden Hills Solar Electric Generating System AFC Table 5.12-6 and Hidden Hills Solar I, LLC and Hidden Hills Solar II, LLC Preliminary Staff Assessment Comments (CH2 2012ee).

Construction truck traffic is proposed to use I-15 within both the State of California and the State of Nevada and SR 160 within the State of Nevada. Truck traffic would originate from southern California heading towards Las Vegas then west on SR 160 to Old Spanish Trail Highway.

Oversized or overweight trucks with unlicensed drivers could present significant hazards to the general public and/or damage roadways. To ensure that trucks comply with weight, size, and route limitations set by the Department of Transportation (Caltrans),

Nevada Department of Transportation, and Inyo County, and that drivers are properly licensed, staff has included Condition of Certification **TRANS-1** to require the project owner to obtain roadway permits for vehicle sizes and weights, driver licensing, and truck routes.

Total Construction Traffic

The HHSEGS is estimated to generate a maximum of 4,000 (3,820 automobile and 180 truck) trips during the peak month (19) with 1,411 trips occurring during the morning peak hour and 1,411 trips occurring during the afternoon peak hour.

The addition of a peak of 4,000 daily trips would have a significant impact on the structural integrity of the Old Spanish Trail Highway within both the State of Nevada and the State of California due to the current and future conditions of the roadway pavement. Old Spanish Trail Highway within Inyo County is approximately 22 feet wide, lacking both shoulders and designed drainage. According to Inyo County, the Old Spanish Trail Highway was paved around 1971, and is not constructed to current roadway standards and as a result, not built or designed for the proposed heavy construction traffic and the hauling of equipment and materials. A section of the Old Spanish Trail Highway, known as Emigrant Pass, is a winding section which hinders clear visibility of oncoming traffic. The portion of Old Spanish Trail Highway within the State of Nevada also lacks shoulders and is not designed for the proposed heavy construction traffic and the hauling of equipment and heavy materials.

Inyo County Public Works Department (ICPW) submitted a letter dated April 30, 2012 (INYO 2012h) regarding access and circulation issues. ICPW expressed concern of potential vehicular truck-related conflicts at Emigrant Pass; additional right-of-way for acceleration and deceleration lanes; sufficient entrance drives; appropriate signage and traffic control; internal circulation and an interpretive stop.

Based on AFC Table 5.12-7 - Project Trip Distribution (HHSB 2001a), truck traffic to and from the west is not expected as all truck traffic is proposed to utilize SR-160 within the State of Nevada to the project site. Therefore, based on this trip distribution; and the public safety concern of oversized trucks maneuvering through the narrow widths of the Old Spanish Trail Highway lacking shoulders or turnouts, staff recommends Condition of Certification **TRANS-4** which requires all truck traffic utilize SR160, then south on Old Spanish Trail Highway and east to the project site.

In order to accommodate the increased vehicle traffic, Inyo County has requested an additional right-of-way along Old Spanish Trail Highway which would provide for acceleration and deceleration lanes. Therefore, staff has recommended Condition of Certification **TRANS-2** to require the project owner dedicate a 24-foot right-of-way (ROW), and Condition of Certification **TRANS-3**, which requires that the project owner repair and restore all roads damaged during construction activities immediately after the damage has occurred.

As depicted in the PSA **Traffic and Transportation Table 6**, 5 percent of construction workers (43 trips) were to utilize Old Spanish Trail Highway/SR 127 to access I-15. Based on the UWA and depicted in **Traffic and Transportation Table 8 & 9**, 22 percent of construction workers (286 trips) in the AM hour and 44 percent of

construction workers (619 trips) in the PM hour are now proposed to utilize Old Spanish Trail Highway/SR 127 to access I-15 in Baker, California.

The increase of construction automobile traffic could have a significant impact on the structural integrity of the Old Spanish Trail Highway within the State of California due to the current and future conditions of the roadway pavement. Based on the UWA, the Inyo County Public Works Department anticipates that the increase in the number of vehicles using Old Spanish Trail Highway west of the project site would result in adverse impacts to road conditions during construction. The County believes those impacts would be best addressed by amending Condition of Certification **TRANS-3** to include an obligation by the applicant to repair workforce traffic road damage (1) during construction and (2) at the conclusion of construction based on a pre-construction survey of Old Spanish Trail Highway from the Nevada state line to the intersection with State Route 127 (CEC 2012kk).

Staff recommended in the PSA Condition of Certification **TRANS-3**, which requires that, the project owner repair and restores all roads damaged during construction activities. Based on the PSA comments, additional language for Condition of Certification **TRANS-3** had been proposed delineating the area to be documented from the western edge of the project site to the intersection of SR 160. Given the revised commute patterns, the area to be documented has been expanded to include Old Spanish Trail Highway from the intersection of SR 127 to the intersection of SR 160 (Nevada State Line).

In addition, in order to address the increased vehicle traffic on the Old Spanish Trail Highway located west of the HHSEGS, and the SR 127/Baker Boulevard intersection, staff recommends Condition of Certification **TRANS-5**, which would require development and implementation of a Traffic Control Plan (TCP) to reduce construction traffic impacts. An aspect of the TCP would be a work schedule and end-of-shift departure plan that would stagger Monday arrivals and Friday departures from the project site.

School and Recreation Traffic

The HHSEGS site is located within the Death Valley Unified School District (DVUSD). The DVUSD includes Death Valley National Park and all regions east of the National Park to the Nevada state line. DVUSD is the largest school district in California in terms of area served and one of the smallest in terms of enrollment. Students in grades 5-12 often travel an hour each way to and from school, while students K-4 have commutes up to 30 minutes each way. The District has four schools: Death Valley Elementary School located in the Cow Creek area of Death Valley National Park; Tecopa-Francis Elementary School located in Tecopa; Shoshone Elementary School located in Shoshone Village; and Death Valley Academy also located in Shoshone Village (DVUSD 2012).

The DVUSD has five existing school bus stops serving the Chareleston View area (CEC 2012r). Of the five stops, only two are on Old Spanish Trail Highway: Ranchos Avenue at Old Spanish Trail Highway and Desert Trail Road at Old Spanish Trail Highway. Both stops are located east of Quartz Street (0.75 mile and 1.25 miles respectively), which is the proposed main construction entrance. **Traffic and Transportation Figure 2** depicts the access roads and internal roadways. Based on the HHSEGS beginning day shift
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hour of 5:00 am and the swing shift hours (6:00 pm-4:30 am) construction traffic and the morning school busses (6:42 am for Desert Trail and 6:45 am for Rancho's Avenue) traffic should not intersect. Therefore, impacts to the two bus stops on Old Spanish Trail Highway would be less than significant.

However, based on the UWA, automobile construction traffic would utilize the Old Spanish Trail Highway at an increased rate. As a result, the HHSEGS ending day shift hour of 3:30 pm, there may be the potential for overlap of construction traffic with the afternoon bus stops (3:26 pm for Desert Trail and 3:28 pm for Rancho's Avenue). To reduce traffic impacts on Old Spanish Trail Highway, staff recommends Condition of Certification **TRANS-5**, which would require development and implementation of a traffic control plan to reduce construction traffic impacts.

The Dumont Dunes Off-Highway Vehicle (OHV) Area is a remote area for off-highway vehicle recreation located east of Highway 127, approximately 31 miles north of Baker, California. Most visitors ride motorcycles or ATVs, sand rails, or tour the area in vehicles with four-wheel-drive (BLM 2012). Inyo County stated individuals from the State of Nevada utilize the Old Spanish Trail Highway to SR-127 then head south to Dumont Dunes driving recreational vehicles. Based on the public safety concern of oversized trucks maneuvering through the narrow widths of the Old Spanish Trail Highway with oncoming recreational vehicles and no turnouts, staff recommends Condition of Certification **TRANS-4** which requires all truck traffic utilize SR-160.

Front Sight Firearms Training Institute Traffic

The Front Sight Firearms Training Institute (FSFTI) is located northwest of HHSEGS on approximately 550 acres within Nye County, Nevada. The FSFTI provides firearms training seven days a week. Two or four day classes are available with hours starting at 6:30 am or 8:00 am and ending at 5:00 pm or 6:00 pm. NSFTI trains approximately 30,000 students a year in a 10 month year- the facility is closed July and August.

A private road was constructed by FSFTI in 2000 to provide access to their facility. The distance from SR 160 to the private road, accessed from the Old Spanish Trail Highway, is approximately three and half miles and the private road is approximately four miles long.

Approximately 98 percent of the students use SR 160 and 2 percent use SR 127; however, not every car is a single car occupant as students tend to carpool with friends or family. Food service is provided on site which minimizes vehicle trips off-site during the day. The road was constructed in 2000 and to date has not been impassable due to rainstorms (CEC 2012aa). Based on the day shift hours (5:00 am to 3:30 pm) construction traffic and FSFTI traffic should not intersect. However, based on starting swing shift hour of 6:00 pm and the students departing from the 6:00 pm class, there may be the potential for overlap of construction traffic with the departing class. To reduce traffic impacts on Old Spanish Trail Highway, staff recommends Condition of Certification **TRANS-5**, which would require development and implementation of a traffic control plan to reduce construction traffic impacts on Old Spanish Trail Highway.

Construction Workforce Parking and Laydown Area

HHSEGS construction would require vehicle parking and laydown areas for materials delivery and storage. The proposed temporary laydown and parking area would be 180 acres on an adjacent parcel that is contiguous to the project site. Primary access to the construction and laydown area access would be from Old Spanish Trail Highway. The Manufacturing Area Construction Phase Site Plan depicts approximately 18 acres (out of the 25 acres of the fenced area) within the 180 acre temporary laydown area would provide an area for the truck route to access the manufacturing building to accommodate project construction.

The other seven acres would contain 200 craft parking spaces; 80 staff parking spaces and office trailers. Outside of the fenced area, 80 visitor parking spaces would be provided. Additional construction laydown and parking areas would also be provided at Solar Plant 1 and Solar Plant 2. The Tower Unit 1 and 2 Site Plan (C-0020 and C-0030) depicts approximately six acres of construction laydown and 300 craft parking spaces (located on 2.5 acres) which provide a total of 800 parking spaces (HHSG 2011a, App 5.15A).

Approximately 155 acres of the laydown area (remaining from the 180 acres) would be available for additional parking. Although the precise number of parking spaces and the area required for internal roadways is unknown, using the applicant's conservative assumption of 10' x 20' of area for one parking space, as shown on the Manufacturing Area Construction Phase Site Plan, the applicant would provide 6,751,800 square feet (155 acres) which would accommodate 18,600³³ (parking spaces) vehicles. Therefore, the 180 acre laydown area would be adequate to provide vehicle parking for the construction workforce.

Construction Impacts Conclusion

With implementation of the conditions of certification discussed in this analysis, construction of the HHSEGS would result in less than significant impacts to the traffic and transportation system in the vicinity of the project, specifically, State Route 160/Old Spanish Trail Highway (State of Nevada); State Route 127/Old Spanish Trail Highway (State of California, Inyo County) and State Route 127/Baker Boulevard (State of California, San Bernardino County) intersections.

Operational Impacts and Mitigation

Workforce Traffic

The project would require 100 full-time employees during project operation. Both Solar Plant 1 and Solar Plant 2 would require 30 employees and the administration office, shop and warehouse facility would require 40 employees. The plant would be operated seven days a week.

The applicant anticipates that most of the operational workforce would come from Las Vegas in Clark County and parts of surrounding rural areas in Inyo County and some may come from Pahrump in Nye County. The applicant assumed that 75 percent would

³³ (155 acres)(300 parking spaces/2.5 (acres) = 18,600 parking spaces.

come from Clark County, Nevada; 20 percent from Nye County, Nevada and 5 percent would come from Inyo County (CH2 2012jj). United Association Local 525 also expects that the operations workforce would be mostly from Las Vegas, supposing that about 80 to 85 percent would come from Clark County (CEC 2012d). The applicant estimates operational workforce would commute from their existing residences instead of moving closer to the project site. Based on the comments from United Association Local 525, staff agrees that the applicant's assumptions are reasonable.

Socioeconomics Table 7 – Housing Supply Within Two-Hour Commute of the Project Site and **Socioeconomics Table 8** – Vacancy Status Within Two-Hour Commute of the Project Site depicts that there would be an adequate housing supply in the area to accommodate the project's operational workforce if employees wanted to move closer to the project site for ease of commuting. Thus, staff agrees with the applicant's assumptions about the operations workforce and does not expect employees to relocate to the immediate project area, given the robust regional workforce.

The operation employees would generate 100 vehicle daily trips (in/out). The 200 daily one-way vehicle trips is a minimal increase to traffic volumes in the area and would have a less than significant impact on overall traffic counts, congestion, and LOS along any of the state highways, roadways, and intersections employees would use to access the project site.

Parking

As indicated earlier, the HHSEGS would employ a total of 100 full time operations staff. The facility would operate and be staffed 24 hours a day, seven days a week. As shown in Figure 2.1-3 of the AFC, HHSEGS proposes 62 parking spaces (58 for non-disabled, 4 for disabled) in the common area. As shown in Figure 2.2-1R1, Power Block Plot Plan there are 26 proposed parking spaces at each power block (24 for non-disabled, 2 for disabled).

Truck Traffic and Hazardous Materials Delivery

Operation of the HHSEGS would result in transportation of hazardous materials. Staff has addressed this issue in the **Hazardous Materials Management** section of this FSA. As presented in that section, staff believes that during construction and operation of HHSEGS, minimal amounts, small shipment sizes and types of hazardous materials (paint, cleaners, solvents, gasoline, diesel fuel, motor oil, various lubricants, hydraulic fluid, sealants, paint thinner and welding gases in standard-sized cylinders) do not pose a significant risk of either spills or public impacts along any transportation route. Therefore, staff does not recommend a specific truck route.

However, delivery of toxic materials could still be hazardous to the public if a spill were to occur. Therefore, staff recommends Condition of Certification **TRANS-6** to ensure that the project owner contracts with a licensed hazardous materials and waste hauler company that complies with all applicable regulations and obtain the proper permits and/or licenses from the California Department of Transportation (Caltrans), Nevada Department of Transportation, and Inyo County.

In addition, Condition of Certification **HAZ-3** requires the development and implementation of a Safety Management Plan for delivery of liquid hazardous materials by tanker truck. The plan shall include procedures, protective equipment requirements and 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. For more information on the hazardous materials proposed for use during project operation and applicable regulations, see the **Hazardous Materials Management** section of this **FSA**.

Emergency Access

Staff believes that both regional and local emergency access to the HHSEGS site is adequate. Regionally, emergency vehicles could access the site using the most direct route from State Route 160 to Old Spanish Trail Highway. Refer to **Traffic and Transportation Figure 2** which depicts the primary emergency access point to the site and the secondary emergency access emergency access with crash gate. On-site circulation of emergency vehicles would be subject to site plan review by the Southern Inyo County Fire Department per conditions of certification in the **Worker Safety and Fire Protection** section of this **FSA**.

Aviation Impacts

The two solar towers would be approximately 750 feet tall and pose an obstruction hazard to aircraft. Because of the tower height, the applicant was required to notify the Federal Aviation Administration (FAA) of construction pursuant to Code of Federal Regulations Title 14, Aeronautics and Space, Part 77. These regulations require FAA notification for any proposed structure over 200 feet in height above ground level (AGL), regardless of the distance from an airport.

The HHSEGS submitted Form 7460-1 and has obtained a Determination of No Hazard to Air Navigation for Solar Tower Unit 1 (Aeronautical Study No. 2011-AWP-1954-OE) and Solar Tower Unit 2 (Aeronautical Study No. 2011-AWP-1955-OE) (CH2 2011e).

In addition, construction equipment, such as cranes that will be used during construction that are 200 feet tall or taller will require the applicant to notify the Federal Aviation Administration (FAA) pursuant to Title 14 of the Code of Federal Regulations Part 77. These regulations establish standards for determining obstructions in navigational space and sets forth requirements for notification of construction. To promote air safety and the efficient use of the navigable airspace, aeronautical studies are conducted based on information provided from FAA Form 7460-1, Notice of Proposed Construction or Alteration. These regulations require notification of the FAA for any construction feature over 200 feet in height AGL regardless of the distance from an airport, or if a proposed project structure would penetrate the navigable airspace of an airport that has a runway longer than 3,200 feet within 20,000 feet of the project structure.

Therefore, staff recommends Condition of Certification **TRANS-7** which would require the project owner to notify the FAA if the construction cranes would be 200 feet tall or taller.

As a condition to the Determination of No Hazard for Solar Tower 1 and 2, the structures must be marked/lighted in accordance with FAA Advisory Circular 70/760-1 K Change 2, Obstruction Marking and Lighting. Therefore, staff recommends Condition of Certification **TRANS-7** which would require obstruction marking and lighting of structures such as the towers and construction cranes to alert pilots to their location.

Glint and Glare

The issue from a Traffic and Transportation perspective is would the HHSEGS produce sufficient glare and/or excessive perceived brightness to either ground traffic or aviation to compromise a driver's or pilot's ability to operate his/her vehicle or aircraft.

Glint is difficulty seeing in the presence of a transient bright light source and is generally considered to be intermittent. 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. In **Appendix TT1-Glint and Glare**, staff concludes that glint and/or glare from the heliostats experienced by pilots would be considered as a discomfort producing effect rather than as a disability producing effect.

The glare effects from the solar receiver steam generators (SRSGs) are unavoidable and would produce a distinct visual distraction effect. However, these glare effects are not considered as sufficient to be visually debilitating and therefore, would not cause a safety hazard from an operator control perspective, such as operating a vehicle or flying a plane.

Direct solar reflections from the heliostat mirrors would produce a pronounced discomfort glare effect on any ground-based or airborne observer. This condition, in which the sun is directly reflected into an observer's eyes, should be avoided whenever possible for all heliostat operational scenarios. To reduce impacts on the reflections from the heliostat mirrors, staff recommends Condition of Certification **TRANS-8** Heliostat Operations Positioning and Monitoring Plan, which reduces the potential for direct solar reflections from the heliostat mirrors to all observers (ground-based or airborne) to an absolute minimum. Refer to **Appendix TT1 -Glint and Glare** for a full discussion of glint and glare and the proposed Condition of Certification **TRANS-8**.

Flooding Impacts

The Federal Emergency Management Agency (FEMA) issues Flood Insurance Rate Maps (FIRM) for use in administrating the National Flood Insurance Program and for floodplain management use by local agencies to reduce the impact of flooding. FEMA map panels 06027C-4625D and 06027C-4175D cover the entire project site and show that the project site crosses into the Zone A³⁴ boundary in two areas: one located at the north tip of the site and the other located at the southwest corner of the site. Please see the **Soils and Surface Water** section of this **FSA** for a more detailed discussion on flooding impacts associated with the construction and operation of HHSEGS; specially **Soils and Surface Water Figure 3**.

³⁴ Zone A is defined by FEMA as special flood hazard area subject to inundation by the 1% annual chance flood also known as the 100-year flood (the flood that has a 1% chance of being equaled or exceeded in any given year). Because detailed analyses are not performed for Zone A, no depths or base flood elevations are shown within these zones.

As previously discussed, the Old Spanish Trail Highway borders the project site's southern boundary and based on the Zone A boundary, this boundary implies that the Old Spanish Trail Highway could experience flooding caused by large storm events. A posted sign along Old Spanish Trail Highway near HHSEGS cautions motorists of potential flooding, and residents of Charleston View have indicated during a workshop and PSA comments that flooding of the roadway occurs³⁵.

The extent, depths, or locations of the flooding on the Old Spanish Trail Highway is not specifically documented because Inyo County does not keep specific storm-related data. However, Inyo County's Road Department has kept records regarding the number of days a flood event occurred, and whether road repairs were necessary in order to fix flood damage. (CEC 2012ii) The applicant's preconstruction hydrology study shows that the portion of Old Spanish Trail Highway located directly adjacent to the project site is expected to flood from flows traveling northwest across the roadway. However, the applicant did not account for the effects of the perimeter fencing and landscape features, which would impede flows which could cause flooding. Refer to **Soils and Surface Water Figure 12** – Post Construction Storm Water Flow Patterns at Old Spanish Trail Highway.

To address flooding on Old Spanish Trail Highway, Soils and Water staff proposes Condition of Certification **SOILS-6** (Perimeter Drainage Management Plan). The proposed condition of certification would require the project to increase the amount of flows crossing the perimeter which would, in turn, reduce the amount of flooding and redirected concentrated flow along the shoulder of Old Spanish Trail Highway. Refer to the **Soils and Surface Water** section of this FSA for additional discussion as it relates to flooding.

COMPLIANCE WITH LORS

Traffic and Transportation Table 13 provides an assessment of the HHSEGS's compliance with applicable laws, ordinances, and regulations (LORS) pertaining to traffic and transportation.

³⁵ The PSA Workshop (June 14, 2012 in Pahrump, Nevada) and Supplemental Comments & Analysis submitted by Intervenor Cindy MacDonald (MAC 2012c).

TRAFFIC AND TRANSPORTATION Table 13
Project Compliance with Adopted Traffic and Transportation LORS

Applicable Law	Description	Consistency
Federal		
Code of Federal Regulations (CFR) Title 14, Aeronautics and Space, Part 77 – Objects Affecting Navigable Airspace 77.13	This regulation requires the project owner to notify the Federal Aviation Administration (FAA) of construction structures with a height greater than 200 feet from grade or greater than an imaginary surface extending outward and upward at a slope of 100 to 1 from the nearest point of the nearest runway of an airport with at least one runway more than 3,200 feet in length.	The project would be consistent with this regulation with the inclusion of Conditions of Certification TRANS-7 .
Code of Federal Regulations (CFR) Title 49 Subtitle B, Parts 171-173, 177-178, 350-359, 397.9 and Appendices A-G	Requires proper handling and storage of hazardous materials during transportation.	The project would be consistent with this regulation with the inclusion of Condition of Certification TRANS-6 .
State		
California Vehicle Code, sections 13369, 15275, 15278	Requires licensing of drivers and the classification of license for the operation of particular types of vehicles. A commercial driver's license is required to operate commercial vehicles. An endorsement issued by the Department of Motor Vehicles (DMV) is required to drive any commercial vehicle identified in Section 15278.	The project would be consistent with this regulation with the inclusion of Condition of Certification TRANS-1 .
California Vehicle Code, sections 31303-31309	Requires transportation of hazardous materials to be on the state or interstate route that offers the shortest overall transit time possible.	The project would be consistent with this regulation with the inclusion of Condition of Certification TRANS-6 .
California Vehicle Code, Sections 31600-31620	Regulates the transportation of explosive materials.	The project would be consistent. The HHSEGS would not use explosive materials as defined in Section 12000 of the Health and Safety Code.
California Vehicle Code, sections 32100-32109	Requires shippers of inhalation hazards in bulk packaging comply with rigorous equipment standards, inspection requirements, and route restrictions.	The project would be consistent with this regulation with the inclusion of Condition of Certification TRANS-6 .
California Vehicle Code, sections 34000-34100	Establishes special requirements for vehicles having a cargo tank and for hazardous waste transport vehicles and containers, as defined in Section 25167.4 of the Health and Safety Code.	The project would be consistent with this regulation with the inclusion of Condition of Certification TRANS-6 .
California Vehicle Code, section 35550	Regulates weight guidelines and restrictions upon vehicles traveling on freeways and highways. A single axle load shall not exceed 20,000 pounds,	The project would be consistent with this regulation with the inclusion of Condition of Certification TRANS-1 .

Applicable Law	Description	Consistency
	the load on any one wheel or wheels supporting one end of an axle is limited to 10,500 pounds.	
California Vehicle Code, section 35551	Defines the maximum overall gross weight as 80,000 pounds and mandates that the gross weight of each set of tandem axles not exceed 34,000 pounds.	The project would be consistent with this regulation with the inclusion of Condition of Certification TRANS-1 .
California Vehicle Code, Section 35780	Requires a single-trip transportation permit to transport oversized or excessive loads over state highways.	The project would be consistent with this regulation with the inclusion of Condition of Certification TRANS-1 .
California Health and Safety Code, section 25160	Addresses the safe transport of hazardous materials	The project would be consistent with this regulation with the inclusion of Conditions of Certifications TRANS-1 and TRANS-6 .
Nevada Administrative Code – Hazardous Materials, Chapter 459, section 459.9785	Lists prerequisites to transportation of hazardous materials for which federal safety permit is required.	The project would be consistent with this regulation with the inclusion of Condition of Certification TRANS-6 .
Nevada Administrative Code – Hazardous Materials, Chapter, section 459.986	Requires Inspection of vehicles; verification of drivers' qualifications.	The project would be consistent with this regulation with the inclusion of Condition of Certification TRANS-1 .
Nevada Administrative Code-Traffic Laws, section 484.500	Requires a transportation permit for the operation of an oversized or overweight vehicle to travel a determined route with a designated load for a designated period.	The project would be consistent with this regulation with the inclusion of Condition of Certification TRANS-1 .
Local		
Inyo County Regional Transportation Plan: Goal 2: A Transportation system which is safe, efficient and comfortable which meets the needs of people and goods and enhances the lifestyle of the county's residents.	Objective 2.1: Maintain and Improve Roadway Level of Service – Maintain or improve existing Level of Service on roadways within the county. Policy 2.2.1: Proper access – Provide proper access to residential, commercial and industrial areas.	The project would be consistent with this policy with the inclusion of Condition of Certification TRANS-2 .

Applicable Law	Description	Consistency
Inyo County Regional Transportation Plan: Goal 3: Maintain adequate capacity on State Routes (SR's) and Local Routes in and Surrounding Inyo County and the City of Bishop.	Objective 3.3: Improve County routes. Policy 3.3.1 : Support roadway improvements to optimize public safety – Improve county roads through specific safety improvements and maintenance.	The project would be consistent with this policy with the inclusion of Conditions of Certification TRANS-2 and TRANS-3.
Section 7.2.4 Roadways and Highways - Policy RH-1.4 Level of Service	Maintain a minimum of Level of Service (LOS) "C" on all roadways in the County of Inyo. For highways within the County of Inyo, LOS "C" should be maintained except where roadways expansion or reconfigurations will adversely impact the small community character and economic viability of designated Central Business Districts.	The project would be consistent with this policy with the inclusion of Condition of Certification TRANS-2 and TRANS-5.
Section 7.2.4 Roadways and Highways Policy RH-1.5 Proper Access	Provide proper access to residential, commercial and industrial uses.	The project would be consistent with this policy with the inclusion of Condition of Certification TRANS-2.
Section 7.2.4 Roadways and Highways Policy RH-1.6 Minimize Environmental Impacts	Ensure that all transportation projects minimize adverse effects on the environment of the County.	The project would be consistent with this policy with the inclusion of Conditions of Certification TRANS-1, TRANS-2, TRANS-3, TRANS-4 and TRANS-6 and TRANS-8.
County of San Bernardino General Plan – Desert Region Goals and Policies of the Circulation and Infrastructure Element - Section IV- Goal D/CI 1 – Ensure a safe and effective transportation system that provides adequate traffic movement while preserving the rural desert character of the region.	Policy D/CI 1.14 – Ensure the County implements a traffic evaluation and monitoring program.	The project would be consistent with this regulation with the inclusion of Condition of Certification TRANS-5.

CUMULATIVE IMPACTS

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (Cal. Code Regs. tit 14,§15065(a)(3)).

Traffic Impacts

Staff reviewed known past, current, and probable future projects in the vicinity of the proposed HHSEGS project. The location of the overall projects identified within California and Nevada with respect to HHSEGS is shown in **Traffic and Transportation Figure 7.**

Traffic and Transportation Table 14 lists the known projects from the master cumulative list that could have overlapping construction schedule with HHSEGS.

**Traffic and Transportation Table 14
Cumulative Projects**

ID #	Project Name	Project Description and Status	Peak Construction Workers	Operation Workers	Construction Begins	Construction Ends
	HHSEGS		2,293	100	1st Qtr 2013	1st Qtr 2015
A	St. Therese Mission – State of California	17.5 acre environmental park, memorial and internment center located at 881 E. Old Spanish Trail Highway, 1.5 miles west of HHSEGS. Project approved June 23, 2010 – Conditional Use Permit #2010-02.	6	Unknown	In Construction	2014
F	Silver State South Solar (NVN 089530, NVN 085801) – State of Nevada	350 MW Solar PV Project located on 2,900 BLM land; Record of Decision 10/12/10.	230-400	70-100	3 rd Qtr 2012	4 th Qtr 2014
G	Stateline Solar Farm – State of California	300 MW Solar PV	500	7-10	4 th Qtr 2013	4 th Qtr 2015
I	Searchlight Wind Energy – State of Nevada	200 MW wind energy facility on 18,949 acres of both BLM and private land.	250-300		2012	2013
J	Southern Owens Valley Solar Ranch – State of California	200 MW of PV on 3,100 acres in southern Owens Valley; Draft Environmental Impact Statement in preparation.	300	10	3 rd Qtr 2012	3 rd Qtr 2015
N	Hidden Hills Valley Electric Transmission (NVN)	10 acre BSE Tap 230/500 kV Substation; Draft Environmental	66		4 th Qtr 2012	1 st Qtr 2015

	089669) – State of Nevada	Impact Statement pending.				
O	Calnev Pipeline Expansion – State of Nevada	16-inch diameter pipeline from an existing facility in Colton, California to an existing facility in Las Vegas, Nevada.	550-650	0	2012	2013/1014
	Total		2,929-3,249	207-240		

Source: US BLM 2012a, US BLM 2012b, US BLM 2012c, LADWP 2010

Traffic trips generated by the construction and/or operation of nearby projects could combine with traffic generated by HHSEGS to result in cumulative impacts to level of service (LOS) of nearby highways, intersections and roadways. Cumulative impacts would be a concern during construction of HHSEGS, but not during operations.

HHSEGS operations would generate a maximum of 200 daily vehicle trips, a minimal increase in traffic that would have a less than significant impact on overall traffic counts. Therefore, staff only evaluated cumulative impacts during HHSEGS construction.

Regional Impacts During Construction

Several proposed projects shown on **Traffic and Transportation Figure 7** have the potential to result in increased congestion on I-15 and SR-160 within the State of Nevada and only one project would utilize Old Spanish Trail Highway within both California and Nevada. These projects include St. Therese Mission, State Line Solar Farm, Silver State South Solar Project, CalNev Pipeline Expansion and Hidden Hills Valley Electric Transmission Project.

St. Therese Mission Project

The St. Therese Mission Project (Mission) would be constructed concurrently with the HHSEGS, and is the only identified cumulative project to also utilize Old Spanish Trail Highway. The Mission would average six construction employees and it is anticipated approximately 1,200 visitors per month would visit the site or an average visitor count of 40 per day.

Silver State South Solar Project

The Silver State South Solar Project (SSSSP) would involve the development of a 350 MW solar energy facility on approximately 2,900 acres of BLM land. The site is located in a largely undeveloped area and, therefore, major transportation routes are limited. Traffic routes within the project site are limited to unpaved OHV roads, trails, and dry washes. I-15 would provide indirect access to SSSSP from the urban centers of Southern California, such as San Diego and the greater Los Angeles area from the south, and Salt Lake City and Las Vegas from the north. East Primm Boulevard provides east-west direct access from I-15, South Las Vegas Boulevard/Nevada State Route (SR) 604, and Desert Arena Drive.

State Line Solar Project

The State Line Solar Project proposes a 300-megawatt (MW) alternating current (AC) solar photovoltaic (PV) energy generating project. The PV generating facility (Solar Farm), the corridor for the Project's 220-kilovolt (kV) generation interconnection (gen-tie) transmission line, and the access road would be located on Federal lands managed by the U.S. Department of Interior, Bureau of Land Management (BLM). The Proposed Solar Farm would be approximately 2 miles south of the California-Nevada border and 0.5 mile west of I-15 in eastern San Bernardino County.

CalNev Pipeline Expansion

The Calnev Pipeline Expansion Project would involve the construction, operation, and maintenance of a new 16-inch-diameter pipeline and ancillary facilities from an existing facility in Colton, California to an existing facility in Las Vegas, Nevada. The new pipeline would extend approximately 233 miles from the existing North Colton Terminal in Colton, San Bernardino County, California to the Bracken Junction near the McCarran International Airport in Las Vegas, Nevada. The Calnev Project roughly parallels Interstate 15 (I-15) from Colton to just outside Las Vegas. During peak construction approximately 550-650 employees would be required. The DEIS stated that pipeline construction generally proceeds at rates ranging from several hundred feet to one mile per day and the activities could last from one week to 30 days. Based on the construction moves through an area quickly, traffic impacts would generally be localized, intermittent and short term.

BLM has proposed MM TRAN-1: Traffic Management Plan requiring the Applicant to develop a Traffic Management Plan for locations along the route where local agencies (e.g., traffic engineering, public works, etc.) identify construction activities that would adversely impact the existing transportation system. Where requested by public agencies, the use of flaggers, warning signs, lights, barricades, cones, etc. would be implemented according to standard guidelines required by the affected jurisdiction.

Valley Electric's Hidden Hills Transmission Project

Valley Electric Association (VEA) has requested a new right-of-way (ROW) authorization from the Bureau of Land Management (BLM) for the construction, operation, maintenance, and termination of transmission infrastructure improvements in Pahrump and Sandy valleys to Jean, Nevada, and terminating at Eldorado Substation near McCullough Pass. This project would provide the system improvements necessary to support the development and delivery of the 500 MW generated by HHSEGS into the VEA.

Cumulative Impacts Conclusion

The total peak construction workers for the identified projects would be approximately 1,622. The only project that would utilize SR 160, and would be heavily impacted by the HHSEGS construction, would be the St. Therese Mission which is currently under construction and has identified 40 daily commercial trips.

The remaining projects, would utilize various section of I-15 and unlikely to overlap with the HHSEGS peak construction month. Therefore, the HHSEGS would not combine

with any past, current, or probable future projects to result in significant cumulative impacts to ground traffic within the State of California or State of Nevada on the nearby traffic and transportation system.

NOTEWORTHY PUBLIC BENEFITS

While the development of the proposed project 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 AGENCY AND PUBLIC COMMENTS

Traffic and Transportation comments were submitted by several individuals and organizations following the May 24, 2012 publication of the Preliminary Staff Assessment (PSA), including access and circulation concerns from Inyo County (INYO 2012h). Staff has addressed all comments, which can be reviewed in **Appendix 1 – PSA Response to Comments, Traffic and Transportation**.

CONCLUSIONS

Staff has analyzed the proposed HHSEGS's impacts to the nearby traffic and transportation system. With implementation of the proposed conditions of certification listed below, the HHSEGS 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.

Staff concludes that with mitigation from recommended Conditions of Certification **TRANS-1, TRANS-2, TRANS-3, TRANS-4, TRANS-5, TRANS-6, TRANS-7** and **TRANS-8**, the construction and operation of the Hidden Hills Solar Electric Generating System project would not result in significant traffic and transportation impacts, according to the California Environmental Quality Act (CEQA) Guidelines.

Socioeconomics Figure 1 and **Socioeconomics Table 2** do not identify the presence of an environmental justice community. Therefore, the 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. For more details, please see the **Socioeconomics** section of the **FSA**.

PROPOSED FINDINGS OF FACT

Based on the evidence, staff proposes the following findings and concludes as follows:

1. Project construction would occur over 29 months.
2. Project construction and operation would add additional automobile and vehicle traffic to the roads in the project region.

3. Currently, the roads in the project region are operating at a Level of Service (LOS) C or above.
4. The additional amounts of traffic attributable to the project construction would decrease existing Levels of Service (LOS) on the region's roads and highways.
5. The Old Spanish Trail Highway in the vicinity of the project could be substantially damaged by project-related heavy truck traffic.
6. Traffic and transportation impacts resulting from HHSEGS during the construction phase would be significant.
7. Traffic and transportation impacts resulting from HHSEGS during the operation phase would be less than significant.
8. Based on the HHSEGS's distance from the nearest airport, the project would not have an impact to aviation safety.
9. Based on the HHSEGS's distance from the nearest rail and nationwide bus service, the project would not have an impact to these forms of transportation.
10. Project-related traffic impacts in combination with the effects of past, present and reasonable foreseeable projects in the Pahrump Valley would not be cumulatively considerable on the traffic and transportation systems in the State of California or State of Nevada.
11. With Conditions of Certification the HHSEGS would not result in significant direct, indirect or cumulative traffic and transportation impacts.

PROPOSED CONDITIONS OF CERTIFICATION

TRANS-1 Roadway Use Permits and Regulations

The project owner or its contractor(s) shall comply with limitations imposed by the Department of Transportation (Caltrans) District 8 and 11 and other relevant jurisdictions, including Nevada Department of Transportation (NDOT) and Inyo County, on vehicle sizes and weights, driver licensing, and truck routes. In addition, the project owner or its contractor(s) shall obtain necessary transportation permits from all relevant jurisdictions for roadway use.

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 Right-of-Way

The project owner shall dedicate to the County of Inyo 24 feet of right-of-way along Old Spanish Trail Highway to ensure adequate turn lanes and acceleration/deceleration lanes for construction traffic. Prior to the peak daily

truck deliveries, the project owner shall have constructed the turn lanes and acceleration/deceleration lanes for construction traffic.

Verification: At least 90 days prior to start of site mobilization, the project owner shall provide evidence to the CPM that the dedication of right-of-way has been accepted and recorded by Inyo County; detailed construction plans that will identify improvements along Old Spanish Trail Highway and at the project entry points for review and comment by Inyo County and the CPM for review and approval. Prior to the peak daily truck deliveries (Month 6), the project owner shall have constructed the turn lanes and acceleration/deceleration lanes for construction traffic.

TRANS-3 Restoration of All Public Roads, Easements, and Rights-of-Way

The project owner shall coordinate with Inyo County to restore all public roads, easements, and rights-of-way that have been damaged due to project-related construction activities. This includes Old Spanish Trail Highway from the intersection of SR 127 to the intersection of SR 160. Restoration of significant damage which could cause hazards (such as potholes or deterioration of the pavement edges, damaged signage) must take place immediately after the damage has occurred. The restoration shall be completed in a timely manner to the road's original condition in compliance with the applicable jurisdiction's specifications.

Verification: Prior to the start of site mobilization, the project owner shall photograph or videotape all of the affected public roads, easements, right-of-way segment(s), and/or intersections. This includes all portions of Old Spanish Trail Highway from the intersection of SR 127 (State of California) to the intersection of SR 160 (State of Nevada). The project owner shall provide the photograph or videotape to the CPM and the affected jurisdictions (California Department of Transportation (Caltrans), Nevada Department of Transportation (NDOT), and Inyo County). The purpose of this notification is to request that these jurisdictions consider postponement of any planned public right-of-way repair 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.

If damage to public roads, easements, or rights-of-way is identified by the project owner or the affected jurisdiction, the project owner shall immediately notify the CPM and the affected jurisdiction(s) to identify the section of the public right-of-way to be repaired. At that time, the project owner shall establish a schedule for completion and approval of the repairs. Following completion of any public right-of-way repairs, the project owner shall provide the CPM letters signed by the person authorized to accept the repairs in the affected jurisdiction(s) stating their satisfaction with the repairs.

TRANS-4 Truck Route

The project owner shall require all construction truck traffic use State Route 160 for all access to and from the project site. Throughout the construction and operation of the project, the project owner shall document, investigate, evaluate, and resolve all project truck related complaints. The project owner or authorized agent shall:

- Provide a spotter (an individual, such as a security guard, to monitor truck traffic) to ensure all construction truck traffic does not utilize Old Spanish Trail Highway via State Route 127;
- Use the Traffic Complaint Resolution Form (below), or a functionally equivalent procedure acceptable to the CPM, to document and respond to each traffic complaint of construction truck traffic using Old Spanish Trail Highway west of the project site;
- Attempt to contact the person(s) making the traffic complaint within 24 hours;
- Conduct an investigation to determine the transportation company in the complaint and;
- Submit a report documenting the complaint and actions taken.

The report shall include: a complaint summary, including the final resolution and, if obtainable, a signed statement by the complainant stating that the truck route problem has been resolved to the complainant's satisfaction.

Verification: The project owner shall include this specific route in its contracts for truck deliveries and provide the CPM with a copy of the transmittal letter to the contractors specifying the truck route.

Within five days of receiving a truck route complaint, the project owner shall file a Traffic Complaint Resolution Form, shown below, with the CPM that documents the resolution of the complaint.

TRANS-5 Traffic Control Plan, Heavy Hauling Plan, and Parking/Staging Plan

The project owner shall prepare and implement a Traffic Control Plan (TCP) for the HHSEGS'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; Department of Transportation (Caltrans) District 9 Office; Nevada Department of Transportation (NDOT); Inyo County; County of San Bernardino; Clark County and Nye County in the preparation and implementation of the Traffic Control Plan (TCP). The project owner shall submit the proposed TCP to Caltrans District 8, 9, NDOT, Inyo County; County of San Bernardino; Clark County and Nye County 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 Traffic Control Plan (TCP) shall include:

- 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), Nevada Department of Transportation (NDOT) other state or federal agencies, and/or the affected local jurisdictions;
- Location and details of construction along affected roadways at night, where permitted;
- Temporary closure of travel lanes or disruptions to street segments and intersections during construction activities;
- Traffic diversion plans (in coordination with the County of Inyo, Caltrans, NDOT; County of San Bernardino; Clark County and Nye County) to ensure access during temporary lane/road closures;
- Access to residential and/or commercial property located near construction work and truck traffic routes;
- Ensure access for emergency vehicles to the project site;
- Advance notification to residents, businesses, emergency providers, hospitals, school districts, such as the Death Valley Unified School District, and the Front Sight Firearms Training Institute that would be affected when roads may be partially or completely closed;
- Visual monitoring of the LOS at the study intersections (SR 160/Old Spanish Trail Highway; SR 127/Old Spanish Trail Highway, and SR 127/Baker Boulevard) by the project owner's representative shall occur once per week, during the morning and afternoon peak hour during peak construction months. Monitoring would begin in Month 12 when 1,176 workers are projected (approximately 51 percent of the peak) and continue through the end of Month 24 when 1,293 workers are projected (approximately 56 percent of the peak). The findings shall be reported monthly to the CPM in the monthly compliance report or as necessary;
- The following measures shall be implemented when the traffic monitoring identifies LOS E conditions at the intersection of SR 160/Old Spanish Trail Highway; LOS D conditions at SR 127/Old Spanish Trail Highway; LOS F conditions at SR 127/ Baker Boulevard:
 - A work schedule and end-of-shift departure plan that would stagger Monday arrivals and Friday departures from the project site;
 - Carpooling - Club Ride Program sponsored by the Regional Transportation Commission of Southern Nevada and;
 - Employer Sponsored Van Program designed to transport construction workers to the project site via a van or bus service. 15-passenger vans shall be used to achieve a baseline carpool rate of 1.5 people per car for the California workforce and the higher carpool rate of 2.5 people per car

when the day shift workforce reaches 1,000 employees shall be required.

- Identification of safety procedures for exiting and entering the site access gate;
- Parking/Staging Plan (PSP) for all phases of project construction and for project operation.

For any activity on public roads, the project owner shall apply for, receive and comply with all conditions of an encroachment permit from the affected jurisdiction.

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 and a copy of the encroachment permit issued by the affected agency for any activities on a public road.

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-6 Transportation of Hazardous Materials

The project owner shall contract with licensed hazardous material delivery and waste hauler companies in order to obtain the necessary permits and/or licenses from the California Highway Patrol, the California Department of Transportation (Caltrans), Nevada Department of Transportation, 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 and the deliveries shall only use State Route 160 to the project site.

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 substances.

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-7 Federal Aviation Administration Notification of Construction Cranes and 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 consistent with FAA requirements, as expressed in the following documents:

- FAA Advisory Circular 70/7460-1K
- 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 operation of the HHSEGS. 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.

The project owner shall file a Form 7460-1 with the Federal Aviation Administration (FAA) regarding the use of 200 feet tall construction cranes.

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 towers that depict the required air traffic obstruction marking and lighting.

Within 5 days of completion of the solar power tower construction and prior to 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.

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.

TRANS-8 Heliostat Operations Positioning and Monitoring Plan

The project owner shall prepare and implement a Heliostat Operations Positioning and Monitoring Plan (HPMP) that would avoid human health and safety hazards and accomplish the following:

- *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" which avoids reflected sunrays on all unintended areas (at least the tower and power block, and other designated sensitive areas). Safe path orientation includes normal repositioning operations as well as any contingency repositioning operations (such as during excessive high winds) which may required.
- *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.

Verification: At least 90 days prior to commercial operation of any of the two HHSEGS Solar Receiver Steam Generators, the project owner shall submit the Heliostat Positioning and Monitoring Plan to the CPM for review and approval. The project owner shall also submit the plan to the Federal Aviation Administration (FAA) for review and comment and forward any comments received to the CPM. The project owner shall not test or operate the project until the HPMP is approved by the CPM.

Traffic Complaint Resolution Form

Hidden Hills Solar Electric Generating System (11-AFC-2)
COMPLAINT LOG NUMBER _____
Complainant's name and address:
Phone number: _____
Date complaint received: _____ Time complaint received: _____
Nature of truck route complaint:
Definition of problem after investigation by plant personnel:
Date complainant first contacted: _____
Description of corrective measures taken:
Complainant's signature: _____ Date: _____
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

- BLM 2012 – Bureau of Land Management - Dumont Dunes Off-Highway Vehicle Area website <http://www.blm.gov/ca/st/en/fo/barstow/dumont.html> accessed 5/12/12.
- CCTE 2008 – Clark County Transportation Element, Adopted July 16, 2003, Last Amendment December 3, 2008.
- CEC 2012d – California Energy Commission/L. Worrall (tn: 63485) Report of Conversation with J. Orr, Local 525. 01/23/2012.
- CEC 2012l – California Energy Commission/M. Monasmith (tn: 63867) Report of Conversation w/ Anthony Parisi re: Military Operations. 2/27/2012.
- CEC 2012n – California Energy Commission/M. Monasmith (tn: 63905) Report of Conversation w/ Candace Hill and CH2MHILL with L. Valdez re: LOS. 3/01/2012
- CEC 2012r – California Energy Commission/M. Monasmith (tn:65224) Report of Conversation w/Candace Hill regarding Bus Stop schedule. 5/15/2012
- CEC 2012 v – California Energy Commission/M. Monasmith (tn: 65071) Report of Conversation with CEC's Candace Hill and Kent Sears of Nevada Department of Transportation Regarding State Route 160 - State of Nevada. 5/4/2012.
- CEC 2012aa – California Energy Commission/M. Monasmith (tn: 66525) Report of Conversation Candace Hill and Mike Meacher COO of Front Site. 8/08/2012.
- CEC 2012gg – California Energy Commission/M. Monasmith (tn: 67623) Record of Conversation between Candace Hill and Caltrans re:Traffic Monitoring Program, Traffic Control Program, Surface Restoration. 10/09/2012
- CEC 2012hh – California Energy Commission/C. Hill (tn: 67693) Record of Conversation with Candace Hill and Ed Petre re: Updated Workforce Analysis - Traffic Implications for San Bernardino County. 10/11/2012
- CEC 2012ii – California Energy Commission/M. Monasmith (tn: 67868) Record of Conversation with Candace Hill and D. Crom re flooding on Old Spanish Highway/Tecopa Road. 8/31/2012.
- CEC 2012kk – California Energy Commission/M. Monasmith (tn: 68001) Record of Conversation, S. Kerr and D. Crom re: Inyo County Public Works. 10/23/2012.
- CEC 2012ll – California Energy Commission/M. Monasmith (tn: 68367) Candace Hill email re: traffic issues, Baker, CA. 11/05/2012

CDOT 2012 – California Department of Transportation, Structure Maintenance and Investigations – California Log of Bridges on State Highways District 8, April 2012.

CDOT 2011 - California Department of Transportation - State Route 127 Transportation Concept Report, District 9, Office of System Planning, October 2011.

CH2 20011e- CH2MHill/J. Carrier (tn 62913) Applicant's Data Response 1A. 11/16/2011.

CH2 2012d – CH2MHill/J. Carrier (tn 63635) Applicant's Data Response Set 2A – Boiler Optimization Plan and Design Change 2/16/2012.

CH2 2012ee – CH2MHill/J. Carrier (tn: 66319) Applicant's PSA Comments, Set 2. 7/23/2012.

CH2 2012jj– CH2MHill/J. Carrier (tn: 67434) Applicant's Updated Workforce Analysis. 10/01/2012.

CH2 2012rr—CH2MHILL/ L. Valdez (tn 68877) Technical Memo State Route 127/ Baker Boulevard Intersection Analysis dated, December 10, 2012. Submitted to CEC Dockets Unit on December 13, 2012.

CSB 2007 – County of San Bernardino 2007 General Plan – Introduction and Circulation and Infrastructure Element.

CSB 2012 – County of San Bernardino, Department of Public Works, Traffic Division.

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Appendix TT 1
Glint and Glare Safety Impact Assessment
Hidden Hills Solar Electric Generating System
Gregg Irvin, Ph.D.

INTRODUCTION

The Hidden Hills Solar Electric Generating(System (HHSGS) would be located on Old Spanish Highway, near the community of Charleston View on approximately 3,277 acres (5.12 square miles) of privately owned land in Inyo County, California, adjacent to the Nevada border. The project site is approximately 18 miles south of Pahrump, Nevada, and approximately 45 miles west of Las Vegas, Nevada.

Each solar plant would use heliostats which are elevated mirrors 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 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. The solar field and power generation equipment would start each morning after sunrise and, unless augmented, would shut down when insolation^[1] drops below the level required keeping the turbine 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. The solar field for each solar plant would consist of approximately 85,000 heliostats.

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 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.

^[1] Defined as "exposure to the sun's rays."

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 Hidden Hills Environment

Perceived brightness depends on a variety of factors including the luminance of the global ambient, target size 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)/m². As such, the luminance of the sun is also enormous and is on the order of 1.6x10⁹ cd/m² (candelas per meter squared) on a clear day at noon.

Irradiance is a measure of the power incident on a surface, also called radiant flux density, and is expressed as Watts/cm². Irradiance characterizes 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_{λ}). 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'Éclairage (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/m² to approximately 7,000 cd/m². Of the total light removed from the direct solar beam by scattering in the atmosphere (approximately 25%) 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. The Rio Mesa site is similar to the Hidden Hills site and the solar and sky measurements taken are considered as applicable to Hidden Hills. 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/m²-sr. When the standard human luminous efficiency function is applied to these spectral measurements the computed luminance values are 6,175 cd/m² ± 222 cd/m². **Figure 1** shows an example of the measured sky spectrum (normalized) over the range of human visual sensitivity (blue). Also shown is the CIE Vλ photopic luminous efficiency function (green) depicting relative visual sensitivity over the wavelength range of 360-830 nm.

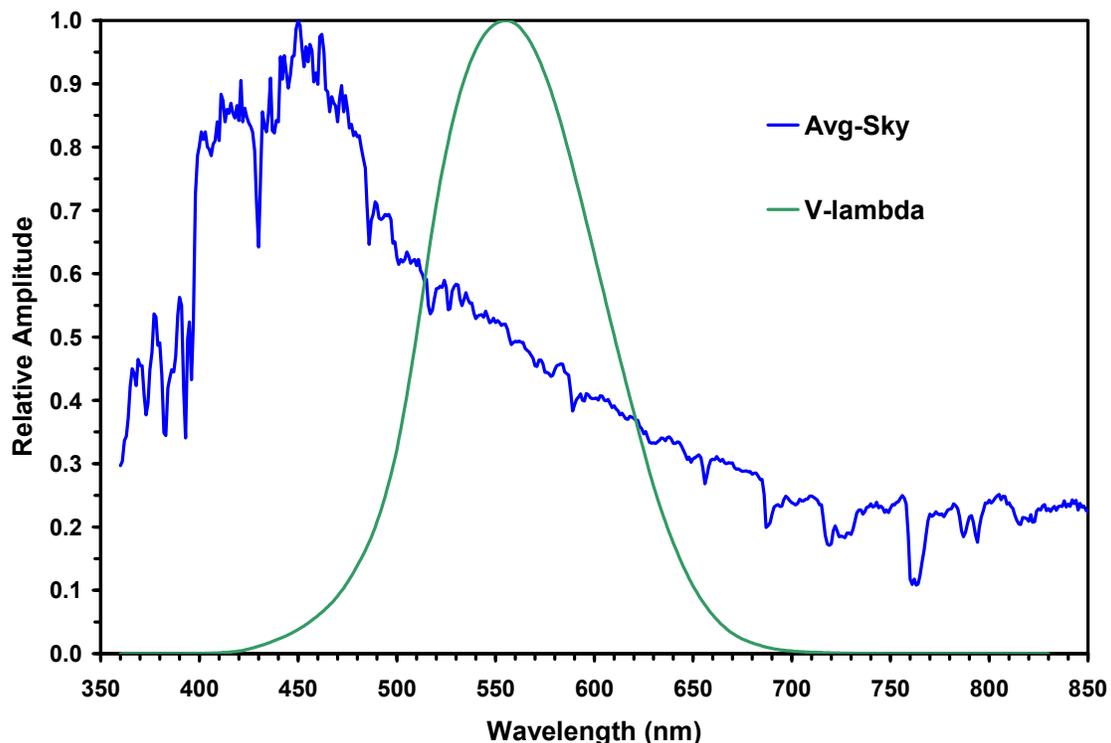


Figure 1 Normalized Sky spectral radiance (W/cm²-sr) resulting in a luminance of 6,157 cd/m² (Dominant wavelength 478 nm, Purity 28.5).

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 G-173-03. The applicant, BrightSource, 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 continuous 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 lower panel shows the region relevant for human vision (360-830 nm).

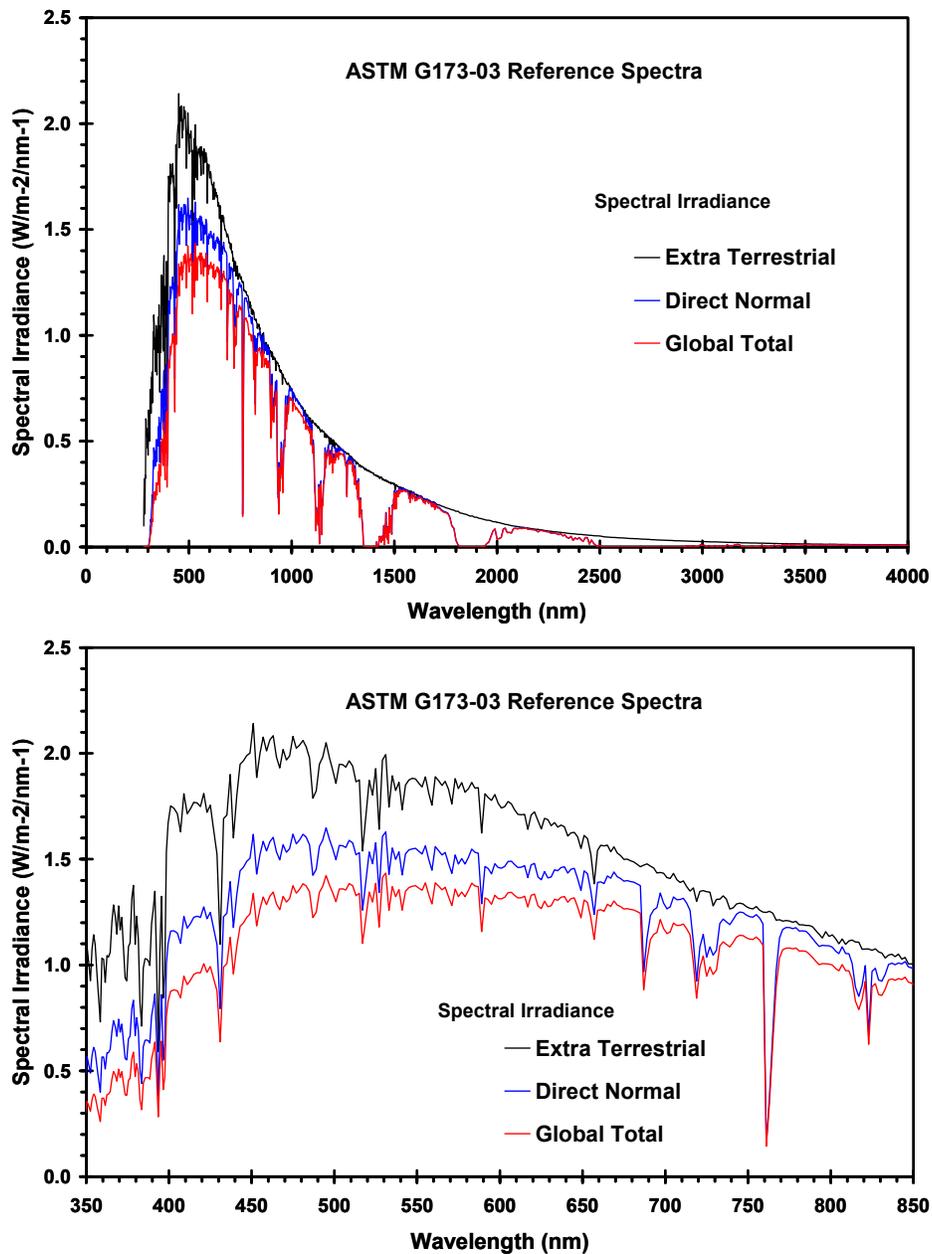


Figure 2 American Society for Testing and Materials G173-03 Reference Spectra.

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 (Irvin & Ramer, 1988). 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 (E_r). The calculation of E_r takes under 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 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 & el. 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 which 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. $80,000 W/m^2$). BrightSource provided modeling in which the modest attenuation by air was not included, i.e., a worst case scenario. In this case the E_r 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 $50 W/m^2$, 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 E_r levels beyond the MPE. The nearest public right of way is Old Spanish Trail Highway (also called Tecopa Road) which is approximately 0.5 mile from the nearest SRSG at its closest point on the southern border of the solar facility. The nearest residential establishment is Charleston View along on the southern region of this same section of Old Spanish Trail Highway. At these distances the level of retinal irradiance exposure is less than 3 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 E_r 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 ring) 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/m²) 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%) 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.

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 Charleston View (population 36) along Old Spanish Trail Highway will be nearest the facility. Motorists utilizing Old Spanish Trail Highway will be no closer than 0.5 mile from the nearest SRSG. At these distances and because these individuals will not experience long duration exposure, there is no risk for photochemical damage. At these distances 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 Pahrump (population 36,441), located approximately 18 miles to the north.

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 HHSEGS 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." BrightSource 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.

Therefore, Worker Safety staff recommends Condition of Certification **Worker Safety 1** (Project Construction Safety and Health Program) and **Worker Safety-2** (Project Operations and Maintenance Safety and Health Program) which are designed to insure that workers in the solar field receive and wear the appropriate personal protective equipment including protective sunglasses.

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, will not receive solar radiation concentrations above that of direct sunlight. Significant precautionary measures have been applied to the planned heliostat

control algorithms and Condition of Certification **TRANS-8** (Heliostat Operations Positioning and Monitoring Plan (HPMP)). This safe operation of the heliostats, according to the applicant, will 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" which 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.

The HPMP and resulting control algorithms will accommodate any known sensitive 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 will avoid aiming reflected sunrays at the sensitive area to ensure that there will be no concentration of solar radiation on it. With these procedures appropriately implemented, 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.

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 HHSEGS site based on the range of the heliostat to the tower SRSG. 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. Thus, an aircraft passing through one or more heliostat 'beams' at altitude above or near the heliostat field will receive a divergent beam. As such the 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.

Thus, glint and/or glare from the heliostats 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 that received successive heliostat exposures in rapid succession over an extended period of time the pilot may experience this as significantly discomforting.

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 will 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 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/m². As such, the luminance of the sun is also enormous and is on the order of 1.6x10⁹ cd/m² (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 will be created by the tower SRSGs have been calculated to be 68 W/m² in views from the north, and 53 W/m² in views from the south. These correspond to maximum luminance values for the SRSGs of 230,000 cd/m² and 424,000 cd/m², respectively.

The north view value is 2,941 times less than that of the sun. The background sky within which the tower will 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/m². As such the SRSGs will be 37 times more luminous (230,000/6,175) than the background. Even in the high state of light adaptation produced by the daytime environment this will appear quite bright to observers. However, the SRGS are still a factor of approximately 7,000 times less luminous than the sun.

What do these values translate to in terms of perceived brightness? In the field of human visual psychophysics Stevens' Power Law¹ 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

$$P(I) \equiv cI^a$$

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 3** 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 61, and the brightness of the sun as 1,170. Thus, perceptually, although the SRSG is 37 times more luminous than the background sky, the perceived brightness is only 3.3 times as great (61/18). Further, the sun would be perceived as 19 times brighter than the SRSGs (1,170/61) and 64 times brighter than the sky (1,170/18).

	Luminance (cd/m ²)	Relative Brightness
Sun	1,600,000,000	1,170
Tower SRSG	230,000	61
Sky	6,175	18

Figure 3. 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.

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 atmospheric effects. For greater ranges perceived brightness will obey Steven's power law. For closer ranges within the solar field perceived brightness could increase substantially as the visual size of the SRSG's increases.

At a viewing distance of 2.8 miles the tower receivers will 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 will have a visual subtense of 1/6 deg, 10 min arc. At this visual size perceived brightness will 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 230,000 cd/m² (61 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 age². 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) receivers are significant and unavoidable. 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.

TRAFFIC & TRANSPORTATION

List of Comment Letters

		Traffic & Transportation Comments?
1	Inyo County	X
2	Bureau of Land Management	
3	National Park Service	
4	The Nature Conservancy	
5	Amargosa Conservancy	
6	Basin & Range Watch	
7	Pahrump Paiute Tribe	
8	Richard Arnold, Pahrump Piahute Tribe	
9	Big Pine Tribe of Owens Valley	
10	Intervenor Cindy MacDonald	X
11	Intervenor Center for Biological Diversity	
12	Intervenor, Old Spanish Trail Association	
13	Applicant, BrightSource Energy, Inc.	X

Comment #	DATE	COMMENT TOPIC	RESPONSE
1	July 17, 2012	Inyo County	
1.6		<p>Old Spanish Trail Highway and Enforcement: The County is concerned that the Condition of Certification TRANS-4 (Truck Route) does not contain a process by which the project owner or contractor(s) would be fined if truck traffic used Old Spanish Trail Highway and State Route 127 to access the project site or to reimburse the County for costs to repair the roadway.</p>	<p>The California Energy Commission through the Warren-Alquist Act Section 25534 (b) provides a process for civil penalties for non-compliance with Conditions of Certification. In addition, staff has added language to Condition of Certification TRANS-4- Truck Route requiring a spotter at the project site to ensure that truck traffic entering the project site are not using the Old Spanish Trail Highway via State Route 127.</p>

Appendix 1 - PSA Response to Comments, Traffic and Transportation

<p align="center">1.61</p>		<p>Revised Condition of Certification (COC): The County requests a revision to COC TRANS-2 (Right-of-Way) to include new language: <u>The configuration of driveways into the HHSEGS site do not allow for rights-of way for traffic transitions within the limits of the HHSEGS site. The drive locations shall be reconfigured to accommodate traffic transitions within the limits of the property boundaries or additional right-of-way beyond the HHSEGS site shall be acquired and dedicated to Inyo County along the Old Spanish Trail Highway.</u> Also add language to the Verification to state the right-of-way must be accepted by Inyo County.</p>	<p>Refer to Condition of Certification TRANS-2 for revised language, which addresses new right-of-way language.</p>
<p align="center">1.62</p>		<p>New Condition of Certification: The County requests a new Condition of Certification TRANS-2A: (Pavement Preparation/Widening) as follows: <u>Prior to any ground disturbance, other improvements, or other obstruction of traffic within any public road, the project owner shall apply for and receive an encroachment permit from Inyo County for the construction and completion of construction of an asphalt concrete overlay on Old Spanish Trail Highway and pavement widening including transitions to accommodate the turning movements along Old Spanish Trail Highway into and out of the HHSEGS site. Verification language: Prior to the start of onsite construction, the project owner shall provide evidence to the CPM that the construction of asphalt concrete overlay and turn lanes into and out of the HHSEGS site have been accepted by Inyo County.</u></p>	<p>The new requested Condition of Certification TRANS-2A was not incorporated as the " construction of an asphalt concrete overlay on Old Spanish Trail Highway " prior to any ground disturbance does not meet CEQA Guidelines Section 15370 - Definition of Mitigation. However, CEC has recommended COC TRANS-3 (Restoration of All Public Roads, Easements, and Rights-of-Way) rectifying the impact by repairing, rehabilitating, or restoring the impacted environment which would be Old Spanish Trail Highway.</p>

Appendix 1 - PSA Response to Comments, Traffic and Transportation

<p>1.63</p>		<p>Revise Verification COC TRANS - 3 to: Prior to the start of site mobilization, the project owner shall photograph or videotape all of the affected public roads, easements, right-of way segment(s), and/or intersections (<u>including the portion of the Old Spanish Trail located to the west of project</u>). The project owner shall provide the photographs or videotape to the CPM and the affected jurisdictions (California Department of Transportation (Caltrans), Nevada Department of Transportation (NDOT), and Inyo County). The purpose of this notification is to request that these jurisdictions consider postponement of any planned public right-of-way repair 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. If damage to public roads, easements, or rights-of-way <u>is identified by the project owner or the affected jurisdiction occurs during construction</u>, the project owner shall <u>immediately</u> notify the CPM and the affected jurisdiction(s) to identify the section of the public right-of-way to be repaired. At that time, the project owner shall <u>apply for, receive and comply with all conditions of an encroachment permit from the affected jurisdiction</u> and establish a schedule for completion and approval of the repairs. Following completion of any public right-of-way repairs, the project owner shall provide the CPM letters signed by <u>the person authorized to accept the repairs</u> in the affected jurisdiction(s) stating their satisfaction with the repairs. <u>If, in the opinion of the affected jurisdiction(s), the project owner is not timely in completing the required repairs, the jurisdiction(s) can, at its discretion, complete the repairs with its own staff or contract with an independent contractor to complete the repairs at the expense of the project owner. The project owner will reimburse the affected agency(ies) for the expense of the repairs.</u></p>	<p>Refer to Condition of Certification TRANS-3 for revised language.</p>
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Appendix 1 - PSA Response to Comments, Traffic and Transportation

<p align="center">1.64</p>		<p>Revise COC TRANS-4 (Truck Route) as follows: The project owner shall require all construction truck traffic use State Route 160 <u>for all access to and from</u> the project site. Throughout the construction and operation of the project, the project owner shall document, <u>that all trucks access the project site using Nevada State Route 160 and shall</u> investigate, evaluate and attempt to resolve all project truck-related complaints. The project owner or authorized agent shall: Use the Traffic Complaint Resolution Form (below), or a functionally equivalent procedure acceptable to the CPM, to document and respond to each traffic complaint; Attempt to contact the person(s) making the traffic complaint within 24 hours; Conduct an investigation to determine the transportation company in the complaint and; Submit a report documenting the complaint and actions taken. The report shall include: a complaint summary, including the final resolution and, if obtainable, a signed statement by the complainant stating that the truck route problem has been resolved to the complainant's satisfaction. <u>The project owner will pay a \$10,000 penalty to Inyo County for each truck that accesses the site using the portion of the Old Spanish Trail Highway to the west of the project. This penalty shall be in addition to the restoration of any damage to the portion of the Old Spanish Trail to the west of project caused and addressed in accordance with TRANS-3.</u></p>	<p>Refer to COC TRANS-4 for revised language. The California Energy Commission through the Warren-Alquist Act Section 25534 (b) provides a process for civil penalties for non-compliance with Conditions of Certification.</p>
<p align="center">1.65</p>		<p>Revise COC TRANS-5 (Traffic Control Plan, Heavy Hauling Plan and Parking/Staging Plan): Add a new sentence after the last bullet that states" <u>For any activity on public roads, the project owner shall apply for, receive and comply with all conditions of an encroachment permit from the affected jurisdiction.</u> 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, <u>and a copy of the encroachment permit issued by the affected agency for any activities on a public road.</u></p>	<p>Refer to Condition of Certification TRANS-5 for revised language.</p>

Appendix 1 - PSA Response to Comments, Traffic and Transportation

Comment #	DATE	COMMENT TOPIC	RESPONSE
10	July 21, 2012	Intervenor Cindy MacDonald -- p. 15-1	
10.1		Requests the location of the waiting area for delivery trucks if they arrive at the project site outside of prescribed times.	Refer to Construction Workforce Parking and Laydown Area for discussion of 180 acres on an adjacent parcel that is contiguous to the project site. Access to the construction and laydown area would be from the Old Spanish Trail Highway.
10.2		Requests new mitigation measures for HHSEGS for waiting delivery trucks to turn off their engines if they must wait longer than three minutes for site entry in order to control air emissions and 5:00 am noise pollution to Charleston View residents located five acres away from the Old Spanish Trail Highway/Tecopa Road.	Refer to Air Quality Section - Condition of Certification AQ-SC5(j) and Noise and Vibration Condition of Certification NOISE-6 - Construction Restrictions.
10.3		Potential additional vehicle impacts on Old Spanish Trail Highway/Tecopa Road from the students at the Front Site Firearms Training Institute located within the State of Nevada have not been addressed. The comment referenced an article in the Pahrump Valley Chamber of Commerce Magazine (23rd Edition, 2012) that stated the Front Site Firearms Training Institute trained nearly 25,000 students in 2011.	A discussion of traffic generated by Front Sight Firearms Training Institute has been included in the Traffic and Transportation FSA Section.
Comment #	DATE	COMMENT TOPIC	RESPONSE
13	July 23, 2012	Applicant, BrightSource Energy, Inc. -- p. 241	
13.1		General Comment: PSA thorough, objective and accurate analysis on Traffic and Transportation issues but several proposed Traffic and Transportation Conditions of Certification are more stringent than the conditions placed on similarly situated projects licensed by the Commission.	Comment noted regarding the PSA analysis. The proposed conditions of certification for HHSEGS have been incorporated from other approved projects associated with construction truck and vehicle traffic impacts.

Appendix 1 - PSA Response to Comments, Traffic and Transportation

<p align="center">13.2</p>		<p>General Comment: Request the access road south of the project site be referenced as Tecopa Road rather than Old Spanish Trail Highway to avoid confusion with the Old Spanish Trail Historic Trail.</p>	<p>The Old Spanish Trail Highway nomenclature has been retained in the Traffic and Transportation Section as it is used by the Department of Transportation (Caltrans), Traffic Data Branch, Traffic and Vehicle Data Systems Unit for traffic counts ; Caltrans - District 9 stated in thier commets to the Updated Workforce Analysis the road is named Old Spanish Trail Highway; Inyo County references Old Spanish Trail Highway and Old Spanish Trail Highway is depicited on the United States Geological Survey (USGS) topographic maps. New language has been included to explain the difference between Old Spanish Trail Highway and Old Spanish Historic Trail.</p>
<p align="center">13.3</p>		<p>General Comment: Request deletion of Conditon of Certification TRANS-1 - (Roadway Use Permits and Regulations). This condition has not been imposed on other similarly situated renewable energy projects and would be burdensome, costly and unenforceable. It has not been shown that the Commission has the authority to impose a condition regarding the permits for vehicles that travel roads in California and Nevada. The Commission has jurisdiction over power plant "sites and related facilities." This condition would be a significantly burdensome and unnessary expansion of the Commission's jurisdiction.</p>	<p>CEC Staff disagrees with the deletion of this Condition of Certification. Of the 11 approved solar thermal projects since 2008, this Condition has been imposed on six Traffic and Transportation projects. Specifically, Palen; Genesis ; Blythe ; Calico ; Palmdale and Rice.</p>
<p align="center">13.4</p>		<p>General Comment: Requests revision to Condition of Certification TRANS-2 - Rather than 24 feet of right-of-way along Old Spanish Trail Highway the condition should be revised to specify that the project owner shall provide the necessary right-of-way for acceleration and</p>	<p>Refer to Condition of Certification TRANS-2 for revised language which addresses right-of-way requirements.</p>
<p align="center">13.5</p>		<p>General Comment: Request revision to the Socioeconomics language to be consistent with the language in the Socioeconomics section.</p>	<p>Staff Agrees- Text has been revised.</p>

Appendix 1 - PSA Response to Comments, Traffic and Transportation

<p align="center">13.6</p>		<p>General Comment: Requests a revision to Condition of Certification TRANS-3 -(Restoration of All Public Roads, Easements, and Rights-of-Ways). The condition is different and more stringent than the standard condition that has been applied to similarly situated projects. This condition requires the project owner to restore all public roads that have been damaged due to project related construction activities to “original condition or better in compliance with the applicable jurisdiction’s specifications.” The verification language differs from the standard condition and raises a number of potential ambiguities in the manner in which it would be applied. To avoid any possible confusion, we urge the Commission to apply the standard condition and verification language.</p>	<p>CEC Staff has revised the language - the phrase or better has been deleted. The COC language was strengthened to address deteriorating roadways during construction of projects.</p>
<p align="center">13.7</p>		<p>General Comment: Requests a revision to Condition of Certification TRANS 4 (Truck Route). The condition states that “The project owner shall require all construction truck traffic use State Route 160 to the project site.” We recommend that the condition be revised to specify that all construction truck traffic originating from outside of Inyo County shall not use Tecopa Road from east of the project site. We expect that there will be some construction trucks that may originate from within Inyo County and we would not want to have a condition that would inadvertently preclude service or deliveries from Inyo County businesses.</p>	<p>Refer to Condition of Certification TRANS-4 for revised language.</p>
<p align="center">13.8</p>		<p>General Comment: Requests deletion of COC TRANS-6 (Transportation of Hazardous Materials). As with TRANS-1 the requirement to contract with licensed hazardous material delivery companies is established by law and is the responsibility of the transporter, not the customer, and is unnecessary, burdensome and inconsistent with previous CEC projects.</p>	<p>CEC Staff disagrees with the deletion of this COC. Of the 11 approved solar thermal projects since 2008, this COC has been imposed on five Traffic and Transportation projects. Specifically, Palen; Genesis ; Blythe ; Calico and Palmdale.</p>

Appendix 1 - PSA Response to Comments, Traffic and Transportation

<p align="center">13.9</p>		<p>Specific Comment: Page 4.11-9, Level of Service, 3rd and 4th paragraphs: The levels of service (LOS) was calculated using seconds of delay not a volume/capacity (V/C) ratio. Therefore, revise the 2nd paragraph as follows: Based on the traffic volumes, the turning movement counts, and the existing number of lanes at each intersection, the volume/capacity (V/C) ratios and levels of service (LOS) have been determined for each intersection. Traffic and Transportation Table 2 summarizes the intersection roadway-LOS criteria based on seconds of delay or associated V/C ratios.</p>	<p>Staff Agrees - Text revised.</p>
<p align="center">13.10</p>		<p>Specific Comment: Page 4.11-9, Table 2, Level of Service Criteria for Roadways and Intersections: Delete "Roadways and" in the table title since the definitions are only for roadways. A separate table for roadways and LOS may be warranted.</p>	<p>Staff Agrees - Text revised.</p>
<p align="center">13.11</p>		<p>Specific Comment: Page 4.11-9, Table 2, Level of Service Criteria for Roadways and Intersections, 2nd column, Control Delay (seconds/vehicles): The control delay listed in this column is for intersections.</p>	<p>Staff Agrees - Text revised.</p>
<p align="center">13.12</p>		<p>Specific Comment: Page 4.11-12, Bicycle and Pedestrian Facilities, 2nd paragraph, 1st sentence (note the font in the heading is inconsistent): A Class II bike lane is provided on either side of SR 160. Thus, please revise the first sentence as follows: Due to the remoteness of the area there are no designated bicycle lanes in the area (other than SR 160) or adjacent to HHSEGS.</p>	<p>Staff Agrees - Language Added</p>
<p align="center">13.13</p>		<p>Specific Comment: Page 4.11-14, Item 8: Applicant suggests that this item be deleted because it is not an applicable threshold of significance under CEQA.</p>	<p>Comment Noted - Staff has retained this item as CEC also utilizes LORS used by other Governmental Agencies and in this case FAA.</p>

Appendix 1 - PSA Response to Comments, Traffic and Transportation

<p align="center">13.14</p>		<p>Specific Comment: Page 4.11-15, Construction Period Impacts and Mitigation, 1st paragraph, 1st sentence: Only one intersection was analyzed. Suggest the following change: Staff analyzed the proposed HHSEGS's potential traffic impacts by evaluating state route segments, roadway segments, and <u>the intersections of SR 160 and Tecopa Road in the vicinity of the project site.</u></p>	<p>Staff Agreed and added the requested language. However, language has since been revised based on the October 1, 2012 Updated Workforce Analysis .</p>
<p align="center">13.15</p>		<p>Specific Comment: Page 4.11-15, Construction Workforce Traffic, first two paragraphs: The analysis has been revised to be consistent with revised impacts from using construction truck traffic levels used in the air quality construction impact assessment. Suggest the following changes be made: insert the phrase <u>at the project site</u> between the words workforce and would; revise the number of peak constructon workers from 634 per month to <u>641</u>; revise the percentage of peak workforce from 82 percent to <u>86</u> percent; insert the phrase <u>a peak</u> between the words In addition and approximately; revise the number of workers to construct the gas and transmission lines from 42 to <u>66</u>; Delete the phrase and linear compliance support.</p>	<p>Staff Agreed and added the requested language. However, language has since been revised based on the October 1, 2012 Updated Workforce Analysis .</p>
<p align="center">13.16</p>		<p>Specific Comment: Page 4.11-16, 4th paragraph: Please revise as follows: revise the total number of daily auto trips from 1,910 to <u>1,912</u> and revise the number 860 for morning and afternoon peak hour trips to <u>863</u>.</p>	<p>Staff Agreed and added the requested language. However, language has since been revised based on the October 1, 2012 Updated Workforce Analysis .</p>
<p align="center">13.17</p>		<p>Specific Comment:Page 4.11-16 and 17, Revise Table 4 - Daily Trips for Automobiles from 1,910 to <u>1,912</u>; Trucks from 834 to <u>768</u>; total from 2,744 to <u>2,680</u>; Automobiles in from 860 to <u>863</u>; Trucks in from 47 to <u>43</u>; Automobiles out from 860 to <u>863</u>; Trucks out from 47 to <u>43</u>; Total out from 907 to <u>906</u>; add new language in the footnote : Assumes <u>peak of 384 truck deliveries</u> are spread equally throughout the day from 6:00a.m to 6:00p.m. <u>with a 3-hour lag for unloading.</u> Revise Table 5: Morning shift Non-Craft from 38 to <u>41</u>; Morning Shift Total Workforce from 930 to <u>933</u></p>	<p>Staff Agreed and added the requested language. However, language has since been revised based on the October 1, 2012 Updated Workforce Analysis .</p>

Appendix 1 - PSA Response to Comments, Traffic and Transportation

<p align="center">13.18</p>		<p>Specific Comment: Page 4.11-17, 1st paragraph following Table 5 - Revise peak trip generation numbers from 860 to <u>933</u>;</p>	<p>Staff Agreed and added the requested language. However, language has since been revised based on the October 1, 2012 Updated Workforce Analysis .</p>
<p align="center">13.19</p>		<p>Specific Comment: Page 4.11-18- Revise Tables 6 and 7 text to: Please note that in Table 7, LOS was recalculated with revised trips. LOS changed slightly during AM peak hour. LOS remained the same during PM peak hour.</p>	<p>Staff Agreed and added the requested language. However, language has since been revised based on the October 1, 2012 Updated Workforce Analysis .</p>
<p align="center">13.20</p>		<p>Specific Comment: Pages 4.1-20 through 4.1-22, Construction Truck Traffic: Table 8 represents trucks per month, instead of trucks per day. The peak number of trucks in 1 day is estimated to be 90 trucks. However, to be consistent with the Air Quality analysis, a peak of 384 truck deliveries (768 truck trips) per day was used in the following revised analysis. As a result of our revised analysis, please change this section to read as follows. Also, it is unrealistic to think that trucking companies would turn their trucks and cargo over to unlicensed drivers. This is cautiousness beyond reality and COC TRANS 1 should be deleted. Please add the following language: Monthly truck deliveries would peak at 717 trucks during Month 5. Peak daily truck deliveries has been estimated using delivery records from construction at Ivanpah SEGS. During the period October 2010 through April 2012, the highest number of daily truck deliveries at Ivanpah SEGS was 72. Adding a 25 percent contingency for HHSEGS would yield a maximum of 90 delivery trucks on a peak day.</p> <p>The analysis of construction deliveries for the Air Quality assessment used a more-conservative method to determine the peak daily number of delivery trucks, using a calculation based on truck volumes during the highest 12 consecutive months. The result was a conservative estimate of 384 deliveries per day, or 768 one-way truck trips per day. To be conservative and consistent with the Air Quality analysis, this much larger value was used in the revised traffic analysis.</p>	<p>Staff Agrees- Numbers revised based on the PSA comments and the October 1, 2012 Updated Workforce Analysis.</p>

Appendix 1 - PSA Response to Comments, Traffic and Transportation

<p align="center">13.21</p>		<p>Specific Comment: Page 4.1-22 and 4.11-23 Construction Truck Traffic- Requests new text and numbers based on the applicant's revised analysis.</p>	<p>Staff Agreed and added the revised numbers and language. However, language and numbers has since been revised based on the October 1, 2012 Updated Workforce Analysis .</p>
<p align="center">13.22</p>		<p>Specific Comment: Page 4.11 24, Workforce Traffic, 5th paragraph: Please clarify the last paragraph as follows: The operation employees would generate 240 vehicle daily trips <u>(in/out)</u>.</p>	<p>Staff Agrees - Text revised.</p>
<p align="center">13.23</p>		<p>Specific Comment: Page 4.11 25, Truck Traffic and Hazardous Materials Delivery, 3rd paragraph, 1st sentence: This sentence is incorrect. The Safety Management Plan required pursuant to Condition HAZ 3 pertains to the off loading of hazardous materials on the HHSEGS site. It does not pertain to the delivery of hazardous materials while in transit to the site.</p>	<p>Text revised to be consistent with Hazardous Materials Management Section of the FSA.</p>
<p align="center">13.24</p>		<p>Specific Comment: Page 4.11 -27, Compliance with LORS, Table 8: This table should be numbered Table 9. Also, in the row "Section 7.2.4 Roadways and Highways – Policy RH 1.4 Level of Service." Please clarify whether the "Description" is intended for permanent development or just during temporary construction.</p>	<p>Staff Agrees - Table number revised; LOS C is the minimum LOS on all roadways in the County of Inyo for both permanent development and construction.</p>
<p align="center">13.25</p>		<p>Specific Comment: Page 4.11 30, Traffic Impacts, Table 9: This table needs to be renumbered as Table 10.</p>	<p>Staff Agreed and renumbered. However, the Table has since been revised based on the October 1, 2012 Updated Workforce Analysis .</p>

Appendix 1 - PSA Response to Comments, Traffic and Transportation

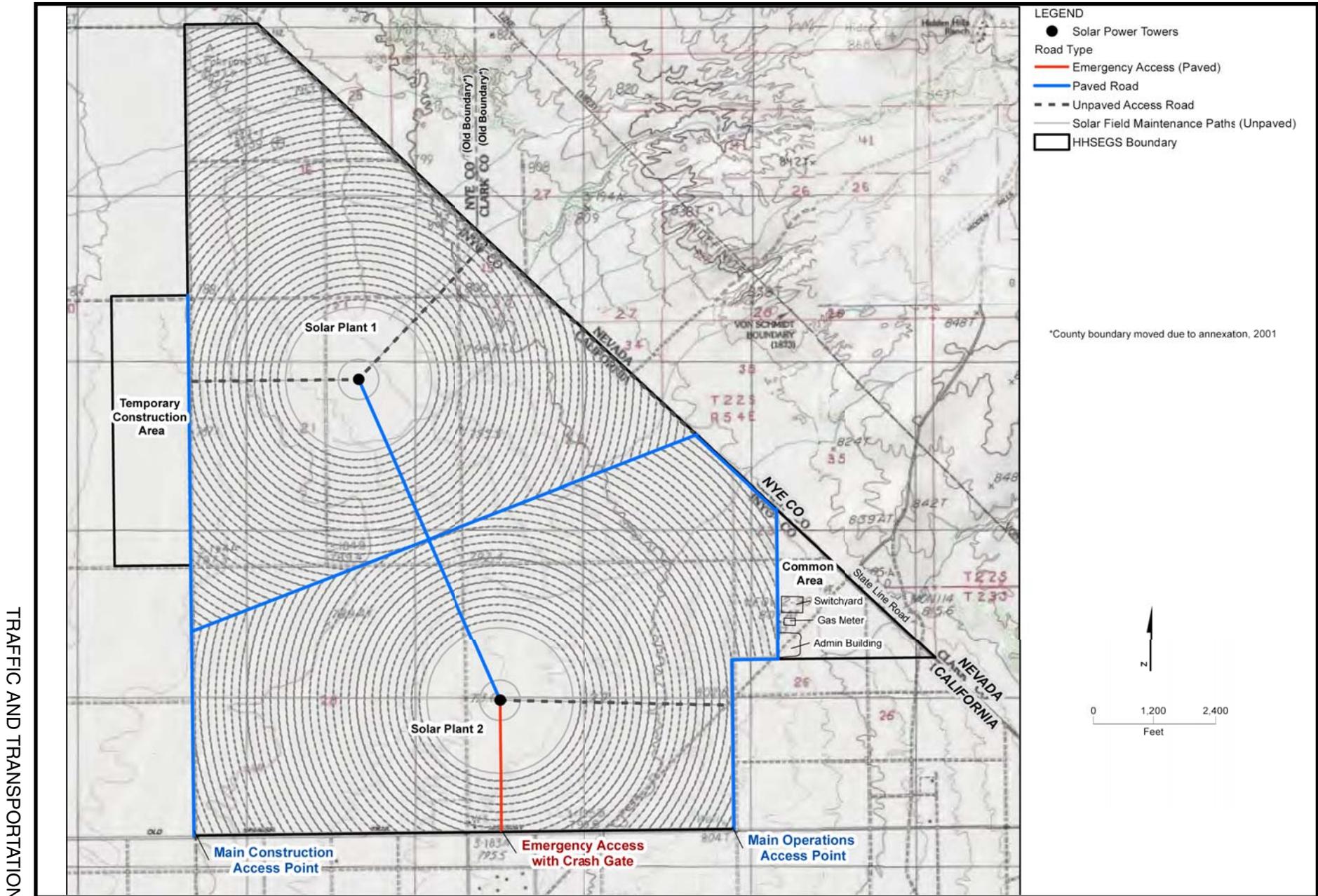
<p align="center">13.26</p>		<p>Specific Comment: Pages 4.11 32 and 33, Hidden Hills Transmission Project, 1st paragraph: Please start a new subsection called “Summary” after the first sentence. This paragraph reads like the Hidden Hills Transmission Project would require 1,622 workers.</p>	<p>Staff Agrees - Heading added for clarification.</p>
<p align="center">13.27</p>		<p>Specific Comment: Page 4.11 33, Noteworthy Public Benefits: Requests the following be included: These improvements could include: Re engineering and repaving Tecopa Road from SR 160 to the project site and adding a right turn pocket at Tecopa Road and SR 160. Increased LOS of improved areas after construction is completed. Adding deceleration lanes to Tecopa Road at the project would improve the roadway along the project frontage with enhanced traffic patterns.</p>	<p>Comment Noted- Staff did not include these as Noteworthy Public Benefits as but for HHSEGS the improved infrastructure would not be warranted.</p>
<p align="center">13.28</p>		<p>Specific Comment: Page 4.11 33, Conclusions, 2nd and 3rd paragraphs: The information about Socioeconomics is incorrect. There are no Census blocks within the 6 mile radius that have minority populations greater than 50 percent. See also Page 4.9 5 of the Socioeconomics section of the PSA, under the heading, “Minority Populations.”</p>	<p>Staff Agrees - Statement corrected.</p>

TRAFFIC AND TRANSPORTATION - FIGURE 1
 Hidden Hills Solar Electric Generating System (HHSEGS) - Regional Street Network



TRAFFIC AND TRANSPORTATION - FIGURE 2

Hidden Hills Solar Electric Generating System (HHSEGS) - Access Roads and Paved Internal Roadways



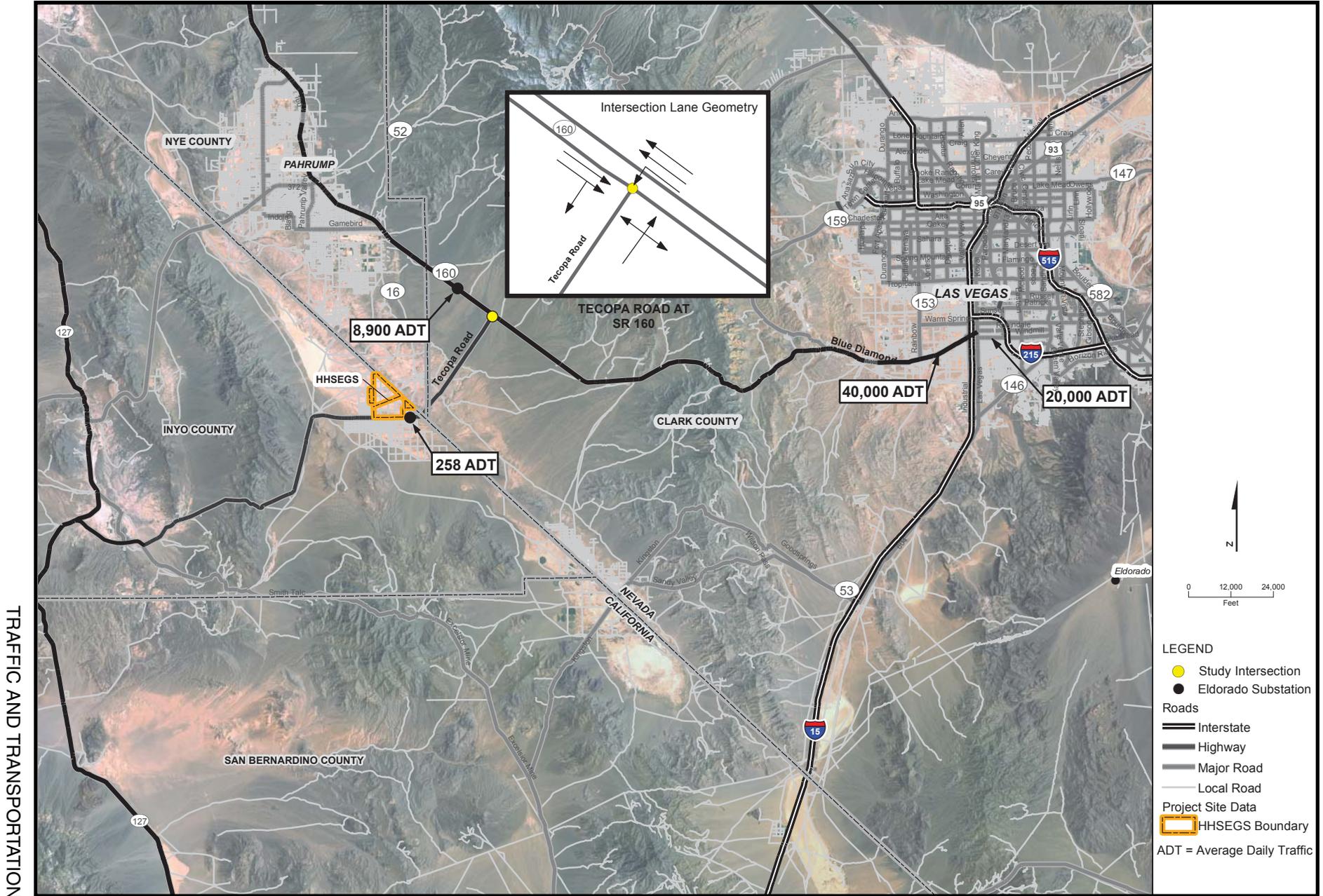
TRAFFIC AND TRANSPORTATION

TRAFFIC AND TRANSPORTATION - FIGURE 3
 Hidden Hills Solar Electric Generating System (HHSEGS) - Local Street Network



TRAFFIC AND TRANSPORTATION

TRAFFIC AND TRANSPORTATION - FIGURE 4
 Hidden Hills Solar Electric Generating System (HHSEGS) - Local Street Network ADT



TRAFFIC AND TRANSPORTATION - FIGURE 6

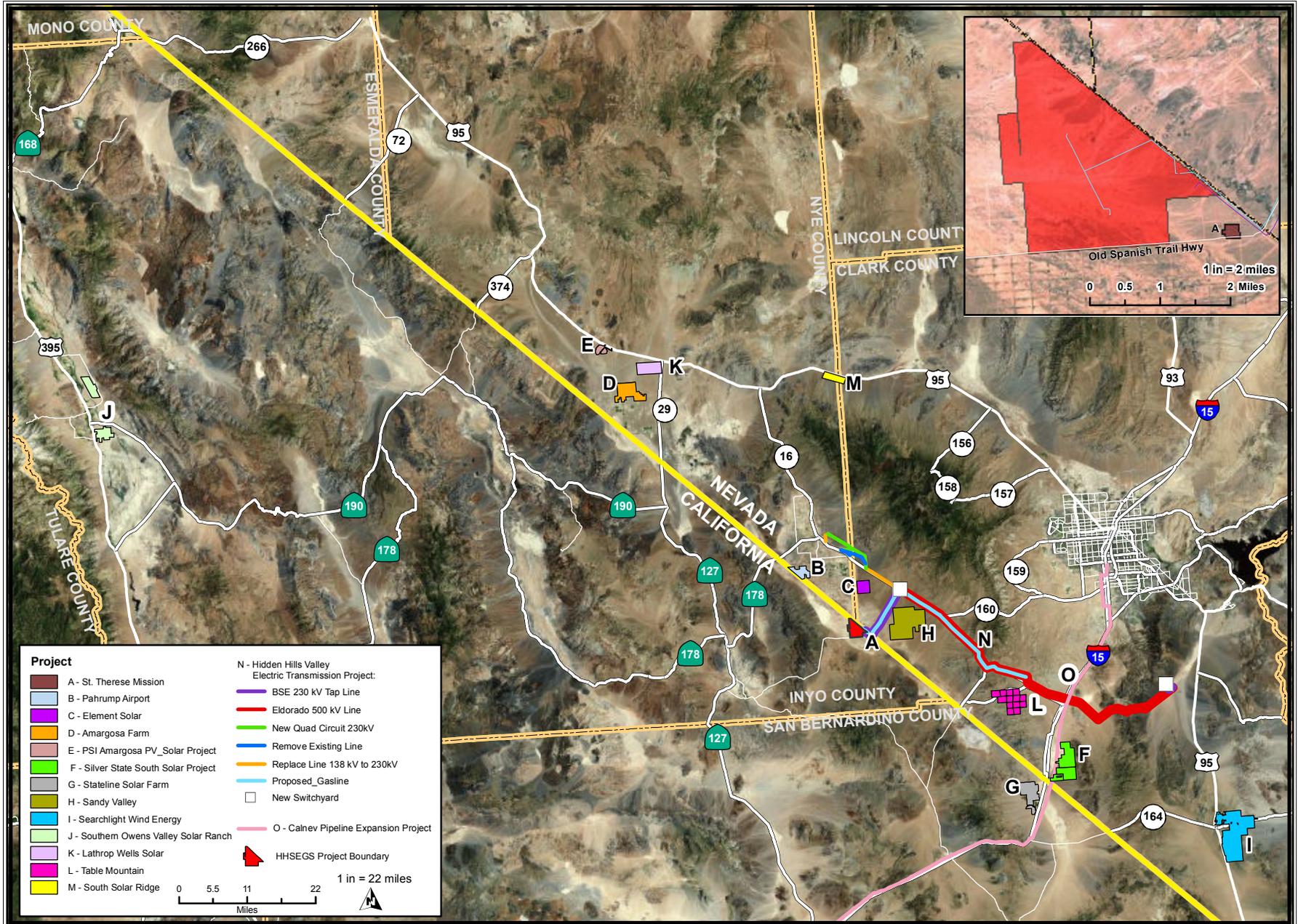
Hidden Hills Solar Electric Generating System (HHSEGS) - Grid Pattern of Roads within the Project Area.



TRAFFIC AND TRANSPORTATION

TRAFFIC AND TRANSPORTATION - FIGURE 7

Hidden Hills Solar Electric Generating System (HHSEGS) - Master List of Cumulative Projects



CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: BLM Southern Nevada District - Renewable Energy in Southern Nevada, BLM California - Renewable Energy Priority Projects, and Los Angeles Department of Water and Power.

TRAFFIC AND TRANSPORTATION - FIGURE 8

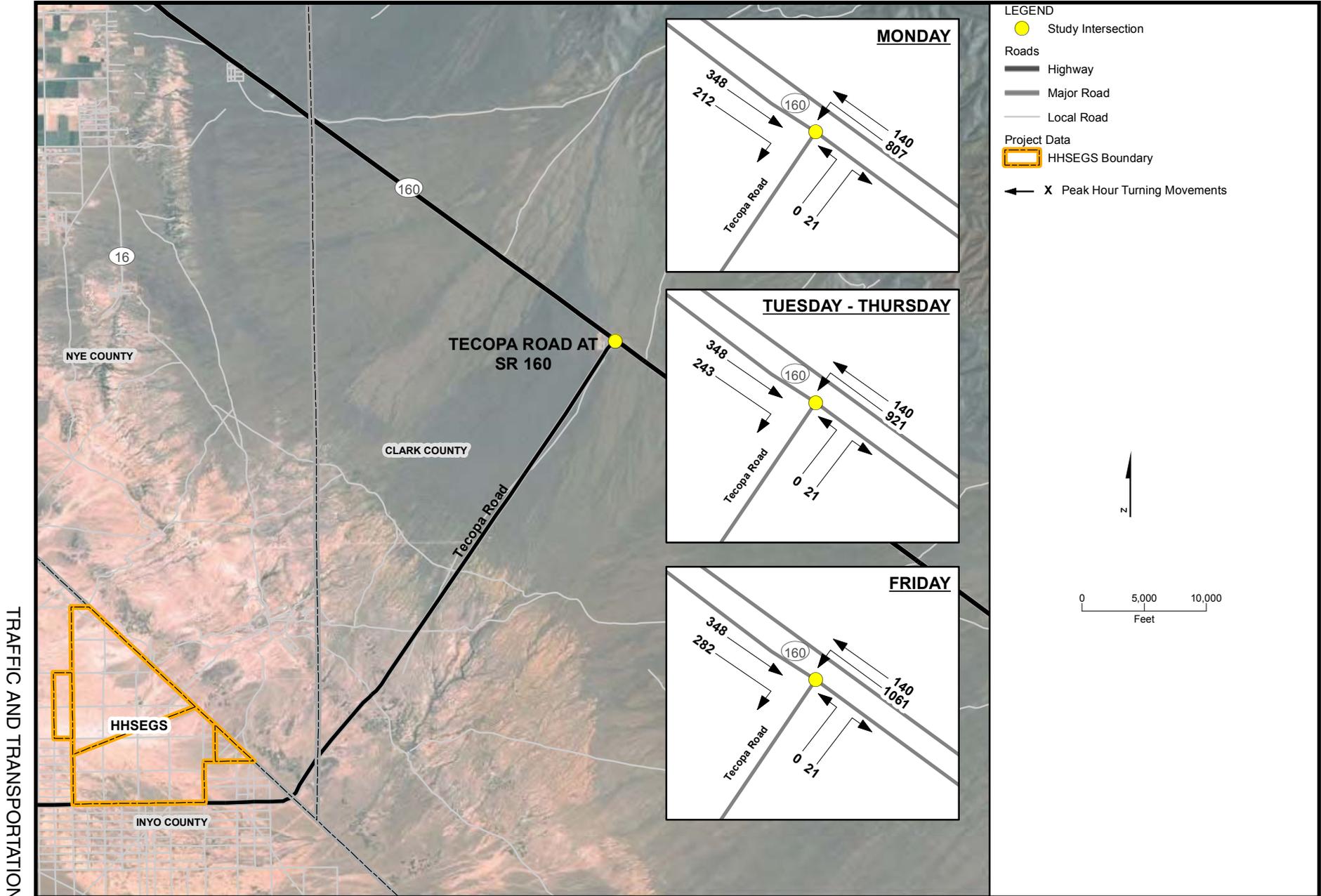
Hidden Hills Solar Electric Generating System (HHSEGS) - State Route 127 Segment Map



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: CA DOT

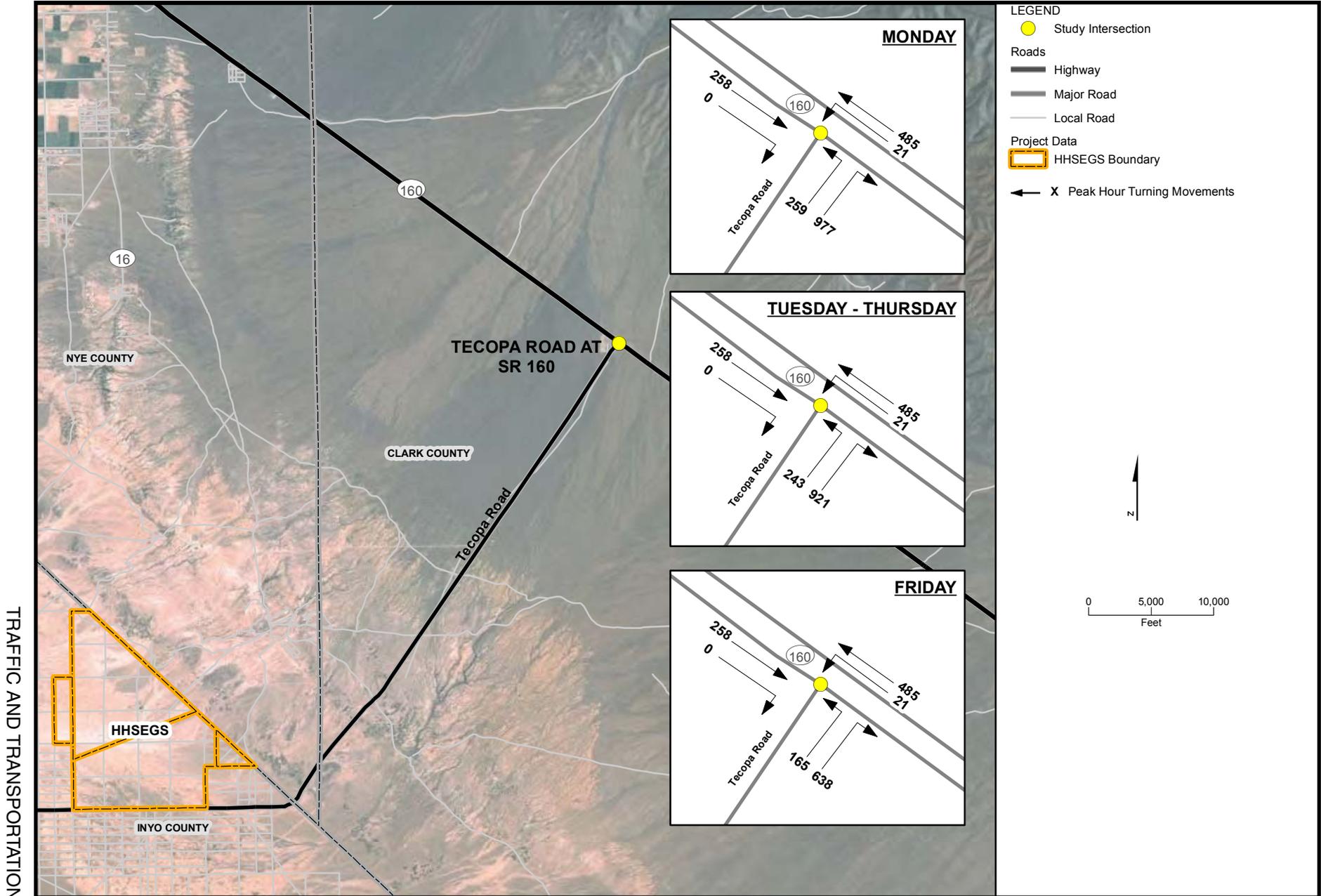
TRAFFIC AND TRANSPORTATION - FIGURE 10

Hidden Hills Solar Electric Generating System (HHSEGS) - Existing + Construction Project AM Peak Hour Intersection Volumes



TRAFFIC AND TRANSPORTATION - FIGURE 11

Hidden Hills Solar Electric Generating System (HHSEGS) - Existing + Construction Project PM Peak Hour Intersection Volumes



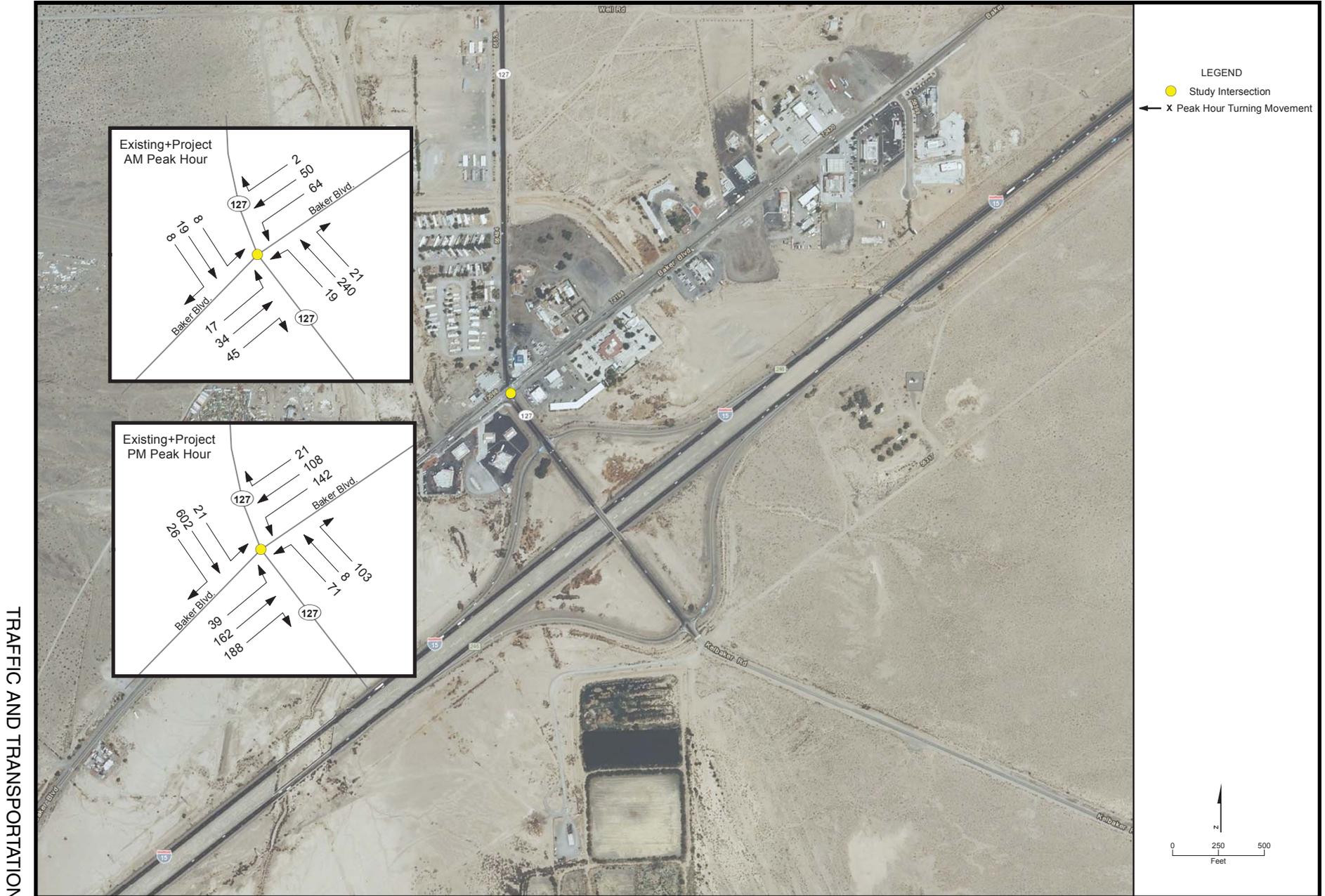
TRAFFIC AND TRANSPORTATION - FIGURE 12

Hidden Hills Solar Electric Generating System (HHSEGS) - Existing Peak Hour Intersection Volume



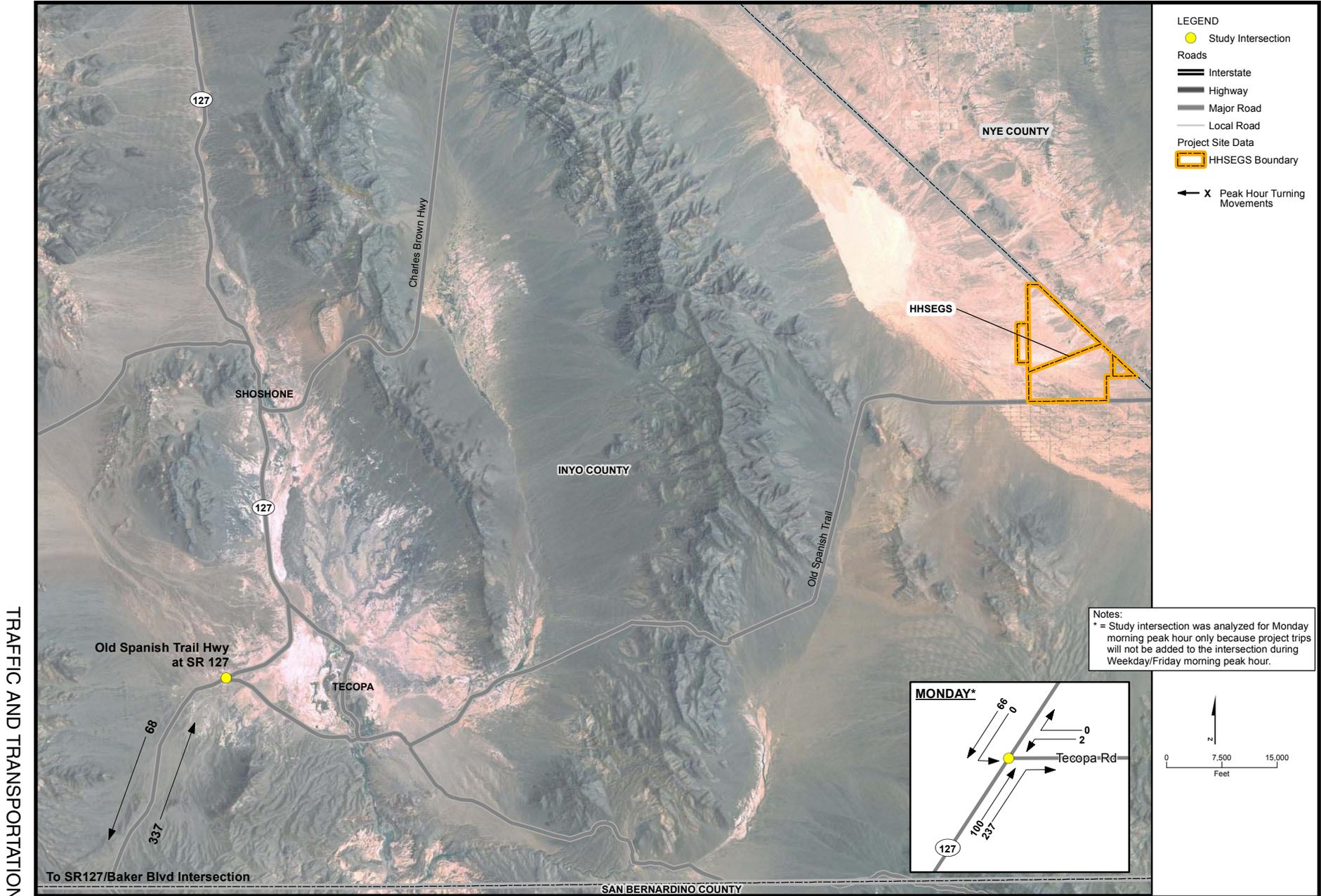
TRAFFIC AND TRANSPORTATION - FIGURE 13

Hidden Hills Solar Electric Generating System (HHSEGS) - Existing + Project Peak Hour Intersection Volume



TRAFFIC AND TRANSPORTATION - FIGURE 14

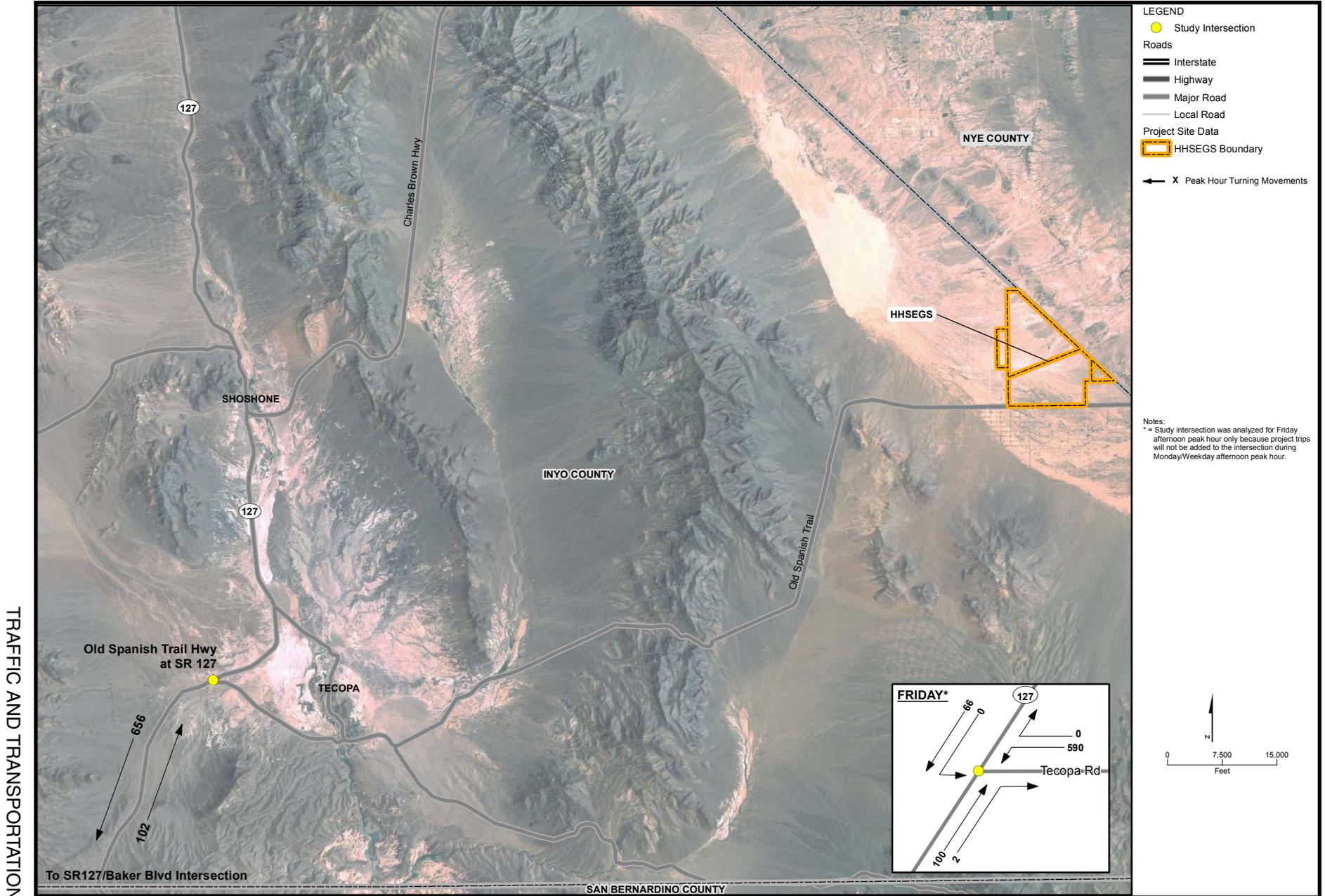
Hidden Hills Solar Electric Generating System (HHSEGS) - Existing + Construction Project AM Peak Hour Intersection Volume



TRAFFIC AND TRANSPORTATION

TRAFFIC AND TRANSPORTATION - FIGURE 15

Hidden Hills Solar Electric Generating System (HHSEGS) - Existing + Construction Project PM Peak Hour Intersection Volume



TRAFFIC AND TRANSPORTATION

TRANSMISSION LINE SAFETY AND NUISANCE

Testimony of Obed Odoemelam, Ph.D.

SUMMARY OF CONCLUSIONS

The California Energy Commission staff concludes that construction and operation of the transmission line for the Hidden Hills Solar Electric Generating System (HHSEGS) would not pose an aviation hazard according to the current FAA criteria. In addition, compliance with the requirements outlined in the proposed conditions of certification would minimize the potential for nuisance and hazardous shocks and maintain the generated fields within levels not associated with radio-frequency interference or audible noise. The proposed line design, routing, and operational plan would be adequate to ensure that the generated electric and magnetic fields are managed to an extent the California Public Utilities Commission considers appropriate in light of the available health effects information. The line would be operated to comply with all federal, state, and local laws, ordinances, regulations, and standards related to transmission line safety and nuisance if staff's recommended conditions of certification are adopted and implemented.

This assessment is limited to the portion of the HHSEGS line located within California. The environmental aspects of the section to be located in Nevada will be assessed by the U.S. Bureau of Land Management (BLM).

INTRODUCTION

The purpose of this analysis is to assess the proposed HHSEGS 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 within California. Similar impacts within Nevada will be assessed by the U.S. Bureau of Land Management. All related health and safety laws, ordinances, regulations, and standards are currently aimed at minimizing these impacts. Staff's analysis focuses on the following issues taking into account both the physical presence of each of the two considered lines and the physical interactions of their respective 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 laws and policies 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.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

**TRANSMISSION LINE SAFETY AND NUISANCE (TLSN) Table 1
Laws, Ordinances, Regulations, and Standards (LORS)**

Applicable LORS	Description
Aviation Safety	
Federal	
Title 14, Part 77 of the Code of Federal Regulations (CFR), "Objects Affecting the Navigable Air Space"	Describes the criteria used to determine the need for a Federal Aviation Administration (FAA) "Notice of Proposed Construction or Alteration" in cases of potential obstruction hazards.
FAA Advisory Circular No. 70/7460-1G, "Proposed Construction and/or Alteration of Objects that May Affect the Navigation Space"	Addresses the need to file the "Notice of Proposed Construction or Alteration" (Form 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	
Noise Limits by the Inyo County Planning Commission.	Establishes noise standards for the different land uses in the county.
Inyo County General Plan.	Establishes exterior noise standards for receptors in the county.
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.
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 HHSEGS site would be 3,097 acres of privately owned land in unincorporated Inyo County California, adjacent to the Nevada border. The site is approximately 8 miles directly south of Pahrump, Nevada and 45 miles northwest of Las Vegas, Nevada. The project would consist of two solar plants: the northern solar plant (Solar Plant 1 occupying 1,483 acres or 2.3 square miles) and the southern solar plant (Solar Plant 2 occupying 1,510 acres or 2.4 square miles). There would be a commonly shared area of 103 acres between the two plants to accommodate an administration, warehouse, and a maintenance complex together with a common on-site switchyard. As more fully discussed by the applicant (HHSEGS 2011a, p. 3-3) the generated power would be transmitted to the Valley Electric Association (VEA) system from each plant's power block, first to the common on-site switchyard, and then across the California/Nevada line into the area Nevada power grid. Each plant's line would begin at the power block as an underground line and extend through the heliostat field to emerge at a transition point into an

overhead configuration. It is from this transition point that the line would extend to the on-site switchyard.

The applicant's chosen option for further transmission into the Nevada grid is the line exiting from the common on-site switchyard on the eastern side of the HHSEGS site and stretching 900 feet on the California side before crossing into Nevada. It is only the 900-foot overhead portion within California that is assessed in this staff report together with the on-site underground sections running beneath the heliostat fields. The potential impacts from the segments within the state of Nevada would be assessed by BLM under the requirements of the National Environmental Policy Act (NEPA) of 1969 (HHS 2011a, pp. 3-2 and 3-3).

The area around HHSEGS and its proposed transmission line is open undisturbed desert land with relatively sparse vegetation and no nearby residences. The nearest residence to the proposed power blocks would be approximately 3,500 feet south of Solar Plant 2, and about 950 feet south of the site's southern boundary. 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 an individual crossing over the line.

PROJECT DESCRIPTION

The environmental impacts of the proposed connecting line within California are best assessed separately as impacts from the on-site underground sections and impacts from the noted 900-foot segment from the common on-site switchyard to the California/Nevada border which would mark the end of the segment under California's jurisdiction. The complete project line would be a 10-mile 230-kV transmission line stretching from its noted origination point at the HHSEGS on-site 230-kV switchyard, and would cross the California/Nevada line, avoiding the mesquite vegetation to the south, and continue east for approximately 1.5 miles until reaching Tecopa Road from where it would extend northeastward on a path parallel to Tacopa Road until it reaches the new Valley Electric Association (VEA) Substation (the Crazy Eye Tap Substation) located immediately east of the Tecopa Road/SR 160 intersection in Clark County Nevada. The Crazy Eye Tap Substation would interconnect to the existing VEA Pahrump-Bob Tap 230-kV line connected to the Colorado Substation with a 1-mile line.

The proposed line would be designed, built and operated by the applicant according to the guidelines of the major area utility, which is the Valley Electric Association (VEA). Specifications in VEA design document (SCE 2004) ensure safety, efficiency, reliability and maintainability for underground and overhead lines (HHS 2011a pp. and 3-4). The requirement for design according to the guidelines of the area's major utility is current CPUC policy on line field management.

The underground segment of the on-site line for Solar 1 would be approximately 3,800 feet (0.7 miles) while the overhead segment would be 10,275 feet or 1.9 miles. For Solar Plant 2, the equivalent underground segment would be 7,300 feet (1.4 miles) while the remaining overhead portion would be 3,270 feet or 0.6 miles.

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 for either candidate line. 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 nearest commercial airport to the HHSEGS site and either of the two possible connecting lines is McCarran International Airport in Las Vegas approximately 45 miles to the east (HHSG 1011a, p. 5.12-11 and 5.12-12). The Pahrump Valley General Aviation Airport is proposed to be located approximately 10 miles northwest of the HHSEGS site and thus too far for any of the lines' structures to pose a significant obstruction risk to utilizing aircraft. Furthermore, the line supports would be erected according to SCE guidelines ensuring heights below the FAA threshold for concern over collision with area aircraft. Other area airports would similarly not pose an aviation hazard because of the distance from the lines or orientation of their respective runways. There are no heliports in the area leading staff to agree with the applicant (HHSG 1211a, p. 5.12-14) that neither of the two candidate lines would 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 in 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 because the responsible fields would be reduced using SCE designs, and the line located away from inhabited areas. The absence of such electric field impacts around underground lines would further serve to minimize the potential for complaints. Staff does not recommend any related conditions of certification.

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. Audible noise usually results from the action of the electric field at the surface of the line conductor and could be perceived as a characteristic crackling, frying, or hissing sound or hum, especially in wet weather. Since the noise level depends on the strength of the line electric field, the potential for perception around an overhead line can be assessed from estimates of the field strengths expected during operation. Such noise is usually generated during rainfall, but mainly from overhead lines of 345-kV or higher. It is, therefore, not generally expected at significant levels from lines of less than 345-kV but is possible for a 500-kV line. Given the use of noise-reducing design and noise-eliminating undergrounding in the nearest area to residences, staff does not expect either line option 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 of this **FSA**.

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 corridors 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.

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 (HHS 2011a, p. 3-4) would serve to minimize the risk of hazardous shocks for the chosen line as located overhead or underground. 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 lines, the project owner would be responsible in all cases for ensuring compliance with these grounding-related practices within the rights-of-way.

The potential for nuisance shocks around the proposed lines would be minimized through standard industry grounding practices (HHS 2011a, p. 3-7). Staff recommends Condition of Certification **TLSN-3** to ensure such grounding for the line segments assessed.

Electric and Magnetic Field Exposure

The possibility of deleterious health effects from EMF exposure has increased public concern in recent years about living near high-voltage lines. Both electric and magnetic fields occur together whenever electricity flows and exposure to them together is generally referred to as EMF exposure. The available evidence as evaluated by the CPUC, other regulatory agencies, and staff has not established that such fields pose a significant health hazard to exposed humans. There are no health-based federal regulations or industry codes specifying environmental limits on the strengths of fields from power lines. Most regulatory agencies believe, as staff does, that health-based limits are inappropriate at this time. They also believe that the present knowledge of the issue does not justify any retrofit of existing lines.

Staff considers it important, as does the CPUC, to note that while such a hazard has not been established from the available evidence, the same evidence does not serve as proof of a definite lack of a hazard. Staff, therefore, considers it appropriate in light of present uncertainty, to recommend feasible reduction of such fields without affecting safety, efficiency, reliability, and maintainability.

While there is considerable uncertainty about EMF health effects, the following facts have been established from the available information and have been used to establish existing policies:

- Any exposure-related health risk to the 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 (HHSG 2011a, p. 3-4), 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 two candidate routes 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 they 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 measurement in **TLSN-2** would allow for direct comparison with short-term human exposures around SCE lines of the same voltages 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 either of the proposed candidate project transmission lines 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 for the chosen line 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 previously noted, the utility in this case is SCE. Since each of the proposed lines 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 HHSEGS. However, Please see **Appendix 1**, PSA Response to Comments, TLSN, for responses to Applicant's Preliminary Staff Assessment (PSA) comments.

CONCLUSIONS

Staff does not expect either of the two candidate HHSEGS transmission lines to pose an aviation hazard according to current FAA criteria, and therefore, does not consider it necessary to recommend location changes on the basis of a potential hazard to area aviation.

The potential for nuisance shocks would be minimized through grounding and other field-reducing measures to be implemented in keeping with current SCE guidelines (reflecting standard industry practices). These field-reducing measures would maintain the generated fields within levels not associated with radio-frequency interference or audible noise. The potential for hazardous shocks would be minimized through compliance with the height and clearance requirements of 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, would minimize 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 HHSEGS 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 either line option 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 lines given the general absence of residences along either of the proposed routes. 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.

Since both of the candidate project lines 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 for either line. With the conditions of certification proposed below, any such impacts would be less than significant for the chosen alternative.

The impacts from the segments within the state of Nevada would be assessed by BLM under the requirements of the National Environmental Policy Act (NEPA) of 1969 (HHS 2011a, pp. 3-2 and 3-3).

PROPOSED CONDITIONS OF CERTIFICATION

TLSN-1 The project owner shall construct the chosen 230-kV or 500-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 any underground segment), and SCE's EMF-reduction guidelines.

Verification: At least 30 days before starting the construction of the chosen line option 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 lines will be constructed according to the requirements stated in the condition.

TLSN-2 The project owner shall use a qualified individual to measure the strengths of the electric and magnetic fields from the chosen line at the points of maximum intensity along its route. The measurements shall be made 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.

TLSN3 The project owner shall ensure that all permanent metallic objects within the right-of-way of each of the chosen project line are grounded according to industry standards.

Verification: At least 30 days before the lines are energized, the project owner shall transmit to the CPM a letter confirming compliance with this condition.

REFERENCES

(EPRI). Electric Power Research Institute. 1982. Transmission Line Reference Book: 345 kV and Above.

HHS 2011a. (BrightSource Energy/J. Woolard (tn:61756). Application for Certification Volumes 1&2: Submitted to the California Energy Commission on August 5, 2011.

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 (Southern California Edison). EMF Design Guidelines for Electrical Facilities. EMF Research & Education, Irwindale, California. September.

Appendix 1 -- PSA Response to Comments, TLSN

TLSN

List of Comment Letters

		TLSN Comments?
1	Inyo County	
2	Bureau of Land Management	
3	National Park Service	
4	The Nature Conservancy	
5	Amargosa Conservancy	
6	Basin & Range Watch	
7	Pahrump Paiute Tribe	
8	Richard Arnold, Pahrump Piahute Tribe	
9	Big Pine Tribe of Owens Valley	
10	Intervenor Cindy MacDonald	
11	Intervenor Center for Biological Diversity	
12	Intervenor, Old Spanish Trail Association	
13	Applicant, BrightSource Energy, Inc.	X

Comment #	DATE	COMMENT TOPIC	RESPONSE
13	July 23, 2012	Applicant, BrightSource Energy	
13.1	p. 258 #1	Page 4.12-1, Summary of Conclusions, 1 st paragraph, 1 st sentence: The PSA-is referencing the lines in Nevada, outside the CEC's jurisdiction. Discussion needs to be limited to onsite transmission lines. Comment is referring to the following text in the first sentence: "... that construction and operation of either of the two candidate transmission lines..."	Comment noted
13.2	p. 258 #2	Page 4.12-3, Setting, 1 st paragraph, 1 st sentence: The following text should be added to the end of the 1 st sentence: "and a 103-acre Common Area for a total plant size of 3,096 acres."	103-acre Common Area added. Project size remains 3,097, however, as was indicated in AFC and uniformly throughout the Final Staff Assessment

Appendix 1 -- PSA Response to Comments, TLSN

13.3	p. 258 #3	Page 4.12-3, Setting, 1 st paragraph, 3 rd sentence: The project size is 3,096 acres (per general comment). The third sentence should be revised to reflect the correct project size.	Project size remains 3,097, however, as was indicated in AFC and uniformly throughout the Final Staff Assessment (FSA)
13.4	p. 258 #4	Page 4.12-4, Setting, 1st paragraph, 1st sentence: This sentence is confusing because the PSA is talking about the aboveground versus underground segments. Note the use of the following text: "Each transmission line option..."	Comment noted
13.5	p. 258 #5	Page 4.12-4, Setting, 2nd paragraph, 1st sentence: This sentence is confusing because the PSA is talking about the aboveground versus underground segments. Note the use of the following text: "two candidate connecting lines..."	Comment noted
13.6	p. 258 #6	Page 4.12-4, Project Description, 1 st paragraph, last three sentences: These three sentences require updating once the EIS is published.	Comment noted
13.7	p. 258 #7	Page 4.12-4, Project Description, 2nd paragraph: Please see the revised transmission system project description in the General Document Comments.	Comment noted, clarification made to discussion in FSA
13.8	p. 258 #8	Page 4.12- 5, 1st paragraph, 1st sentence: Valley Electric Associate (VEA) would be the owner of most of the 230-kv facilities beyond the gen-tie. Replace "Southern California Edison (SCE)" at the end of this sentence with "VEA."	Comment noted, clarification made to discussion in FSA

VISUAL RESOURCES

Testimony of Melissa Mourkas, ASLA

SUMMARY OF CONCLUSIONS

Energy Commission staff concludes that the Hidden Hills Solar Electric Generating System (HHSEGS) project would result in substantial adverse visual impacts. This impact would be significant even after employing all feasible mitigation, in large part because of the visual prominence of the two 750 foot solar power towers that are a feature of its design. Examples of these significant visual effects are provided by analysis of several Key Observation Points.

The project would also result in a significant cumulative effect when viewed in combination with existing and foreseeable future Nevada-side projects within the project viewshed. Project impacts, in combination with existing and foreseeable future solar and other development projects within the greater Pahrump Valley, including both California and Nevada, would contribute to a perceived sense of industrialization of the open, undeveloped desert landscape and impact views of scenic resources in the Pahrump Valley viewshed, having the potential to be significant and unavoidable.

Finally, the project would not be consistent with several applicable goals and policies of the Inyo County General Plan and Renewable Energy Ordinance (Title 21). The project is found to be generally consistent with Nevada's laws, ordinances, regulations, and standards (LORS) as they pertain to Visual Resources, although they are not applicable to the project in California.

If the Energy Commission approves the project, staff recommends that all of staff's proposed conditions of certification be adopted in order to minimize visual impacts to the greatest feasible extent.

INTRODUCTION

Visual resources consist of the viewable natural and built features of the environment. In this section, staff evaluates the construction and operation of the HHSEGS using the "Aesthetics" criteria in the California Environmental Quality Act (CEQA) Guidelines to determine if the project would cause significant impact on the environment. In addition, staff assesses the extent to which the project would comply with applicable federal, state, and local 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**.

REGIONAL SETTING

The project site would be located in the unincorporated community of Charleston View, within the Pahrump Valley, which extends across the California-Nevada state line. The

valley is well-defined by the mountain ranges which form a nearly continuous circumference. The proposed site is located adjacent to Old Spanish Trail Highway, also known locally and on some maps as Tecopa Road¹, approximately 10 miles east of Nevada State Highway 160, which bisects the valley in a northwesterly-southeasterly trajectory. The landscape is generally characterized by rugged mountain ranges with broad alluvial fans leading to the valley floor. The city of Pahrump, Nevada, is located to the northwest of the project site, with the city center (the intersection of Nevada State Highways 160 and 372) being approximately 8 miles as the crow flies from the center of the project site. Pahrump is not a densely developed city, but instead has a rural development pattern of residential areas interspersed with small commercial and agricultural uses. The city has an underlying rectangular grid of streets, some of which are incomplete or not through streets. There is no direct-access paved road to the project site from Pahrump. There are dirt roads that criss-cross the valley floor, so it possible to reach Charleston View from Pahrump via four-wheel drive vehicle.

Nearby designated recreation areas include the Nopah Wilderness Area and Pahrump Valley Wilderness Areas in California and the Spring Mountains Recreation Area, including Mt. Charleston, in Nevada (see **Visual Resources Figure 1-Project Vicinity Map**). Wilderness Areas are designated by legislation under the 1964 Wilderness Act².

The Bureau of Land Management (BLM) describes Wilderness Areas as places of solitude where people may experience freedom from our fast-paced industrialized society. Motorized vehicle use is prohibited in Wilderness Areas, except within designated roadways. Recreation opportunities generally include hiking, camping, rockhounding, fishing and hunting.

The Nopah Range Wilderness Area encompasses 106,623 acres to the west of the project site. It incorporates the Resting Spring Range on the western side and the Nopah Range on the eastern side, as well as the Chicago Valley, which divides the two ranges. Nopah Peak rises to 6,395 feet in elevation and is visible from the greater Pahrump Valley. The area is comprised of alluvial fans, badlands, playa, plains, river washes and hills. The portion of the wilderness facing the project site can be characterized as rugged mountains which give way to broad alluvial fans, upon which is found creosote bushes, yucca and other Mojave Desert shrub species.

Pahrump Valley Wilderness encompasses 73,726 acres, and is located south of the proposed project site. Its three valleys, California, Pahrump and Mesquite, are comprised of alluvial slopes rising southward into the Kingston Range, which is partially located within the Wilderness Area. The highest peak is 4,569 feet in elevation. Vegetation includes species typical of the Mojave Desert at this elevation plus a few unique plants which thrive in the limestone soils of the area. The Pahrump Valley Wilderness Area landscape can be characterized as rugged and changeable. Like the Nopah Range, the pronounced alluvial fans are fairly densely vegetated in contrast to the less-vegetated, rugged mountainsides.

¹ This section will use Old Spanish Trail Highway in lieu of Tecopa Road.

² The Wilderness Act, Public Law 88-577 (16 U.S. C. 1131-1136), 88th Congress, Second Session, September 3, 1964

The Mount Charleston Wilderness and the Spring Mountains National Recreation Area are located east of the proposed project site in Nevada, within the Humboldt-Toiyabe National Forest. The Spring Mountains get their name from the many natural springs in the area. The higher elevations of the range provide an alpine respite from the heat of the valley floor. Charleston Peak, at 11,918 feet in elevation, is a prominent feature of the range and dominates the overall landscape of the Pahrump Valley. The recreation area spans 316,000 acres and offers numerous hiking trails, including along the spine of the mountains. Access to the trails and the recreation areas are from Highway 95 in Nevada, on the eastern side of the range. Access from the Pahrump Valley appears limited.

Pahrump Valley is also home to segments of the Old Spanish National Historic Trail (OST). OST was designated as a National Historic Trail when Congress passed Senate Bill No. 1946 and was signed into law in December, 2002. The trail segments in California as recorded by the National Park Service (NPS) may be seen in Visual Resources Figure 2. For the purposes of this analysis, the current NPS alignments provided to Energy Commission cartography staff will be used as the primary routes for the OST. However, there are differences of opinion as to the correct alignment of the OST routes, whether it is the current NPS routes, routes shown in the Final Feasibility Study (2001)³, routes shown on DeLorme maps, routes identified by members of the Old Spanish Trail Association (OSTA) or the route used by the applicant in the AFC. OSTA provided Energy Commission staff with independently-surveyed traces of the trail after becoming interveners in the process. This resource is discussed in more detail in the **Cultural Resources** section of this Final Staff Assessment (FSA).

Visual Resources Figure 1 shows the relationship between the proposed project site and the wilderness and recreation areas described above and the national historic trail in the area. Figure 1 clearly shows the “bowl” whose bottom is the project site and whose sides are made up of areas of high scenic quality. It is this high-quality scenic landscape which is the backdrop for the proposed industrial-scale development of HHSEGS.

The proposed project site is privately-owned land located in an area where most of the land is publicly-owned or managed by the Bureau of Land Management (BLM). The BLM lands surrounding the project site have been inventoried by the respective California and Nevada BLM field offices and both Visual Resource Inventory (VRI) and Visual Resource Management (VRM) classes have been applied. The system BLM uses classifies BLM-owned or managed land into one of four visual inventory classes. From the inventory data, the Resource Management Plan (RMP) process then assigns a VRM class to the inventoried areas. The VRM class reflects the way the visual landscape will be managed and the amount of visual change that will be permitted to take place within that landscape area.

VRI classes are assigned by evaluating Visual Sensitivity, Scenic Quality and Distance Zone. Examples of high visual sensitivity would include areas within scenic byways, national monuments, wilderness areas or major transportation corridors. Scenic quality

³ Old Spanish Trail National Historic Trail Feasibility Study and Environmental Assessment July 2001, <http://parkplanning.nps.gov/document.cfm?parkID=454&projectID=12591&documentID=38207>

is established by rating the following landscape features: land forms, vegetation, water, color, adjacent scenery, scarcity and cultural modifications from Key Observation Points (KOPs) within a defined viewshed. The overall score determines the scenic quality. Distance is the third component used to establish a VRI rating by using foreground, middle ground, background or seldom seen to describe the part of the viewshed that is most critical.

From the VRI ratings, VRM takes into account the management of the resource as a whole and policy decisions regarding land management. VRM classes do not necessarily reflect the VRI classes that were established for the particular area. There are four VRM classes:

- Class I: the objective is to preserve the existing character of the landscape and the level of change allowed should be very low. Wilderness Areas are automatically placed into Class I;
- Class II: the objective is to retain the existing character of the landscape and level of change to the landscape must be low;
- Class III: the objective is to partially retain the existing character of the landscape and the level of change can be moderate;
- Class IV: the objective is to provide for activities that require major modification of the landscape and the degree of change can be high.

Visual Resources Figure 3 shows the Visual Resource Inventory Classes for the BLM lands in the vicinity of the project area. Nearly 50 percent of the land shown in Figure 3 is Class I, areas of the highest scenic quality and viewer sensitivity. These Class I areas extend beyond the boundaries of the wilderness areas. The Class II areas are seen in both mountains and valleys adjacent to Class I areas and on the Pahrump Valley floor. Class III areas appear to be the smallest component of the areas shown in the figure. Class IV are found mostly in the Pahrump Valley. The figure demonstrates that, according to the BLM rating system, there is a generally a high degree of scenic quality in the vicinity of the project site.

Visual Resources Figure 4 shows the VRM classes assigned to the area in the most recent RMP. Note the significant migration of Class I areas to Class II, III and IV, and the significant downgrade of the valley floor and alluvial fans to Class III and IV. The only remaining Class I designations are the Nopah and Pahrump Valley Wilderness Areas. The two figures clearly illustrate the high degree of scenic quality that exists with the viewshed of the proposed project site.

Other sources have characterized the scenic qualities of the Pahrump Valley and the project location. The Environmental Impact Report prepared for Roland Wiley in 1974 for the subdivision of Parcels 86 and 87 describes the aesthetic character of the area to be subdivided, now portions of the project site. "With over 90 basins and 160 mountain ranges and spurs, the regional topography offers much in the way of visual enjoyment ". The report goes on to describe "marbled mountain formations" and concludes "the region has a high aesthetic value, one not measured solely in currency" (EDB 1974, p. 41). The report states that "the present aesthetic aspects of the site are predominantly visual, i.e., a desert valley with surrounding ranges of mountains", although the report

described the “desert flora and lightly timbered mountains” as providing little in the way of visual diversity (EDB 1974, p. 68).

Landscape character photographs of the regional setting can be found in **Visual Resources Figures 5-16**. Located immediately to the south of the project site and Old Spanish Trail Highway is the community of Charleston View. The 1960s residential subdivision’s unpaved streets are in a very recognizable grid and the lots are predominantly 2.5 acres in size. 2010 U.S. Census data⁴ indicates there are 68 residents living within 6 miles of the project site in California. While the residences are scattered throughout the subdivision, many are located within the area bounded by Silver Street on the west, an unnamed street two blocks to the east, and Charity Lane to the south. The residences include single-family homes and other structures such as trailers and outbuildings. In addition to permanent residents, Inyo County’s Director of Health and Human Services indicates there exist a number of squatters on various lots throughout Charleston View⁵.

PROJECT SITE

The project site would encompass approximately 3,277 acres (5.12 square miles) of privately owned land in the community of Charleston View, Inyo County, California. The site is immediately adjacent to the border with Nevada; the border forms the eastern boundary of much of the project site. The land was subdivided in the 1960s and features a grid of dirt roads approximately one-half mile apart. The roadways have been maintained and continue to experience vehicular travel. The grid of dirt roads also extends into the residential area south of the project site. Other than a storage area for boats and trailers located just beyond the eastern boundary of the project site, the remnants of an old orchard and the roads created in the 1960s, much of the project site is undisturbed. It is a landscape of typical Mojave Desert Scrub and shadscale scrub⁶ plant species, a generally flat to mildly sloping terrain, gravelly sandy soil⁷ and is criss-crossed by washes and minor depressions and rises.

Visual Resources Table 1 provides the proposed project’s approximate dimensions, colors, materials, and finishes for major buildings and structures.

VISUAL RESOURCES Table 1
Proposed HHSEGS Project’s Dimensions, Colors, Materials and Finishes
Of Major Buildings and Structures

Element	Height (ft)	Length (ft)	Width (ft)	Diameter (ft)	Color	Materials	Finish
Power Tower	590			72	Natural	Concrete	Natural

⁴ Source: U.S. Census Bureau, 2010 Census

⁵ Inyo County, Health and Human Services Department, Jean Turner, Director, letter dated December 12, 2011, received by CEC as attachment to **INYO 2012b – Inyo County/K. Carunchio (tn: 63719)** Inyo County Letter from Inyo County regarding Preliminary Estimates for the Fiscal Impacts of the Construction and Operation. 02/16/2012.

⁶ 11-AFC-02, Figure 5.2-3 Vegetation Map.

⁷ 11-AFC-02, Figure 5.11-1, Soil within 1 mile of HHSEGS.

							Concrete Finish
Solar Receiver Steam Generator (SMSG)	160			102	Black or Brightly Glowing	Metal	Flat
Switchyard (off site)	36	420	310		Gray & Silver	Metal	Flat
Steam Turbine Generator Enclosure	45	110	46		Metal	Metal	Flat
Aux. Boiler	25	78	68		Not Specified	Painted	Not Specified
Element	Height (ft)	Length (ft)	Width (ft)	Diameter (ft)	Color	Materials	Finish
Aux. Boiler Stack	135			5.5	Not Specified	Painted	Flat
Night Preservation Boiler	14	25	15		Not Specified	Painted	Not Specified
Night Preservation Boiler Stack	30			1.5	Not Specified	Not Specified	Not Specified
Fin Fan Dry Coolers	13.5	80	60		Rusted Finish	Metal	Flat
Air-cooled Condenser (ACC)	120	310	218		Not Specified	Metal	Flat
Emergency Generator (Power Block)	10	30	9		Not Specified	Metal	Flat
Emergency Generator (Common Area)	7	15	6		Not Specified	Painted	Not Specified
Generator Step Up Transformer	25	40	58		Gray	Metal	Flat
Unit Auxiliary Transformer	14	24	25		Gray	Metal	Flat
Service/Fire Water Storage Tank	32		1	34	Not Specified	Metal	Flat
Treated Water Storage Tank	32			34	Not Specified	Metal	Flat

Potable Water Storage Tank	9			6	Not Specified	Not Specified	Flat
Potable Water Treatment System Feed Tank	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified
Demineralized Water Storage Tank	32			30	Not Specified	Metal	Flat
Element	Height (ft)	Length (ft)	Width (ft)	Diameter (ft)	Color	Materials	Finish
Waste Water Collection Tank	25			14	Not Specified	Metal	Flat
Mirror Wash Water Storage Tank	16			23	Not Specified	Metal	Flat
Heliostats	14.5' Max	17.16'	Not Specified		White (back of unit)	Galvanized (steel parts)	Semi-Matte (back of unit)
Admin/Control/Warehouse Building	14-22	325	85		Not Specified	Metal	Flat
Deaerator/Feed Water Heaters	130	162	43		Not Specified	Metal	Flat
Mirror Wash Covered Parking	20	300	55		Not Specified	Metal	Flat
Plant Services Building	15	88	40		Not Specified	Metal	Flat
Plant Electrical Building	30	132	38		Not Specified	Metal	Flat
Water Treatment Building	30	150	85		Not Specified	Metal	Flat

Source: 11-AFC-02, Supplemental DR Set 2, Table 5.13-4R1, DR Set 2C, Figure DR 152-1.

Transmission Line(s)

The interconnecting transmission lines are proposed to be located in Nevada, leaving the HHSEGS facility at the state line, connecting to the project switchyard in Nevada and proceeding in a corridor parallel to Old Spanish Trail Highway toward Nevada Highway 160. The transmission corridor in Nevada is within BLM's permitting jurisdiction, and the impacts of the project's offsite transmission lines will be assessed through the National Environmental Policy Act (NEPA), process by BLM in its Environmental Impact Statement (EIS) for the transmission lines. The on-site underground transmission lines originate at Solar Plants 1 and 2, and extend under the heliostat arrays to the substation located in the common area.

The Nevada transmission corridor is shown in Figure TSE-2 in the Application for Certification (AFC), which depicts "typical" Double-Circuit Monopole 230kV pole

structure, ranging in height from 90 feet to 120 feet. The transmission poles are listed in Table 5.13-4 as one-hundred feet in height, and the proposed color and materials are rusted metal. KOP-1 in Nevada includes a portion of a pole in the view of the KOP.

Natural Gas Pipeline

The natural gas pipeline would be underground and not visible on the project site. A 12-inch diameter pipeline is anticipated, and would enter the HHSEGS site in the common area where it would connect with an onsite gas metering station. It would exit the project site at the state border, and continue parallel to Old Spanish Trail Highway in Nevada. The portion of the underground gas line that is onsite is shown in Data Response Set 1A, Revised Figure DR34-1. No visible components of the onsite gas line are anticipated.

Water Supply and Discharge

Water for facility use would be pumped from several (up to six) onsite wells. Groundwater would be treated and stored on site in a storage tank at each power block noted on Figure 2.2-1-R1 (Supplemental Data Response Set 2, April 2, 2012). The tanks would be located within the cluster of facilities of each solar power plant at the base of the power tower. The largest of the storage tanks would be 32 feet in height and 34 feet in diameter.

Construction Laydown and Staging Area

The temporary construction laydown area would be an approximately 180-acre area roughly bounded by Quartz Street on the east, Avenue B on the north, Avenue D on the south and extending west of the project site approximately one-quarter mile. The southern edge of construction laydown area as defined would be approximately one mile north of Old Spanish Trail Highway at Avenue D and extend one mile north to Avenue B. The AFC indicates that construction traffic would enter through the main HHSEGS entry drive, however, a later figure, Access Roads and Paved Internal Roadways (AFC, Traffic and Transportation Figure 2), shows construction traffic entering at what is now Topaz Street, on the western project boundary. The laydown area would be used for parking, storage of construction materials and some construction assembly activities.

APPLICANT PROPOSED MITIGATION MEASURES AND CONDITIONS OF CERTIFICATION

The applicant's discussion of the impacts of the HHSEGS is found in Section 5.13.6, pages 5.13-32 to 33 in the AFC. The applicant concludes that HHSEGS includes features that reduce visual impacts to less than significant, with mitigation, from the construction and operation of the facility. The applicant proposes the following visual resources mitigation measures to reduce visual impacts to less-than-significant levels:

1. Ground disturbance and soil erosion will be minimized by avoiding steep slopes and by minimizing the amount of construction and ground clearing needed for roads and staging areas. Dust suppression techniques will be employed to minimize impacts of vehicular and pedestrian traffic, construction and wind on exposed surfaces.

2. A lighting plan that minimizes the project's nighttime light impacts will be developed and submitted to Energy Commission staff for review. Provisions contained in this plan will include installation of nighttime lighting only in areas where it is required for operations or safety, use of the lowest levels of lighting consistent with operational needs and safety regulations, use of light fixtures that are hooded to direct light only to the areas where it is needed and to prevent light from spilling off the site or up into the sky, and use of switches and motion detectors to assure that lighting is turned on only when required.
2. A color treatment plan to blend the project facilities into the existing setting will be developed in consultation with Inyo County and Energy Commission staff.
3. A landscape plan will be developed for the project setback area along Old Spanish Trail Highway. In the portion of the setback area directly north of Charleston View residential area, this plan will include the use of a mix of tall growing trees to provide partial screening of the views toward the solar power towers from the residential area, and lower growing shrubs to screen views into the site from Old Spanish Trail Highway. The plant species selected for this area will emphasize species with low water needs that are aesthetically compatible with the landscape setting. In the remainder of the setback area along Old Spanish Trail Highway, the emphasis will be on use of native shrubs with low water requirements that are planted in an informal, naturalistic pattern to provide partial screening of views into the project site. The landscape plan will be submitted to Inyo County and Energy Commission staff for review.
5. To reduce and compensate for the changes to the views toward the project site seen from Charleston View (KOP 4), two measures will be implemented:
 - a. The applicant will make provisions for a one-time program to plant trees on the properties of any Charleston View residents who indicate an interest in 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 applicant's professional arborist will identify a set of species that are well adapted to the local conditions and which have characteristics that provide effective screening of views. The applicant's arborist will work with residents to select up to eight trees from this set of species and will assist the residents in indentifying appropriate locations for their installation. The applicant will take responsibility for purchasing and installing the trees, which will be up to ten gallons in size. Once installed, irrigation and maintenance of the trees will be the responsibility of the property owner.
 - b. To compensate for the visual clutter the solar power towers will add to a portion of the view from Charleston View, the applicant will assist with a one-time clean-up program within the Charleston View rural residential subdivision. This clean-up program will entail the applicant making provisions to assist property owners with clean-up of their properties by providing free hauling and disposal of unwanted debris and vehicles.

The applicant discusses applicable laws, ordinances, regulations and standards (LORS) in Section 5.13.2 of the AFC. On page 5.13-3 to 4, the applicant discusses the project's compliance with state and local laws. The applicant concludes the proposed project would be in conformance with state scenic highway regulations and local Inyo County General Plan provisions and ordinances. Staff notes that the Renewable Energy Overlay Zone General Plan Amendment of April, 2011, was revoked by the County Supervisors in September of 2011. This was after publication of the AFC. The General Plan Designation for the project site has since returned to Open Space and Recreation. Industrial development such as the HHSEGS facility is not permitted in Open Space and Recreation designations and the assumptions made in the AFC as to conformance with the Overlay Zone are no longer applicable. Please see the **Land Use** section of this **FSA** for more discussions on land use zoning. Staff provides a full summary of conformance with LORS in **Visual Resources Table 6**.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Staff evaluates the project to determine compliance with federal, state and local laws, ordinances, regulations and standards. Federal and state laws reviewed generally fall under scenic by-way and highway designations. No National Scenic By-Ways or State Scenic Highways are located within the project vicinity; therefore there is no discussion of these laws in this section.

California Government Code, section 65300, requires each city and county in California to adopt a general plan for the physical development of the county or city and any land outside its boundaries that bears relation to its planning. On the basis of these general plans, cities and counties establish policies and strategies necessary to carry out elements of the plan.

The Inyo County General Plan, adopted in 2001, sets forth the Goals and Policies that provide direction for the adoption of regulations, ordinances and codes. **Visual Resources Table 2** lists the local laws, ordinances, regulations, and standards (LORS) as they pertain to the HHSEGS.

Visual Resources Table 2 includes information about relevant local laws, ordinances, regulations, and standards (LORS) pertaining to aesthetics or the preservation and protection of sensitive visual resources.

VISUAL RESOURCES Table 2
Applicable Laws, Ordinances, Regulations, and Standards

Source	Policy and Strategy Description
STATE	
State of California AB 1881 (2006), Water Efficient Landscape Ordinance (WELO).	Local agencies were required to adopt a WELO based on the state model by January 31, 2010, or the state's model ordinance would be applicable within the jurisdiction of the local agency. Inyo County has not adopted its own ordinance; therefore the state model ordinance applies.
LOCAL	
Inyo County, California	

Source	Policy and Strategy Description
Inyo County General Plan, Goals and Policies Report, December, 2001. Public Services and Utilities, Policy PSU-1.7: Undergrounding Utilities.	The County shall require undergrounding of utility lines in new development areas...except where infeasible for operational or financial reasons. Additional implementation measures are found in Table 4-4, page 4-44.
Inyo County General Plan, Goals and Policies Report, December, 2001. Public Services and Utilities, Policy PSU-3.1: Efficient Water Use.	The County shall promote efficient water use by encouraging and enforcing water-conserving landscaping and other measures.
Inyo County General Plan, Goals and Policies Report, December, 2001. Gas and Electrical Facilities, Policy PSU-10.1: Expansion of Services	The County shall work with local electric utility companies to design and locate appropriate expansion of electric systems, while minimizing impacts to agriculture and minimizing noise, electromagnetic, visual and other impacts on existing and future residents.
Inyo County General Plan, Goals and Policies Report, December, 2001.7.3, Scenic Highways, Policy SH-1.1: Protect the Natural Qualities of Designated Scenic Routes.	The natural qualities of designated scenic routes should be protected. Definitions of scenic routes may be found in Section 7.3.1, page 7-11.
Inyo County General Plan, Goals and Policies Report, December, 2001. 7.8 Canals, Pipelines and Transmission Cables. Policy CPT-1.1: Placement of Corridors.	The County shall consider the visual and environmental impacts associated with placement of regional conveyance corridors. Table 7-7, page 7-33, lists implementation measures.
Inyo County General Plan, Goals and Policies Report, December, 2001. 8.8 Visual Resources, 8.8.3: Visual Resource Issues.	Critical visual resource issues identified: <ul style="list-style-type: none"> • Maintain small town character; • Preserve panoramic views; • Maintain open natural character of the County; Maintain visual resources of scenic corridors, highways and roadways.
Inyo County General Plan, Goals and Policies Report, December, 2001. 8.8 Visual Resources. Goal VIS-1.	<ul style="list-style-type: none"> • Preserve and protect resources throughout the County that contribute to a unique visual experience for visitors and quality of life for County residents. This includes a number of policies (not listed here) to protect historic character, encourage community design themes, establish grading standards and ensure outdoor advertising does not degrade visual resources.

Source	Policy and Strategy Description
Inyo County General Plan, Goals and Policies Report, December, 2001. 8.8 Visual Resources. Goal VIS-1.1: Historic Character.	The County shall preserve and maintain the historic character of communities within the County.
Inyo County General Plan, Goals and Policies Report, December, 2001. 8.8 Visual Resources, Policy VIS-1.4: Equipment Screening.	Within communities, building equipment shall be screened from public view.
Inyo County General Plan, Goals and Policies Report, December, 2001. 8.8 Visual Resources, Policy VIS-1.6: Control of Light and Glare.	The County shall require that all outdoor light fixtures use low-energy, shielded light fixtures which direct light downward.
Inyo County General Plan, Goals and Policies Report, December, 2001. 8.8 Visual Resources, Policy VIS-1.7: Street Lighting.	Street lighting shall only be utilized where needed to protect public safety related to traffic movement.
Inyo County Renewable Energy Ordinance, August 17, 2010.	<ul style="list-style-type: none"> • Potential adverse impacts may include scenic views which may be blocked or degraded, which may affect the attractiveness of the County for tourism. Other impacts may include light and glare. The County requires that adverse impacts are avoided or acceptably mitigated. • Police powers of the County include protection of the environment of Inyo County, including biological and other natural resources, aesthetics, recreational attractiveness. • The term “environment” includes the ecological, social, aesthetic and economic environment of the County. It is not limited by and may be broader than the environmental considerations under CEQA or NEPA [National Environmental Policy Act]. <p>In lieu of imposing development standards set forth in Title 18 (above), the County may impose such standards as are deemed appropriate and may incorporate or impose such other standards and mitigation measures as are deemed necessary.</p>
Clark County, Nevada	

Source	Policy and Strategy Description
Northwest Clark County Land Use Plan, November 7, 2007: Wilderness Areas	Three Wilderness Areas and one Wilderness Study Area are located in Northwest Clark County. These include Mt. Charleston, La Madre Mountain and Rainbow Mountain Wilderness Areas and the Mount Stirling Wilderness Study Area. Mount Charleston and Mount Stirling are within the viewshed of the project area.
Northwest Clark County Land Use Plan, November 7, 2007: Scenic Byways	Northwest Clark County has two county-designated Scenic Highways, a BLM Back Country Route and four state-designated Scenic Byways. No designated scenic highways, byways or back country routes are in the vicinity of the proposed project site.
Clark County Chapter 30.56: Site Development Standards, Part F: Lighting Standards	Provides lighting standards that restricts height of poles to 25 feet and that all outdoor freestanding luminaries shall be hooded and directed downward. Security lighting on sensors are exempt from the standards.
Clark County Chapter 30.68.30: Site Environmental Standards: Lighting	Lighting shall be designed to prevent light from shining directly on residential uses. All light sources shall be shielded and directed downward at all times.
Clark County Comprehensive Plan, November 16, 2010, Volume One, Environmentally Sensitive Lands (ESL) Policy and ESL Advisory Committee Report, January 29, 2004.	Aesthetic Areas are defined in the 2004 ESL Report These areas include Scenic Routes, Slopes of 50% or more, Significant Geologic Features and Scenic Points or Features identified in Table one of the report. There are slopes of more 50%, significant geologic features and scenic points potentially within the viewshed of the proposed project site. The policies outlined in the Comprehensive Plan generally pertain to land use and not aesthetics.
Nye County, Nevada	
Nye County Comprehensive/Master Plan, June 7, 2011, Section 3.5.1, Solar Energy, Figures 7 and 8.	Figure 7 shows pending and approved renewable energy projects. Figure 8 shows those areas of the county best suited to solar development based upon a March 2010 analysis. ⁸ The greater Pahrump

⁸ Suitability Analysis for Nye County Solar Generation, Transmission and Related Support Facilities, March 2010.

Source	Policy and Strategy Description
	Valley is shown as “Better” for solar development, on a scale Best- Better-Good-Unsuitable. An area adjacent to Highway 160 is identified as best. This is presumably the same area identified in Figure 7 as “pending solar project”. This appears to be in the vicinity of the possible solar project listed in Visual Resources Table 5 Cumulative Impacts as Sandy Valley in Clark County.
Nye County Comprehensive/Master Plan, June 7, 2011, 6.1.7: Scenic Drives	Three scenic roads are identified on page 53: Lunar Crater Back Country Byway, The Extraterrestrial Highway and Tonopah Star Trails. None of the roads are in the proposed project vicinity.

ASSESSMENTS 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 the anticipated 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 sensitivity (Environmental Checklist pertaining to “Aesthetics”, takes into account scenic quality, high levels of viewer concern, etc.), that experience high levels of visual change from a project, are more likely to experience 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 Operation Impacts and Mitigation section of this analysis.

Visual Resources Figure 17 shows the locations of the seven KOPs provided by the applicant in the AFC. The four KOPs located in California used in this analysis are as follows:

- **KOP 3** – View from Old Spanish Trail Highway and Property Boundary of Proposed St. Therese Mission, Charleston View, California
- **KOP 4** – View from Silver Street at Charity Lane, Charleston View, California
- **KOP 5** – View from Old Spanish Trail Highway Eastbound, Inyo County, California
- **KOP 7** – View from Garnett Road at Old Spanish National Historic Trail Alignment/4WD Road, Charleston View, California

The following three KOPs are located in Nevada, looking toward the project site:

- **KOP 1** – View from Old Spanish Trail Highway Westbound, Nevada
- **KOP 2** – View from Stump Springs ACEC, Nevada
- **KOP 6** – View from Thorne Drive at Homestead Road, Pahrump, Nevada

The KOPs were selected to represent the overall project viewshed or area of potential visual effect (the area within which the project could potentially be seen). Staff also reviews applicable federal, state, and local LORS and their policies or guidelines for aesthetics or preservation and protection of sensitive visual resources that may be applicable to the project site and surrounding area. These LORS include local government land use planning documents (e.g., General Plan, zoning ordinance). See **Visual Resources Table 2** for applicable LORS and **Table 6** for the project’s consistency with applicable LORS.

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 VISTA

“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 distant view of high pictorial 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. As seen in **Visual Resources Figures 1 and 3**, the project is surrounded by identified areas of high scenic value. Views of the Nopah Range and Wilderness Area, Kingston Range and Pahrump Valley Wilderness Area and Spring Mountains National Recreation Area, including the prominent Mt. Charleston, would all be significantly impacted by the project. An earlier environmental document prepared for Roland H. Wiley, concluded that the previously proposed agricultural development of “dispersed farm buildings and housing units will probably not interfere with the view of the surrounding mountains as would a high-rise development or an industrial complex with smoke stacks and other structures which ordinarily protrude above buildings (EDB 1974, p. 68). As described earlier in this section, these areas were inventoried by the BLM as Classification 1, the highest scenic value that can be assigned. Views from some of these scenic resources would also be significantly impacted, as would views from some alignments of the Mormon and Old Spanish National Historic Trails.

KOPs 5 and 7 clearly show the impact of the project on the existing scenic view of Mt. Charleston, a prominent landmark of importance in pre-history and current times. KOP 5, while located just beyond the boundary of the Nopah Wilderness Area, is representative of the view from the Nopah Wilderness Area as Old Spanish Trail Highway passes through the same alluvial foothills as the mountain range. KOP 7, located just outside the boundary of the Pahrump Valley Wilderness Area, representative of a portion of the Mormon/Old Spanish National Historic Trail, illustrates the project’s visual disturbance of the view of Mt. Charleston from the historic trail alignment and from the wilderness area.

KOP 3 manifests the adverse impact of the project on the motorists’ view of the highly scenic Nopah Range and Wilderness Area. There is no physical mitigation that can be offered to reduce the substantial adverse effect on the high pictorial quality in this valley by the introduction of two 750-foot power towers and related facilities into the landscape in both California and Nevada.

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.

No. The valley floor in the project area consists primarily of desert scrub vegetation and a sandy or gravelly soil. The project site is not located within an eligible state scenic highway corridor and there are no notable scenic features or historic structures located within the site. Therefore, the project would not substantially damage scenic resources such as trees, rock outcroppings, or historic buildings within a state scenic highway.

C. VISUAL CHARACTER OR QUALITY

“Would the project substantially degrade the existing visual character or quality of the site and its surroundings?” **Yes**, as described below.

The visual aspects evaluated according to this criterion are organized into two categories: 1) construction impacts and 2) operational impacts.

Construction Impacts and Mitigation

Information about construction impacts are organized according to project site and construction laydown and parking area and linear routes. Per the AFC, construction would take place over 29 months.

Project Site and Construction Laydown Area

Construction activities at the project site and construction laydown area would substantially degrade the visual character or quality of the site and surrounding areas as viewed from KOPs 3, 4, 5 and 7, due in large part to the construction of the power towers. The construction activity, other than the power towers, would be moderately to highly visible from KOP 3, representative of the motorists travelling westbound on Old Spanish Trail Highway. Construction activities, including movement of large vehicles and materials and installation of heliostats, would occur along the entire two-mile linear project boundary fronting the road and would be at least partially visible from multiple vantage points. Construction-related truck traffic would be entering and leaving the project by way of what is now known as Topaz Street, at the westernmost boundary of the project site, and would introduce activity into the views not currently seen. The laydown area, where much of the storage and assembly would occur, is approximately one mile north of Old Spanish Trail Highway, and therefore would have low visibility from KOP 3 and the road. The construction of the power towers would be highly visible from all vantage points and therefore produce the most significant visual impact of the project. Construction views of the project structures, other than the power towers, from KOPs 4 and 7, would be diminished by the distance and screening provided by existing vegetation and topography. The project view from KOP 5 would be seen in its entirety on the valley floor and would be significantly altered by the construction activity.

Light or Glare

Nighttime construction and security lighting would have the potential to produce glare or off-site light trespass. If bright exterior lights were not shielded or directed onsite, they could introduce significant light or glare to the vicinity, particularly for motorists on Old Spanish Trail Highway, as represented by KOP 3 and 5. This has the potential to cause distraction in the form of glare and confusion as to the light source origin for motorists, who are used to travelling along a fairly dark stretch of highway. Depending upon the project setbacks, without screening and lighting controls, the impact upon motorists on Old Spanish Trail Highway would be adverse and significant. 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.

The construction lighting and activity have the potential to create significant and unavoidable visual impacts on residents, motorists and other viewers. The applicant's proposed mitigation measures do not address nighttime construction lighting (5.13-32), but does describe that assembly of the heliostats would occur within a building and therefore this activity would not be visible. Impacts from nighttime construction lighting may be partially mitigated through effective implementation of Conditions of Certification **VIS-4** and **VIS-5**, screening fencing and lighting controls. Conditions of Certification **VIS-4** and **VIS-5** would also limit visibility of the construction site and the potential for glare and light trespass during construction for the lower profile construction activities. There is no mitigation for reducing the visual lighting impacts during construction of the solar tower facilities and FAA required lighting of the power towers, therefore these visual effects would remain significant and unavoidable.

Linears

Gas pipeline construction would occur primarily in Nevada on BLM-managed lands. Due to their temporary nature and low visibility, there would be no significant adverse impacts from construction of the pipelines.

On-site construction would include underground transmission facilities. There would be temporary visual impacts of staged construction materials, equipment and excavation. With effective implementation of **VIS-4** and **VIS-5**, onsite linear construction would be largely screened from view for viewers at close proximity, such as KOP 3. Staff anticipates that no significant adverse visual impacts would occur during construction of the linears associated with the project in California. BLM is addressing the impacts of linear construction in Nevada.

CONCLUSION

Overall, staff concludes that the project's proposed construction activities as described above would substantially degrade the existing visual character or quality of the site and its surroundings. The adoption of the conditions of certification noted herein would mitigate some of the visual impacts at ground level but there is no mitigation for the visual impacts during construction of the power towers.

Staff has reviewed **Socioeconomics Figure 1** showing the minority population is less than 50 percent within a six-mile radius of the proposed HHSEGS. The absence of an

environmental justice population within that radius and, by extension, the lack of visual impacts to any environmental justice population leads Energy Commission staff to the conclusion that there are no visual resources environmental justice issues related to the construction of this project and no minority or low-income populations would be significantly or adversely impacted.

Operational Impacts and Mitigation

Operation impacts are discussed by representative Key Observation Points (KOPs) followed by a summary of impacts from Linears and Water Vapor Plumes. As discussed earlier, seven KOPs were identified within the AFC and all are analyzed for CEQA purposes. Potential impacts are identified by two fundamental factors for each KOP: *visual sensitivity* (the susceptibility of the setting to impact as a result of its existing characteristics, including current level of visual quality, potential visibility of the project, and sensitivity to scenic values of viewers); and the degree of *visual change* anticipated as a result of the project.

KEY OBSERVATION POINTS IN CALIFORNIA

KOP 3 (Figure 20a)

KOP 3 is designed to represent the view of the project from the perspective of motorists traveling westbound on Old Spanish Trail Highway and visitors to the St. Therese Mission, currently under construction. The mission is located 0.75 mile east of the eastern boundary of the HHSEGS project, The 17.5 acre campus-style environmental park will function primarily as a columbarium. St. Therese Mission⁹, will include the following structures and activities:

- A small chapel;
- Two enclosed columbarium buildings, each built to store 2000 niches;
- An outdoor garden featuring 68 family columbaria and 132 garden niches;
- A restaurant with indoor and outdoor seating space and banquet area;
- A visitor's center with offices;
- A children's playground and a small dog park;
- A residential unit developed for housing two full-time staff members; and
- A meditation garden will feature 14 life-sized Stations of the Cross.

St. Therese Mission includes areas set aside for large passenger busses navigating the entry area of the site and parking in dedicated bus parking stalls. Therefore, it may be safely assumed that the St. Therese Missions expects visitors to arrive by both automobile and bus.

Visual Sensitivity

Old Spanish Trail Highway is a two-lane roadway and the westbound direction provides drivers and passengers a panoramic vista of the Pahrump Valley and the Nopah Range.

⁹ <http://www.sttheresemission.com/>

The view from KOP 3 is of roadside edge elements in the foreground, such as fencing and wooden transmission poles, construction activities at St. Therese Mission in the middle ground, and the Nopah Range and Wilderness Area in the background. The view would be cohesive and highly scenic due to the panoramic nature of the horizon line formed by the Nopah Range were it not for the roadside elements in the foreground and construction activity in the middle ground. This combination reduces KOP 3 to moderate visual quality. Viewer concern takes into account views of residential, recreational and motoring viewers. The view at KOP 3 is primarily viewed by drivers and passengers. The overall scenic and panoramic view at KOP 3 creates moderate-high viewer concern for passing viewers.

Drivers and passengers along Old Spanish Trail Highway travelling westbound have a largely unobstructed view of the project site, giving KOP 3 a high degree of visibility. 2007 Traffic counts indicate 258 to 275 automobiles per day for this stretch of Old Spanish Trail Highway¹⁰. Staff observations concur with those figures. This is a low number of viewers¹¹. Upon completion of the St. Therese Mission, the number of viewers from KOP 3 may increase by up to 40 per day¹². For the purposes of this analysis, based on existing traffic data, the number of viewers is rated as low. At fifty-five miles per hour (nearly one mile per minute), the driver's attention is rightly more focused on the road and scanning for vehicles or pedestrians entering the roadway, and therefore their view duration at KOP 3 may be considered low to moderate¹³. Passengers, however, are more inclined to take in the passing view and so the view duration for passengers is naturally higher than for drivers. Passengers have the luxury of scanning the horizon and taking in the larger view, therefore they would experience a moderate view duration. The completion of the St. Therese Mission campus would increase the view duration significantly as, not only would visitors be entering the property in automobiles and busses, but would be lingering on the property for hours. This would give the future viewers from the Mission a high degree of view duration. Averaging the three viewing durations above, staff rates the view duration at KOP 3 as moderate.

Thus, based on the moderate visual quality and viewer exposure, and moderate to high viewer concern, overall visual sensitivity at KOP 3 is moderate.

Visual Change (Figures 20b, 20c)

The addition of the proposed project to the view from KOP 3 would add two very formidable and tall industrial power towers to the view. This is true of all of the KOPs. Other structures seen in the simulation, such as the air-cooled condenser unit at Solar Plant 2, are much smaller in comparison to the power towers strong vertical profile. The towers break the horizon line of the Nopah Range and clearly capture the attention of the viewer due to their stark contrast to the pristine wilderness area behind them. The

¹⁰ E-mail to Candace Hill from Joshua Hart, Inyo County Planning Director, April 3, 2012.

¹¹ CEC staff characterizes daily motor vehicle trips of 151-300 as low and 501-2,500 as low-moderate.

¹² Visitation expectations included in Conditional Use Permit #2010-02/St. Therese Mission, and Negative Declaration associated with the permit.

¹³ CEC staff generally characterizes view duration as low if less than 10 seconds, low-moderate 10-20 seconds, moderate 20-60 seconds, moderate-high 1-2 minutes and high longer than 2 minutes.

conical forms, thick vertical lines, industrial gray color, luminous tops and smooth surfaces are markedly different than any other landscape or built feature in the view. Insertion of the towers into the view provides a high degree of contrast to the existing view as there are no other structures like them in the vicinity. While existing structures such as wooden roadside transmission poles already provide a minor degree of vertical intrusion, the sheer size of two 750-foot tall towers and their mass (72 feet in diameter, capped by a distinct 102 foot diameter “head” that is the solar receiver) are disproportionate to anything else in the view and their dominance is high. While the two towers pierce the horizon line of the mountain range (known as skylining), they do not have the effect of blocking any views in a significant way, as might a more traditional gas-fired power plant, with its more horizontal structures. But the towers do interrupt the highly scenic panorama of the Nopah Range and Wilderness Area, therefore view disruption is moderate.

As a result of a Data Request by staff (DR 154-155), the applicant revised KOP 3 to illustrate the visual effects of airborne dust and particles (**Visual Resources Figure 20c**). KOP 3 was chosen for this revision as it is the closest KOP to the project site and the location where the visual effect of “haloing” or “tee-peeing” would be the most pronounced. The applicant references in the response to DR-154 that the “tee-pee” effect would be seen at either high humidity (RH) conditions (above 40 percent) or during hazy (i.e. dusty) conditions. The applicant discusses that high RH values are normally expected during the cool hours of the day (most typically in the morning). Therefore the “tee-pee” effect is more likely to be seen in the cooler hours of the morning or evening, when RH is highest. It is also stated that the effect may be more pronounced when the sun is low over the horizon. This would create a potentially higher incidence of visual distraction from the motorist’s perspective at KOP 3. If the sun were low in the horizon to the south (as in the winter months) or to the west (as in the summer months), the visual dominance and the potential view disruption of the scattering effect of light would add to the overall visual change, which under these circumstances would now both be characterized as high. This results in the overall visual change at KOP 3 as high.

The contrast and dominance of the project structures in the landscape as seen in the simulation are high and the view disruption of the Nopah Range is high. The overall visual change at KOP 3 is high.

KOP 3 Summary

Taking into account the moderate visual sensitivity and the high overall visual change, visual impacts at KOP 3 would remain significant even with mitigation. Views of the dominant power towers and bright solar receivers cannot be effectively screened. Views of other project structures may be partially screened with perimeter tree plantings, solid walls and fencing. Adoption of Condition of Certification **VIS-1** (Surface Treatment) and **VIS-2** (Landscape Screening) will reduce the project’s contrast with the surroundings by requiring neutral tones complimentary to the desert landscape and providing a perimeter screening consisting of vegetation, walls and/or screened fencing. Adoption of Condition of Certification **VIS-6** would provide remedial mitigation for the loss of scenic views from KOP 3 by providing an interpretive area highlighting the natural and cultural visual resources in the area. The interpretive area would benefit the public by providing information about the Wilderness Areas, National Recreation Areas, named peaks and

the Old Spanish National Historic Trail, all adversely impacted by the introduction of the project. This remedial mitigation and its public benefit does not, however, reduce the visual impacts to less than significant, and is offered as an educational tool.

Partial screening of the project may also occur with the buildout of the St. Therese Mission project. The Mission project will introduce various building structures and landscape plantings into the foreground partially masking the HHSEGS structures except for the power towers. A tree canopy on site, as shown in the renderings, would have the effect of limiting the direct view of lower-profile HHSEGS structures to visitors arriving and using the St. Therese Mission facility.

KOP 4 (Figure 21a)

KOP 4 is representative of the view from residences in Charleston View, the only residential community in California near to the project site. The community can be characterized as sparsely populated (population of 68 in 2010 census count, see footnote 4) and composed of scattered low-profile, one story structures and planted vegetation including trees and shrubs. Charleston View has a total of 34 housing units, 29 of which are occupied¹⁴. The lots are 2.5 acres in size and a street grid of unpaved roads exists and appears to be maintained by the County Public Works Department (grading). The community has uninterrupted views of Mount Charleston and the Spring Mountains, hence the name Charleston View. As seen in KOP 4, the long view from Charleston View extends northwest to the range of mountains adjacent to Pahrump, Nevada. Charleston View residents also have direct, uninterrupted views of the Nopah Wilderness Area to the west and the Pahrump Valley Wilderness Area to the south of the community. The subdivision, laid out and permitted in the 1960s, never even began to approach its full build-out capacity. Visual Resources Figures 12 and 13 are characteristic of the developed portions of Charleston View.

KOP 4 is located at the intersection of Silver Street and Charity Lane. The view is panoramic, with the Spring Mountains forming an unbroken horizon line. The view north along Silver Street takes the eye beyond Old Spanish Trail Highway and to brightness on the ground in the distance before the toe of the mountain range, which appears to be the sandy plateau of the landform locally-referred to as Hidden Hills. The foreground is composed of the unpaved roads, and some sparse desert vegetation with a large expanse of sandy soil exposed in the right portion of the view. The middle ground is occupied by a single house, sited at a roughly forty-five degree angle to the Silver Street and flanked by vegetation and other structures on the property. The west side of Silver Street has native desert vegetation that appears undisturbed in the middle ground. The background is composed of the distinct linear form of the Spring Mountains and the snow-covered peaks of Mount Charleston and Mount Stirling. The line of the mountain range is subordinate to the expanse of blue sky, which makes up approximately forty percent of the view at KOP 4. The low profile of the fore- and middle ground and long vistas to the mountains characterize this view.

¹⁴ CH2MHILL - Census 2010 PL 94-171 Data

Visual Sensitivity

The Spring Mountains provide a highly scenic backdrop to this view. To the residents, who have chosen to live within this viewshed, it may be perceived as picture-postcard-like in its scenic value, and therefore of high quality. Other than the low-profile buildings and scattered plantings, there is little to obstruct the view, which is highly visible from the treeline above and down the linear corridor of Silver Street. Typically, residential areas are considered to have a high degree of visual concern. As mentioned earlier, the 2010 U.S. Census counts the population in the vicinity of Charleston View as 68. Therefore the number of permanent viewers is moderately high¹⁵. Because of the permanent nature of residential viewers, the duration of the view is also extended and therefore is rated as high. Considering the high visibility of the open expanse, the moderate to high number of viewers and the high duration of the view, the overall viewer exposure is high. With the high visual quality, high degree of viewer concern and the overall high degree of viewer exposure, the overall visual sensitivity at KOP 4 is high.

Visual Change (Figure 21b)

The introduction of the structures for the HHSEGS facility into the view at KOP 4 dramatically alters the nature of the view from rural and highly scenic to highly industrial. The two power towers as seen on Silver Street are very visible and do not mimic any existing line, form, color or texture in the view. The verticality of the towers and their smooth conical form topped by a luminescent cap are in direct contrast to the horizontal, soft-edged forms of the natural vegetation and low profile of the existing residential structures and plants. The industrial gray tone of the tower and the bright white solar receiver on top are in marked contrast from the low-key, natural desert palette. While gray foliage is characteristic of some of the desert plant species seen in the view, they are accompanied by plants of various hues of browns, tans and greens. The sleek, smooth surfaces and strong vertical directionality of the towers adjacent to the coarse, gravelly texture of the roadbed and the irregularity of the desert vegetation and scattered structures is not conducive to the surrounding area, therefore the visual contrast is high.

The broad, panoramic horizon line of the Spring Mountains and expansive blue sky are both pierced by the towers. The two 750-foot towers with their luminescent solar receiver caps dominate the landscape so completely that it will be hard to imagine the unbroken, highly scenic quality of the existing view. It is noted here that staff conducted reconnaissance trips to the Pahrump Valley several times and have made note of some of the valley's tallest and largest existing structures as reflected in **Visual Resources Figures 15 and 16**. There is nothing in the entire valley that dominates the landscape in the way the towers would as shown in the KOP 4 simulation, therefore, dominance is high. The high visual quality and continuity of the view of the mountains and expanse of sky is disrupted by the industrial towers and their introduction would cause some view disruption. View disruption is moderate to high. High visual contrast and dominance together with moderate to high view disruption yields a high degree of overall visual change.

¹⁵ CEC staff characterizes residential viewers as very low: 1 or none; low: 2 to 5; low-moderate: 6-20; moderate: 21-50; moderate-high: 51-100; and high: more than 100.

KOP 4 Summary

Overall visual sensitivity is high and overall visual change is high at KOP 4, so visual impacts at KOP 4 would be significant and unavoidable. Adoption of Condition of Certification **VIS-1** would ensure the project structures other than the towers and SRSGs do not contrast with the surroundings by requiring neutral tones complimentary to the existing desert landscape. Implementation of Condition of Certification **VIS-2** would have some screening effect from this distance on the lower project structures, such as the air-cooled condenser. Adoption of Condition of Certification **VIS-6** would provide remedial mitigation for the loss of scenic views from KOP 4. The applicant's proposed Mitigation Measure 5 and staff's proposed Condition of Certification **VIS-7** provide for tree plantings on the property of Charleston View residents. For those who choose this option, it may partially screen the view of the power towers. It may also, in some instances, have the effect of screening the resident's highly scenic view of the northern portion of the Spring Mountain range. The planting of trees, however, does not provide complete mitigation for the visual impact of the towers. Therefore, the visual impacts would remain significant and unavoidable.

KOP 5 (Figure 22a)

KOP 5 primarily represents the view of the motorist travelling eastbound on Old Spanish Trail Highway, which overlooks the greater Pahrump Valley. It also represents the view of visitors to the Nopah Wilderness Area. **Visual Resources Figure 17** and AFC Figure DR 32-1 (not included in this section) show the visibility of the towers and the heliostat field respectively. Based on the applicant's visibility models, and staff's own field visits, the KOP 5 location on the road is where the valley becomes visible to the motorist for the first time travelling eastward from Tecopa. The viewer has a panoramic view of the valley and the Spring Mountains, with Mount Charleston centered in the frame. The foreground is made up of the asphalt roadway, gravel shoulder and a slightly rising slope with fairly dense native vegetation. The middle ground is comprised of the undeveloped valley floor. A portion of Old Spanish Trail Highway is visible traversing at an angle toward Mount Charleston in the right half of the frame of KOP 5. The background is composed of the unbroken line of the Spring Mountains and a vast expanse of blue sky.

Visual Sensitivity

At certain times of year, the scene of the Pahrump Valley is quite vibrant, with the dark bluish hue of the mountains with snow-capped peaks set against the medium blue sky and verdant vegetation adjacent to the roadway. Throughout the season, the views are panoramic and feature the focal point of Mount Charleston in the center of the view.

The Old Spanish Trail Highway snaking through the valley and the broad expanse of sky and mountains with ample vegetation is a picture-postcard quality scene of high visual quality and has a high degree of visibility. Motorists' visual concerns generally take in oncoming or roadside traffic, the ability to see clearly the road ahead, the existence of distracting or discordant elements and effects of glint or glare from both natural and human-developed causes. Natural causes may be the sun or a reflection on a water body and human-developed causes might be a reflection on car's window, headlights at night or lighting adjacent to the road. KOP 4 is largely devoid of much of those causes of glint and glare, other than the obvious headlights and possible sun

reflections on automobile glass. Viewer concern from the motorists' perspective is moderate. There are expected to be at least some recreationists in the Nopah Wilderness area who would have a higher level of viewer concern, due to the very nature of the designated scenic wilderness in which they have chosen to spend time, as the BLM describes it, in "places of solitude where people may experience freedom from our fast-paced industrialized society". That would place the viewer concern as high. A combined viewer concern of the motorist and the recreationist is moderate to high. Staff investigated visitation figures for the Nopah Wilderness Area with BLM staff at the Barstow Field Office. BLM staff was unable to provide visitation counts as they do not keep these records. BLM staff mentioned that logs are kept on some outdoor recreation sites, but there is no way to verify those figures. Staff agrees with the applicant that the number of viewers is low. As mentioned in the analysis of KOP 3, the traffic data for Old Spanish Trail Highway in the vicinity of the proposed project, and staff's own observations, indicate the number of motorists is low. Therefore, the combined number of recreational and motoring viewers represented by KOP 5 is low.

Duration of views would be different for motorists and recreationists. At this fixed point, the view would be quite fleeting for the motorist. Compared to the view duration of KOP 3, from KOP 5, the entirety of the valley can be seen for some time descending from the Nopah Range to the valley floor, a distance of approximately nearly five miles to the project center. KOP 5 is described as 3.8 miles west of the project site boundary in the AFC. The center of the power blocks, where the power towers are located, is approximately 5 miles from KOP 5. At a speed of approximately one mile per minute, the project's power towers would be in full view of the motorist for nearly five minutes, which is considered a high view duration. Likewise for the recreationist, who is hiking, or camping, possibly enjoying the solitude of the view, the duration would be high. As both views would last longer than two minutes, view duration at KOP 5 is rated as high. Overall viewer exposure, made up of high visibility, low number of viewers, high duration of view, is moderate to high. Overall visual sensitivity at KOP 5 is comprised of high visual quality, moderate to high viewer concern and viewer exposure and is therefore rated as high.

Visual Change (Figure 22b)

The introduction of the industrial structures of the proposed power plant creates strong contrast with the existing view. The simulation reveals a clearly visible project footprint and field of mirrors. The height of the towers nearly extends into the horizon line of the mountains, stopping just short. The vertical line and cylindrical form of the towers is unlike anything else seen in the view. The broad horizontal expanse of heliostats creates the illusion of a lakebed on the valley floor and introduces a strong horizontal line that did not exist before. The smooth gray concrete towers capped with a radiant solar generator do not blend in with the natural hues of the desert floor, mountains and sky. The project facilities at the base of towers, while noticeable even at this distance, do not contrast in the same overt way as the towers themselves. The facilities are shown in colors suited to the desert environment. The simulation shows areas of brightness within the heliostat field. The contrast with the existing view at KOP 5 is high. The simulation does not represent the actual brightness of the SRSG, which when viewed from KOP 5 would appear to be slightly above the direct eye level of a motorist. (The elevation of KOP 5 is approximately 143 feet above the valley floor location of

Solar Plant 2¹⁶). The direct view of the brightly illuminated SRSG would present an extreme visual change for the motorist who has just travelled through a canyon road bounded by natural vegetation and landform features.

The proposed project is co-dominant with other features in the landscape at KOP 5. From this distance, the project towers are subordinate to the peaks of the Spring Mountains. They remain below the horizon line of the peaks, and yet compete for the viewer's attention as focal points, therefore dominance is moderate. As the towers are not breaking the line of the mountains, and have a great deal of visual space between them from this viewpoint, the view disruption is moderate. In terms of high contrast, moderate dominance and moderate view disruption, the net overall visual change is moderate to high.

KOP 5 Summary

Overall visual sensitivity is moderate to high and overall visual change is moderate to high, consequently visual impacts would be significant and unavoidable. Recommended adoption of Condition of Certification **VIS-1** would ensure the project structures other than the towers do not contrast with the surroundings by requiring neutral tones complimentary to the existing desert landscape. However, the visual impact of the towers and the SRSGs is unmitigable.

KOP 7 (Figure 24a)

KOP 7 was selected to represent the view of the project site from the perspective of a hiker or driver following what is identified in many documents as the Old Spanish National Historic Trail (OST) and/or the Mormon Trail (see citations on **Visual Resources Figure 2**). As the actual traces of the historic trails have not been inventoried and published, for the purposes of this analysis staff would proceed on the assumption that remnants of the historic trails are in the vicinity of the alignment provided by the National Park Service, as seen in the composite Visual Resources Figure 2. The two-track path, seen in KOP 7, is also used by four-wheel drive motorists. Staff has seen evidence of vehicle tire tracks on several site visits. The location of KOP 7 also places it just outside the bounds of the Pahrump Valley Wilderness Area and therefore also represents the view of potential recreationists within the wilderness area, as well as those following the historic trail route on foot or by vehicle.

In the foreground, fairly dense desert vegetation carpets the gravelly soil. Leading off to the right is one track of the two-track path of the Old Spanish/Mormon Trail. The middle ground reveals a broad expanse of valley floor, culminating in the sandy cliffs of the Hidden Hills escarpment. From there, the Spring Mountains rise majestically, with Mount Charleston crowning the range with its snow capped peak. The bluish cast of the mountains nearly blends into the sky above, and yet the horizon line of the ridge is distinct. At certain times of year, the hue of the range is dark blue and capped with snow (see **Visual Resources Figures 6, 7 and 21a**). The vegetation in the foreground displays a surprisingly varied palette of hues from brown to gray to dark green to lighter green, and it is nicely set off by the medium tan and brown tones of the gravelly soil

¹⁶ Google Earth 2012

below. Like the other KOPs, this frame features a large expanse of sky as a co-dominant element.

Visual Sensitivity

The panoramic view of desert valley floor, regal mountains and large expanse of clear blue sky, with little interruption in the way of human development, is of high scenic quality. During the times of year when vegetation becomes dormant, the residential structures of Charleston View appear faintly in the middle ground, to the right of the frame, due to lack of screening. Even then, at this distance, the structures are barely discernable in the view.

Viewers at this location are locals traversing the two-track path in their four-wheel drive vehicles and recreationists. For motorists, the viewer concern would be low-moderate as they would likely be intent on navigating the path safely and reaching their destination. Recreationalists would naturally have a higher degree of viewer concern, as they would be traveling more slowly and taking in the surroundings, including the panoramic view as shown in KOP 7 as well as the views to and within the Pahrump Valley Wilderness Area. Therefore, staff finds a moderate level of viewer concern at KOP 7. As mentioned earlier, the BLM Barstow field office does not have visitation figures for the wilderness area or the historic trail. Staff observations are that vehicular use of the path appears to be light; there was never more than a singular set of tire tracks evident at any of the site visits staff made to this KOP.

Visual Resources Figure 5 shows the two-track path headed in a southwesterly direction near this same viewpoint. One can see evidence of vehicle use but it does not appear to be highly impacted by multiple tire tracks. **Visual Resources Figure 7** shows the trail alignment in an easterly direction toward Mount Charleston and the vehicular use appears to be even lighter. Staff concludes that the number of viewers is very low at KOP 7. From KOP 7, the view is panoramic and unobstructed, giving it a high degree of visibility. The duration of views would vary, with motorists having shorter views than recreationists. Drivers would be focused on traversing the unpaved path but passengers would have undistracted views. Recreationalists would experience longer view durations. Given the various types of viewers, the duration of view is moderate-high at KOP 7. Considering the high degree of visibility, the low number of viewers and the moderate-high duration of view, the overall viewer exposure is moderate.

It should be noted that BLM is developing an Old Spanish Trail (OST) Interpretive Auto Tour for California (Las Vegas to Los Angeles). The auto tour is modeled after the National Park Service National Trails System National Historic Trails Auto Tour Route Interpretive Guides and will be presented both in physical booklet form and online as a PDF. The auto tour stays on paved roads: highways, interstates, city roads, etc. and its path approximates the OST corridor. Selected OST historical sites, museums, state historical markers, parks and trails will be listed as tour stops. The publication of this auto tour may have the effect of increasing visitorship to the off-road trails and sites along the route in the future, thereby increasing the viewer concern.

The high visual quality of the scene, with moderate viewer concern and exposure yields a moderate to high overall visual sensitivity. This is borne out as the KOP represents

both the view from a wilderness area as well as from a point on a national historic trail, where viewer concern should be higher than average.

Visual Change (Figure 24b)

The introduction of the HHSEGS structures into the KOP 7 view would alter the landscape substantially. The vast scene of natural features and broad horizontality would be disrupted by the strong vertical lines of the power towers in the middle ground. The smooth, cylindrical towers, with their luminescent caps, would be in direct opposition to the texture of natural landforms and vegetation seen in the view, therefore contrast is high. The proposed facility, including the broad array of reflective mirrors, would dominate the view. Even though the towers do not break the horizon line of the mountains, their appearance in the tranquil desert landscape is jarring and commands the viewer's attention. Dominance is moderate to high. The towers disrupt the continuous horizontal refrain of valley floor and mountain range and in so doing, introduce an element of view disruption. By not extending into the ridgeline's horizon, the effect of disruption is reduced. View disruption is moderate. The overall visual change at KOP 7 is moderate to high.

KOP 7 Summary

KOP 7 has a moderate to high overall visual sensitivity and a moderate to high degree of visual change, consequently visual impacts would be significant. Implementation of the proposed conditions of certification would not substantially reduce the impacts at this KOP. Adoption of Condition of Certification **VIS-1** would reduce the contrast with the surroundings by requiring neutral tones complimentary to the existing landscape but the unobstructed view of the project structures, including the towers, prevents any mitigation which would reduce the overall impact to less than significant. Adoption of Condition of Certification **VIS-6** would provide remedial mitigation for the loss of scenic views from KOP 7.

KEY OBSERVATION POINTS IN NEVADA

While BLM is the lead agency for NEPA analysis in Nevada and has the responsibility to assess visual impacts and assign conditions to the portions of the project in Nevada, Energy Commission staff have analyzed the visual impacts of the solar plant in California on the KOPs in Nevada.

In addition to the Nevada KOPs provided by the applicant, staff briefly analyzed the impacts from the perspective of motorists on Highway 160 and recreationists in the Spring Mountains Recreation Area.

State Highway 160 in Nevada is the primary throughway for the Pahrump Valley. The descent into the Pahrump Valley from the east presents the motorist with a high quality view of relatively undisturbed landscapes. While a KOP has not been established from Highway 160, it is important to note the high degree of visibility of the valley floor to motorists travelling northwest on the highway from Las Vegas toward Pahrump (See **Visual Resources Figure 14**). Based on the 2008 traffic counts provided by the Nevada Department of Transportation, SR 160 carried approximately 8,900 vehicles daily at a point just west of the Old Spanish Trail Highway turnoff. Traffic counts in

subsequent years have fallen from the 2008 levels. However, the traffic counts still represent a moderate to high number of viewers¹⁷. With the view duration fairly extended, even at 70 miles per hour, the view toward the project site would last for several minutes, therefore providing high view duration¹⁸. While drivers may be focused on the road ahead, passengers would have the opportunity for an extended view toward the project site. Given the distance from the project, the viewer concern from SR 160 is low to moderate. It is likely the view of the heliostat field would resemble a dry lake bed (not unlike Pahrump Dry Lake, which is also in the view from SR 160) from elevated positions. Therefore the contrast with the existing landscape would be low to moderate. The glow of the power tower receivers would be noticeable but not as bright as from locations closer to the project.

Considering the distance from SR 160, for example, from a point directly east of the project site, which is approximately 15 miles from the center of the project site, the visual impacts would be less than significant. The project would not dominate the landscape or disrupt the horizon line of the ridges. Staff concludes that while the project would be visible and noticeable from SR 160, the contrast, dominance and disruption would be low to moderate, therefore overall visual change is low to moderate.

In response to comments received from Basin and Range Watch, staff analyzed the view toward the proposed project site from a high elevation position in the Spring Mountains National Recreation Area in Nevada. Using a photograph and Universal Transverse Mercator (UTM) provided by Basin and Range Watch, staff mapped the position of the photograph taken from the Bonanza Peak Trail, northwest of Mount Charleston. The elevation of this point is approximately 9,882 feet above sea level (ASL). The view distance from the trail point to the project site is approximately thirty miles. Staff was able to create a simulation of the proposed project in the view from the trail. Visual Resources Figure 26 includes a simulation of the view from the Bonanza Peak Trail and map of the viewpoint location. Staff has determined that, while the project would be visible from this location, the distance and atmospheric interference would lessen the visual impacts to less than significant. The contrast of the towers with the landscape at large is low-to-moderate from this high-elevation view. It is the reflection from the mirrors which would create the greatest contrast, and yet it would not likely be much different visually than the dry lake bed also visible from this viewpoint. Staff appreciates the opportunity to review this viewpoint and finds that the impacts on visual resources would be less than significant from this location.

KOP 1 – View from Old Spanish Trail Highway Westbound, Nevada (Figures 18a-18b)

The view from Old Spanish Trail Highway is an important view from the motorist's perspective. This is a travel route to and from Tecopa, California, a small community approximately 34 miles west from Nevada Highway 160. The current view across the Pahrump Valley is largely undisturbed and highlights the Nopah Range to the west and

¹⁷ Energy Commission staff characterizes 5,001-10,000 motorists as a moderate to high number of viewers.

¹⁸ Energy Commission staff characterizes view durations longer than 2 minutes as high.

the Pahrump Valley Wilderness to the south. The terrain drops slowly in elevation as the road approaches the California-Nevada state line, approximately 9 miles from the intersection of Old Spanish Trail Highway and Nevada Highway 160. KOP 1 was selected to represent the motorist's view at a point where the project structures become highly visible from the road, approximately 1.75 miles from the closest portion of the project site.

Visual Sensitivity

The existing view is uncluttered by human elements, except for the roadbed and shoulder (Figure 18a). Mesquite coppices are visible in the foreground. The middle ground is an expansive plain of Mojave Desert vegetation. The Nopah Range forms a formidable backdrop to this view, its craggy slopes offering contrast to the relative smoothness of the desert floor below. It has a high degree of visual quality due to the undisturbed nature of the view. Viewer concern is from the motorists' perspective and is high, given the highly scenic and undisturbed view of the desert and the Nopah Range. The view from KOP 1 has a high degree of visibility, as there are no foreground or middle ground elements to disturb the panoramic scene of the Nopah Range in the background. Traffic counts from the Inyo County portion of the Old Spanish Trail Highway indicate 258 to 275 automobiles per day, which can be extracted to apply to the Nevada segment of this roadway. This is a low number of vehicles and therefore viewership is low. It is interesting to note that some of the vehicle trips made on this road have an ultimate destination of either Dumont Dunes Off-Highway Area or Death Valley National Park. Death Valley visitors may have a heightened degree of sensitivity to the scenic qualities of the natural desert environment around them. While the duration of the view at the KOP may be fleeting, the length of time the general panoramic view is seen by the driver and passengers is several minutes. Given that the project site would be visible from Highway 160 to the state line, a distance of nearly 10 miles, the duration of view is high. Taking into account the high visibility, low number of viewers and high duration of view, overall viewer exposure is moderate to high. In conjunction with high visual quality, high viewer concern and moderate to high overall visual concern, the overall visual sensitivity at KOP 1 is high.

Visual Change

With the Nopah Range and Nopah Peak as the backdrop for KOP 1, the power towers rise vertically from the valley floor in direct contrast to the broad horizontal lines of the expansive desert floor and horizon line of the mountain range (Figure 18b). Topography appears to mask the view of the heliostat array but the power block facilities, such as the air-cooled condenser, may be seen at the base of Solar Plant 2's power tower, to the left of center of the frame. This KOP also shows the lower portion of a transmission pole in the left of the view. These transmission poles are proposed to be installed parallel to Old Spanish Trail Highway. The power towers and transmission structures would collectively dominate the view and while there is no view disruption or skylining (structures breaking the horizon line) by the power towers from this viewpoint, the transmission poles disrupt the panoramic quality of the view. Dominance is moderate to high and view disruption is moderate. The contrast of the industrial scale structures with the surrounding undeveloped desert landscape is high. Moderate to high dominance, moderate view disruption and high contrast creates a scenario of an overall moderate to high degree of visual change to the view. The visual impacts of the proposed project at

KOP 1 would be high, and considered significant and unavoidable and are unmitigable from this vantage point.

KOP 2 – View from Stump Springs ACEC, Nevada (Figures 19a-19b)

Stump Springs is an Area of Critical Environmental Concern (ACEC). Areas of Critical Environmental Concern are special management areas designated by BLM to protect significant historic, cultural, or scenic values, fish and wildlife resources, natural process or systems, and natural hazards. In southern Nevada, twelve ACECs protect and preserve irreplaceable significant cultural resource sites that include prehistoric rock art sites, prehistoric village and habitation sites, and historic mining, town, railroad, and trail sites. These sites are either eligible for, or are on the National Register of Historic Places (NRHP)¹⁹. Stump Springs is believed to be located on a segment of the Old Spanish Trail and/or the Mormon Trail and was used by the Native Americans who lived in and around Pahrump Valley. While actual trail traces have not been formally documented and recorded, the general corridor of all of the historic trails would have included Stump Springs. (See discussion of trails in KOP 7 and Regional Setting above, and in the Cultural Resources Staff Assessment).

KOP 2 represents the view of a visitor to the historic springs toward the project site, and is approximately 2.3 miles from the eastern edge of the project site. Existing conditions reveal desert vegetation and sandy dune-like terrain in the foreground and the strong horizontal line of the Nopah Range in the background. The view is taken at a high point above the actual streambed of the spring area. The view is undisturbed by the introduction of human elements and likely remains very similar to the view during the historic periods of use. Lacking a scenic middle ground, the visual quality is moderate to high. Based on its status as an ACEC, viewer concern is high. No visitation counts are available, but the numbers of viewers is believed to be low. While in the early 20th Century, Native American tribes used the site for gatherings (story related to staff by Elders of the Pahrump Paiute on August 1, 2011), staff has observed in numerous site visits that the area now seems more likely to be used by four-wheel drive enthusiasts or campers. Due to the intervening topography, visibility toward the project site is considered moderate to high. It is difficult to establish a view duration, but staff estimates it to be low to moderate as the attention of the viewer is likely more on navigating the 4WD track or finding the springs themselves. The overall viewer exposure is therefore low to moderate. Taking into account the moderate to high visual quality, high viewer concern and low to moderate viewer exposure, the overall visual sensitivity at KOP 2 is moderate to high.

Introduction of the project's power towers into the simulated view (Figure 19b) adds two strong vertical architectural elements that provide a high degree of contrast with the existing conditions. There are distinct changes in lines, forms, and texture in the simulated view. Change in color tones is more moderate for the towers themselves, as they are depicted as a dull gray, but the brightness of the solar receivers stand out from the blue hues of the Nopah range in the background. Similar to KOP 1, there is no skylining, and moderate view disruption. With the foreground terrain partially blocking the view of the towers, they appear co-dominant with other elements in the view,

¹⁹ http://www.blm.gov/nv/st/en/fo/lvfo/blm_programs/lvfo_recreation/accessing_your_public/acec_information.html

particularly the balancing peaks of the Nopah Range. The towers are unmistakable, due to their height and luminance, therefore dominance is moderate to high. Taking into account the towers high degree of contrast, moderate to high dominance and moderate view disruption, the degree of visual change is moderate to high.

The project as simulated in KOP 2 would have a moderate to high impact on visual resources. The impacts are significant and unavoidable and there is no feasible mitigation.

KOP 6 – View from Thorne Drive at Homestead Road, Pahrump, Nevada (Figures 23a-23b)

KOP 6 represents the view of the project site from the southern extents of Pahrump, Nevada, approximately 5.5 miles northwest of the project's northern boundary. Pahrump is an unincorporated city with 36,441 residents and is the largest township in Nye County. Located within a residential area, across the street from some houses, the existing view from KOP 6 is composed of desert landscape from foreground to middle ground and the Pahrump Valley Wilderness with the distant Kingston Range in the background. A compound of residential and agricultural structures is visible in the middle ground, before it gives way to the horizon line. The existing view is mixed, without uniformity or a clear visual character. The mountain ranges are quite distant and therefore do not add a high degree of definition to the view.

Visual Sensitivity

The mixed nature of the view from KOP 6 (Figure 23a) and the diminished stature of the mountain ranges from this distance provide a moderate degree of visual quality. Viewer concern from residential areas is typically treated as high. Google Earth imagery from October, 2011, indicates a residential development of approximately 25 homes in the vicinity of KOP 6. About 15 of those homes are oriented in such a way that they may have views directly toward the project site. Others have intervening structures or vegetation that would limit the duration of their views. In this case, view duration must also take into account motorists on Homestead Drive travelling southbound. As this development is isolated from other development in Pahrump, it is not likely that there is a great deal of through traffic. Therefore, view duration is rated as moderate, because of the balance of permanent potential views from some of the residences and temporary, short-term views from motorists and other residents. The number of viewers is moderate, falling into the 21-50 range as far as permanent residential viewers are concerned. Viewer exposure at KOP 6 is moderate. Moderate visual quality combined with high viewer concern and moderate overall viewer exposure provides a view with moderate to high visual sensitivity.

Visual Change

The visual simulation of the project (Figure 23b) shows the two towers nearly in alignment with one another, due to the angle of view. The profile of the power towers do not break the horizon line of the mountain range and would appear more distinct from the background if it were a cloudless day with blue sky. From this distance, the view disruption is low. As shown in the simulation, the contrast of brightness of the solar receivers to the background is poorly represented. The SRGS would be much brighter and highlighted against the medium to dark tones of the mountain range. The

brightness of the SGSGs and scale of the towers as seen from this distance could be likened to the look of stadium lights from a lesser distance as seen during daylight hours. The muted color of the tower structure reduces the contrast to the existing surrounding condition. The muted colors and distance from the KOP combined with the brightness of the SRGs would provide a moderate to high degree of contrast. The towers in the background are co-dominant with foreground and middle ground elements. An intervening rise in topography obscures the bases of the power towers and the plant facilities. Without clear dominance, view disruption or a high degree of contrast, the overall visual change is moderate. The overall visual impact from the introduction of the power towers and SRGs to the existing view is low to moderate and less than significant at KOP 6.

Overall Project Operation Impacts on Existing Visual Character or Quality

Project operation impacts from six of seven identified KOPs on the existing visual character and quality of the setting would be significant and unavoidable, even with staff-recommended conditions of certification. Proposed Condition of Certification **VIS-1**, Surface Treatment, would reduce the project's color contrast with the surroundings by requiring neutral tones complimentary to the existing desert landscape; proposed Condition of Certification **VIS-2**, Landscape Improvements, Permanent Fencing and Screening, would provide a screen of vegetation and fencing that would partially mitigate the visual impact of the project structures on viewers at KOP 3. Implementation of Conditions of Certification **VIS-3**, Permanent Exterior Lighting, would control the lighting to minimize off-site spillage. Proposed Condition of Certification **VIS-6** would provide remedial mitigation for the loss of scenic views. **VIS-7** would add varying degrees of reduction of the visual impacts to Charleston View residents during operation, but there is no mitigation for the impacts of the 750 foot tall towers topped by a very bright SRSG and lighted at night with aviation safety lighting. No mitigation is suggested for KOPs 1, 2 and 6 in Nevada. Even with these measures, the impacts from the project at operation would substantially degrade the existing visual character and quality of the site, and its surroundings, as perceived by sensitive receptors in the project viewshed.

**Visual Resources Table 4
OVERALL VISUAL CHANGE**

KOP No.	VISUAL SENSITIVITY (Existing Condition- California)						
	Visual Quality	Viewer Concern	Viewer Exposure				Overall Visual Sensitivity
			Visibility	No. of Viewers	Duration of View	Overall Viewer Exposure	
1	High	High	High	Low	High	Moderate to High	High
2	Moderate to High	High	Moderate to High	Low	Low to Moderate	Low to Moderate	Moderate to High
3	Moderate	Moderate to High	High	Low	Moderate	Moderate	Moderate
4	High	High	High	Moderate to High	High	High	High
5	High	Moderate to High	High	Low	High	Moderate to High	Moderate to High
6	Moderate	High	Moderate to High	Moderate	Moderate	Moderate	Moderate to High
7	High	Moderate	High	Low	Moderate-High	Moderate	Moderate to High

KOP No.	VISUAL CHANGE (Proposed Condition- California)							
	Project Effect							Overall Visual Change
	Contrast					Dominance	View Disruption	
Form	Line	Color	Texture	Overall Contrast				
1	High	High	High	High	High	Moderate to High	Moderate	Moderate to High
2	High	High	High	High	High	Moderate to High	Moderate	Moderate to High
3	High	High	High	High	High	High	High	High
4	High	High	High	High	High	High	Moderate to High	High
5	High	High	High	High	High	Moderate	Moderate	Moderate to High
6	Moderate	High	Moderate to High	Moderate	Moderate-High	Low to Moderate	Low	Low to Moderate
7	High	High	High	High	High	Moderate to High	Moderate	Moderate to High
KOP No.	KOP VISUAL IMPACT SIGNIFICANCE DETERMINATION- All KOPs							
	Overall Visual Sensitivity		Overall Visual Change		Visual Impact Significance		Mitigation (See Staff Proposed KOP Visual Mitigation)	

				Measures)
1	High	High	Significant and unavoidable	There is no feasible mitigation for KOP 1.
2	Moderate to High	Moderate to High	Significant and unavoidable	There is no feasible mitigation for KOP 2.
3	Moderate	High	Significant and unavoidable, even with mitigation for the foreground	Adoption of Condition of Certification VIS-1 , Surface Treatment, VIS-2 , Landscape Improvements, Permanent Fencing and Screening. These measures will not lessen the impacts to less than significant.
4	High	High	Significant and Unavoidable	Adoption of Applicant's Proposed Mitigation Measure 5 and Condition of Certification VIS-7, Tree Plantings, and VIS-2, Landscape Improvements, Permanent Fencing and Screening, will not lessen the impacts to less than significant.
5	Moderate to High	Moderate to High	Significant and Unavoidable	Recommended adoption of Condition of Certification VIS-1 would ensure the project structures other than the towers do not contrast with the surroundings There is no feasible mitigation for the towers for KOP 5.
6	Moderate to High	Low to Moderate	Less than significant	No mitigation suggested.
7	Moderate to High	Moderate to High	Significant and Unavoidable	Adoption of VIS-6 as Mitigation for Loss of Historic Context and Scenic Views from Historic Old Spanish Trail does not reduce the impacts to less than significant.

Linears

Transmission Lines

HHSEGS would interconnect to the Valley Electric Association (VEA) system. The interconnection would require an approximately 10-mile-long generation tie-line (gen-tie line) from the HHSEGS to the proposed Crazy Eyes Tap Station, where the project would interconnect to the VEA electric grid. The gen-tie line would originate at the HHSEGS' onsite switchyard, cross the Nevada state line, and continue east for approximately 1.5 miles until reaching Old Spanish Trail Highway. At Old Spanish Trail Highway, the route would head northeast paralleling Old Spanish Trail Highway until it reached the Crazy Eyes Tap Substation, which would be located immediately east of the Old Spanish Trail Highway /SR 160 intersection.

Pipelines

A 12-inch-diameter natural gas pipeline would be required for the project. The gas pipeline would enter the HHSEGS site in the common area where it would connect with an onsite gas metering station. It would exit the HHSEGS site at the California-Nevada border and extend 32.4 miles to the Kern River Gas Transmission (KRGT) existing mainline system just north of Goodsprings in Clark County, Nevada. The transmission and natural gas pipeline alignments would be located in Nevada, primarily on land managed by BLM. Staff anticipates there would be no adverse visual impacts in California during the operational phase as the proposed gas lines would be underground on the project site.

Water Supply and Discharge

Each solar plant and the administration building would incorporate a septic tank and leach field system for on-site disposal. Water from the solar plant equipment and the general plant drains would be recycled and reused on site. Waste separated from the water during the onsite treatment would be trucked off site for disposal. Staff anticipates no adverse visual impacts from these water supply and discharge lines during the operational phase as they would be underground and or located wholly within on site project structures, such as tanks, subject to the visual mitigation surface treatment, screening and lighting requirements contained in Condition of Certification **VIS-1**, **VIS-2** and **VIS-3**.

Publicly Visible Water Vapor Plumes

The HHSEGS cooling system is proposed to be a dry-cooling system with technologies to minimize water use. The air-cooled condensers would provide the bulk of the cooling for the power generation equipment. A partial dry-cooling system would be used for auxiliary equipment cooling. Based on the proposed technology for the HHSEGS facility and its location in the arid Mojave Desert, potential visible plumes may rarely occur from the cooling system and/or exhaust stack. Since visible plume formation is unlikely, staff did not conduct any modeling. Cooler temperatures are more favorable to formation of visible plumes, which would occur at nighttime or in the early morning or evening hours. As the solar plant would be operational only during daylight hours, the potential for visible water vapor plumes from normal operation is minimal. The night preservation boiler would provide super-heated steam to the system overnight and during other shutdown periods. There would be potential for visible water vapor plumes to form during the nighttime operation of the night preservation boiler. Visible plumes during normal daytime operation are anticipated to be infrequent. Any plumes that may form at

night would not likely be noticeable because uplighting would be minimized by staff's proposed Condition of Certification **VIS-3**.

B. LIGHT OR GLARE

"Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?" This discussion is separated into two sections: 1. Light and, 2. Glint and Glare, as these are quite different visual phenomenon.

Light:

Yes. The immediate area of Charleston View is sparsely settled and relatively dark at night. There are no existing streetlights along Old Spanish Trail Highway or on the project site as it exists today. There is some limited lighting within the residential areas of Charleston View. The lights of Pahrump are visible from some elevations. Discussions with local residents and the owners of several resorts in Tecopa indicate that the vast majority of nighttime lighting seen in the project area emanates from Las Vegas, at least 40 miles distant and screened by mountains. While several of the Tecopa resorts host astronomy gatherings taking advantage of the area's naturally dark skies, none of the resort operators' staff had concerns about the HHSEGS increasing nighttime lighting in the Tecopa area. During operation, the proposed project has the potential to introduce light offsite to the roadway and surrounding properties, and uplighting to the nighttime sky. If bright exterior lights were unshielded and lights not directed onsite they could introduce significant nighttime light to the vicinity. The 750-foot towers are well above the FAA threshold for aviation safety lighting and aviation safety lighting for the towers has been proposed and conditioned under Condition of Certification **TRANS-8**, Obstruction Marking and Lighting. Operational areas identified in the AFC in Section 5-13.4.2.3 requiring nighttime lighting include the power blocks, plant services building, switchyard and gas metering station. Other areas requiring lighting identified in AFC Section 2.2.10, Plant Auxiliaries, include those areas providing personnel with lighting under normal operating conditions, egress under emergency conditions and emergency lighting to perform manual operations during an outage of the normal power source. Additionally, portable lighting would be used to illuminate the areas where heliostat cleaning is taking place. It is further noted in the AFC, Section 5.13.4.2.3, that the exterior lighting would comply with International Dark Sky standards (no specific reference as to what those are) and would be shielded and directed to aim at the places where it would be needed to prevent spill-off of light off the project site.

Staff has reviewed Inyo County's General Plan and other regulations regarding outdoor lighting. The Inyo County General Plan, Goals and Policies Report, December, 2001, 8.8 Visual Resources, Policy VIS-1.6: Control of Light and Glare and Policy VIS-1.7: Street Lighting, addresses nighttime lighting in a limited way. The policies require that lighting be shielded and directed downward and that street lighting shall only be used to provide safety in regards to traffic movement.

The addition of the aviation safety lighting would substantially alter the nighttime appearance of the project area and would be prominently featured in the night sky due to the height of the towers and the number of lights required by the towers' size. The

applicant indicates there would be eighteen FAA warning lights on each tower. Once the project becomes operational, the visual impact of the federally required aviation safety lighting is unmitigable, and therefore would be significant. With effective implementation of the applicant's proposed light trespass mitigation measures as described in the AFC and staff-recommended Condition of Certification **VIS-3**, the project's operation-related lighting impacts, excluding FAA safety lighting, would be less than significant and are anticipated to meet the County requirements for nighttime lighting. Condition of Certification **VIS-3** requires a comprehensive lighting plan be submitted to the County of Inyo 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.

Glint and Glare:

Facility Surfaces:

No. Surfaces of the facilities of the HHSEGS (excluding the solar receivers and the mirrored surfaces of the heliostats, which are discussed below) have the potential to introduce 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 **VIS-2** and **VIS-7** would reduce the visibility of project structures at the ground level and minimize the potential for adverse visual impacts to viewers at KOP 3 and 4. Staff recommends Conditions of Certification **VIS-1**, **VIS-2** and **VIS-7** to reduce the potential for adverse daytime glare impacts to less than significant and comply with LORS.

Heliostats:

No. Energy Commission staff has determined that the potential for a significant impact on Visual Resources from heliostat reflections does not exist for both ground based observers and airborne observers outside of the boundaries of the solar field project site during daytime conditions. The effective implementation of traffic and transportation's recommended Condition of Certification **TRANS-9**, Heliostat Operations Positioning and Monitoring Plan (HPMP), would insure that significant precautionary measures have been applied to the planned heliostat control algorithms to reduce the probability of direct solar heliostat reflections to ground observers outside the boundaries of the solar field project site. See Appendix VR-2 for a detailed analysis of the visual impacts of the heliostats.

Solar Power Towers/SRSGs:

Yes. Energy Commission staff has determined that the visual impact of the SRSGs solar reflections would have a significant and unavoidable impact. Please see the **Visual Resources Appendix VR-2, Visual Resource Glint and Glare Impact Assessment** and the **Traffic and Transportation** section, **Appendix TT1 – Glint and Glare Safety Impact Assessment** for a more detailed analysis of the visual impacts of the SRSGs.

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. A significant cumulative impact would depend on the degree to which (1) the viewshed is altered; (2) view of a scenic resource is impaired; or (3) visual quality is diminished. **Visual Resources Table 5** lists those projects located within the visible sphere of the proposed HHSEGS

**Visual Resource Table 5
Projects Considered in the Cumulative Impacts Analysis**

Project²⁰	County	Distance from Project Site	Visual Resources Characteristics	Status of Project
St. Therese Mission	Inyo (California)	0.5 mile	A 17.5-acre, campus-like development with outdoor garden spaces, low-profile structures and a tree canopy.	Permitted and under construction.
Pahrump Airport	Nye (Nevada)	Approximately 12 miles NW of HHSEGS	International Airport to supplement the McCarran International Airport in Las Vegas. 5,934 acre site adjacent to Pahrump, NV. 7,000 acre sphere of influence.	Draft EIS was in progress, but suspended June 2010. News reports in June 2010 suggest project on hold.
Element Power-Solar	Nye (Nevada)	6 ½ miles north of proposed HHSEGS in Nevada.	300 MW Photovoltaic, 4,160 acres	Plan of Development
Hidden Hills Valley Electric Transmission Project (NVN089669)	Nye and Clark, (Nevada)	Less than one mile from HHSEGS, extending 9.7 miles to Highway 160, Nevada and beyond.	A new substation located just east of HHSEGS in Nevada, 230 kV transmission line along Old Spanish Trail Highway to Highway 160. A new 10-acre substation at Highway 160 in Nevada. 53.7 miles of new 500kV transmission lines to El Dorado substation in Nevada. A new 230 kV transmission line to Pahrump, Nevada. Introduction of significant industrial-scale electric facilities in an area of high visibility.	DEIS Pending (BLM lead), expected for release in late 2012, early 2013
Sandy Valley (NVN090476)	Clark (Nevada)	8 miles east-southeast of HHSEGS near Highway 160.	Solar Power Tower Plant on BLM-managed land.	Plan of Development

²⁰ See Visual Resources Figure 25 for locations of the listed projects.

Three quarters of a mile to the east of the project in California is the St. Therese Mission, which is currently under construction. The St. Therese Mission is a 17.5 acre campus-style environmental park functioning primarily as a columbarium with garden niches and outdoor seating for reflection.

Renderings of the project show a tree canopy and a series of outdoor rooms connecting the buildings. It is a low-profile development with structure heights meeting the limitations of the Open Space designation and was found to be consistent with both the Inyo County General Plan and Zoning Ordinance²¹. It is slated to use desert plantings and colors in order to blend in with its environment. The County has reserved the right for additional 10 foot right-of-way along Old Spanish Trail Highway for turning lanes. Therefore it is assumed the project would be set back from the roadbed. This low-profile development would be in stark contrast to the heavy industrial solar electric plant next door. The Notice of Determination found it to be consistent with the General Plan and Zoning Code and did not find any adverse environmental effects that would exceed thresholds of significance either individually or cumulatively.

The community of Charleston View consists of a residential subdivision of two-acre or larger lots south of Old Spanish Trail Highway. Census counts indicate approximately 68 residents in the area and the existing number of scattered residences is 34, 29 of which are occupied. It is possible that, over time, if community services such as utility services upgrades, the community of Charleston View could experience some build-out. This would be low-profile development conforming to the General Plan designations of Rural Residential Medium Density (RRM), Resort/Recreational (REC) and Open Space and Recreation (OSR)²². Some of the various uses allowed in those General Plan designations are residential, recreational facilities, parks, campgrounds, restaurants, general stores and gas stations.

For the purpose of discussion of cumulative impacts of development in the project vicinity, staff has expanded the visual sphere of influence due to the high visibility of the power towers and the topography of the valley. Staff has chosen to assess the impacts of projects identified within the visibility range of the towers as depicted in **Visual Resources Figure 17** and shown on **Visual Resources Figure 25**.

The balance of the projects under consideration for cumulative visual resource impacts are in Nevada. Of particular note would be the development of a solar energy plant, Sandy Valley, utilizing power tower technology on BLM land along Highway 160. The area in question appears to be VRM Class IV, which, under BLM guidelines, would provide for activities that require major modification of the landscape and the degree of change can be high (see **Visual Resources Figure 4**). The other significant introduction of structures to the valley viewshed would be the transmission lines associated with HHSEGS. These transmission corridors would also be placed in VRM Class IV areas while these would parallel existing linear facilities, the scale of the new poles would be significantly larger. Existing wood poles along Old Spanish Trail

²¹ Notice of Determination, Inyo County, Conditional Use Permit #2010-02//St.Therese Mission, June 23, 2010.

²² Inyo County General Plan, Land use and Conservation/Open Space Elements, Diagram 29.

Highway are approximately 30 to 40 feet in height. The new poles would be 90 to 120 feet in height and would extend 9.7 miles from HHSEGS to the new Valley Electric Association Tap Substation. The new ten-acre Tap Substation would be located at the intersection of Old Spanish Trail Highway and Highway 160. Transmission line upgrades along Highway 160 would be replacing existing lines in some areas and introducing new lines in other areas. The HHSEGS project would introduce a new 53.7 mile 500kV single-circuit transmission line from the Tap Substation to the El Dorado Substation. A new 230kV transmission line would run from the Tap Substation to Pahrump, replacing an existing 138kV line. The net effect on views throughout the valley would be a noticeable increase in the number and size of electric transmission facilities.

A Draft Environmental Impact Statement (DEIS) from BLM for the Valley Electric Hidden Hills Transmission Project (NVN-089669) is pending publication. The DEIS would include an assessment of cumulative impacts of the projects planned in Nevada. Energy Commission staff has not been able to reference BLM's preliminary findings as part of this analysis because publication of the DEIS is pending as of this writing.

Other projects planned in Nevada include the Element Solar photovoltaic project and the Pahrump Airport. Photovoltaic projects typically are low profile and do not include tall, highly visible ancillary facilities such as air cooling units or boiler stacks, and therefore visibility would be more limited and localized than with the power tower configuration. The project would be likely highly visible from Highway 160 and would require some mitigation measures to protect motorists and other viewers from distracting light, glint or glare. The Pahrump Airport would include a control tower, which might be in the range of 75 to 100 feet in height. Otherwise, the hangar and passenger facilities would likely be relatively low-profile and only visible in a localized way.

The greater viewshed of the Pahrump Valley would be altered significantly if HHSEGS is constructed in addition to these projects as planned. This would result in a significant cumulative impact on the viewshed. Views of the Spring Mountains, the Nopah and Pahrump Valley Wilderness areas would be impaired by the introduction of additional power towers and large-capacity transmission lines. While the proposed transmission and Sandy Valley power tower projects would be located in VRM Class IV areas, the visual quality would be diminished by the industrialization of the landscape. There would be the potential for significant adverse cumulative effects. For viewers in Charleston View, only the proposed Sandy Valley power towers and transmission lines along Old Spanish Trail Highway would be potentially visible. The Sandy Valley project would be approximately 10 miles away, and using KOP 6 as an example, from that distance, the towers would appear quite small. Due to elevation changes, only the upper portions of the towers would likely be visible and the contrast with the mountains and desert landscape would be moderate. From Charleston View, views of the new transmission poles along Old Spanish Trail Highway would diminish quickly and terrain changes would block their view as they progress eastward along the road.

However, the experience of the motorists who traverse the valley would be that of driving through an area that has been industrialized by the addition of two substantial solar power tower projects and their associated transmission linears. For instance, a

motorist travelling from Las Vegas to Tecopa would encounter not one, but two large scale solar power tower projects and their associated transmission facilities. This would be a dramatic shift in the viewshed from the relatively undisturbed and low-profile Mojave desert landscape that exists today.

The connected actions of HHSEGS and its related linears, in conjunction with the reasonably foreseeable proposed development projects in the greater Pahrump Valley viewshed would be cumulatively considerable, significant and adverse. This result would be that, in spite of the fact that much of the proposed energy-related development is on BLM land classified as VRM IV, which provides for major modification of the existing character of the landscape, a high degree of change and features of the projects may dominate the views.

COMPLIANCE WITH APPLICABLE LORS

Staff evaluates the project to determine compliance with federal, state and local laws, ordinances, regulations and standards. Federal and state laws reviewed generally fall under scenic by-way and highway designations. No National Scenic By-Ways or State Scenic Highways are located within the project vicinity; therefore there is no discussion of conformance with these laws in this section

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 6
Compliance with Applicable Laws, Ordinances, Regulations, and Standards

LORS			
Source	Policy and Strategy Description	Consistency Determination	Basis for Consistency
CALIFORNIA			
State of California AB 1881 (2006), Water Efficient Landscape Ordinance (WELO).	Local agencies were required to adopt a WELO based on the state model by January 31, 2010, or the state's model ordinance would be applicable within the jurisdiction of the local agency. Inyo County has not adopted its own ordinance, therefore the state model ordinance applies.	Yes, as conditioned	Landscape and irrigation plans that meet WELO requirements are conditioned in Condition of Certification VIS-2 .

LORS			
Source	Policy and Strategy Description	Consistency Determination	Basis for Consistency
LOCAL			
Inyo County, California			
Inyo County General Plan, Goals and Policies Report, December, 2001. Land Use Element, Policy LU-1.15: Buffers.	As part of new development review, the County shall require that residential development/districts are protected from non-residential uses by use of buffers or other devices. Landscaping, walls, building/facility placement, and other similar aesthetically pleasing devices are acceptable for this purpose.	Yes, as conditioned	Perimeter screening with vegetation is included in Condition of Certification VIS-2 .
Inyo County General Plan, Goals and Policies Report, December, 2001. Land Use Element, Policy LU-4.9: Landscaping.	The County shall require landscaping to screen industrial uses.	Yes, as conditioned	Landscape screening is required in Condition of Certification VIS-2 .
Inyo County General Plan, Goals and Policies Report, December, 2001. Public Services and Utilities, Policy PSU-1.7: Undergrounding Utilities.	The County shall require undergrounding of utility lines in new development areas...except where infeasible for operational or financial reasons. Additional implementation measures are found in Table 4-4, page 4-44.	Yes	Project includes all underground transmission lines on-site.
Inyo County General Plan, Goals and Policies Report, December, 2001. Public Services and Utilities, Policy PSU-3.1: Efficient Water Use.	The County shall promote efficient water use by encouraging and enforcing water-conserving landscaping and other measures.	Yes, as conditioned	Compliance with WELO would meet this goal and is required in Condition of Certification VIS-2 .
Inyo County General Plan, Goals and Policies Report, December, 2001. Gas and Electrical Facilities, Policy PSU-10.1: Expansion of Services	The County shall work with local electric utility companies to design and locate appropriate expansion of electric systems, while minimizing impacts to agriculture and minimizing noise, electromagnetic, visual and other impacts on existing and future residents.	No	Conditions of Certification VIS-1 , VIS-2 , VIS-3 and VIS-7 minimize some of the visual impacts upon the existing and future residents of the county, but the visual impacts of the power towers are unmitigable and contrary to this policy.

LORS			
Source	Policy and Strategy Description	Consistency Determination	Basis for Consistency
Inyo County General Plan, Goals and Policies Report, December, 2001.7.3, Scenic Highways, Policy SH-1.1: Protect the Natural Qualities of Designated Scenic Routes.	The natural qualities of designated scenic routes should be protected. Definitions of scenic routes may be found in Section 7.3.1, page 7-11.	Yes	There are no designated scenic routes in the project vicinity.
Inyo County General Plan, Goals and Policies Report, December, 2001. 7.8 Canals, Pipelines and Transmission Cables. Policy CPT-1.1: Placement of Corridors.	The County shall consider the visual and environmental impacts associated with placement of regional conveyance corridors. Table 7-7, page 7-33, lists implementation measures.	Yes	Conveyance corridors for this project are not located in Inyo County.
Inyo County General Plan, Goals and Policies Report, December, 2001. 8.8 Visual Resources, 8.8.3: Visual Resource Issues.	Critical visual resource issues identified: <ul style="list-style-type: none"> • Maintain small town character; • Preserve panoramic views; • Maintain open natural character of the County; • Maintain visual resources of scenic corridors, highways and roadways. 	No	The project would have significant and unavoidable visual impacts on panoramic views within Inyo County. "Striking views of the contorted layers of the Nopah Range ²³ " would be impacted. Condition of Certification VIS-6 would provide limited remedial mitigation for the loss of scenic views within the County.
Inyo County General Plan, Goals and Policies Report, December, 2001. 8.8 Visual Resources. Goal VIS-1.	Preserve and protect resources throughout the County that contribute to a unique visual experience for visitors and quality of life for County residents.	No	Charleston View is a recognized community in the General Plan with "Striking views of the contorted layers of the Nopah Range." Views of the Nopah Range and other nearby scenic vistas would be disrupted by the project.
Inyo County General Plan, Goals and Policies Report, December, 2001. 8.8 Visual Resources. Goal VIS-1.1: Historic Character.	The County shall preserve and maintain the historic character of communities within the County.	No	The height of the towers inherently changes the landscape in the vicinity of the project and in the Old Spanish National Historic Trail corridor.

²³ Inyo County General Plan, p. 2-8, description of Charleston View.

LORS			
Source	Policy and Strategy Description	Consistency Determination	Basis for Consistency
Inyo County General Plan, Goals and Policies Report, December, 2001. 8.8 Visual Resources, Policy VIS-1.4: Equipment Screening.	Within communities, building equipment shall be screened from public view.	Yes, as conditioned	Condition of Certification VIS-2 would ensure adequate screening of on-site building equipment from public view.
Inyo County General Plan, Goals and Policies Report, December, 2001. 8.8 Visual Resources, Policy VIS-1.6: Control of Light and Glare.	The County shall require that all outdoor light fixtures...use low-energy, shielded light fixtures which direct light downward.	Yes, as conditioned	Condition of Certification VIS-3 and VIS-5 would ensure that lighting is shielded and directed downward during both construction and operation.
Inyo County General Plan, Goals and Policies Report, December, 2001. 8.8 Visual Resources, Policy VIS-1.7: Street Lighting.	Street lighting shall only be utilized where needed to protect public safety related to traffic movement.	Yes	No public right-of-way lighting has been proposed.
Inyo County Renewable Energy Ordinance, August 17, 2010.	<p>Potential adverse impacts may include scenic views which may be blocked or degraded, which may affect the attractiveness of the County for tourism. Other impacts may include light and glare. The County requires that adverse impacts are avoided or acceptably mitigated.</p> <p>Police powers of the County include protection of the environment of Inyo County, including biological and other natural resources, aesthetics, recreational attractiveness.</p> <p>The term "environment" includes the ecological, social, aesthetic and economic environment of the County. It is not limited by and may be broader than the environmental considerations under CEQA or NEPA.</p> <p>In lieu of imposing development standards set forth in Title 18 (above), the</p>	No	<p>The project would have significant and unavoidable visual impacts on scenic views within Inyo County. The project would produce an unmitigable amount of glare due to the technologies employed. Project development standards have been employed in the conditions to mitigate some of the more immediate visual impacts at the ground level but the sheer size and dominance of the power towers and the extreme brightness of the solar receivers are visually unmitigable. The visual impacts to the "environment" in this assessment have been analyzed in a broad context in response to Title 21. Condition of Certification VIS-6 would provide remedial mitigation for the loss of</p>

LORS			
Source	Policy and Strategy Description	Consistency Determination	Basis for Consistency
	County may impose such standards as are deemed appropriate and may incorporate or impose such other standards and mitigation measures as are deemed necessary.		scenic views within the County.
Clark County, Nevada			
Northwest Clark County Land Use Plan, November 7, 2007: Wilderness Areas	Three Wilderness Areas and one Wilderness Study Area are located in Northwest Clark County. These include Mount Charleston, La Madre Mountain and Rainbow Mountain Wilderness Areas and the Mount Stirling Wilderness Study Area.	Not applicable.	Mount Charleston and Mount Stirling are within the viewshed of the project area. Views of Mount Charleston and Mount Stirling within Nevada are not affected by the project in California. Views may be affected by the upgraded transmission facilities in Nevada.
Northwest Clark County Land Use Plan, November 7, 2007: Scenic Byways	Northwest Clark County has two county-designated Scenic Highways, a BLM Back Country Route and four state-designated Scenic Byways.	Not applicable.	No designated scenic highways, byways or back country routes in Clark County are in the vicinity of the proposed project site.
Clark County Chapter 30.56: Site Development Standards, Part F: Lighting Standards	Provides lighting standards that restricts height of poles to 25 feet and that all outdoor freestanding luminaries shall be hooded and directed downward. Security lighting on sensors are exempt from the standards.	Not applicable.	Generally the project is conditioned to conform to this standard by VIS-3 .
Clark County Chapter 30.68.30: Site Environmental Standards: Lighting	Lighting shall be designed to prevent light from shining directly on residential uses. All light sources shall be shielded and directed downward at all times.	Not applicable.	Generally the project is conditioned to conform to this standard by VIS-3 .
Clark County Comprehensive Plan, November 16, 2010, Volume One, Environmentally Sensitive Lands (ESL) Policy and ESL Advisory Committee Report, January 29, 2004.	Aesthetic Areas are defined in the 2004 ESL Report. These areas include Scenic Routes, Slopes of 50% or more, Significant Geologic Features and Scenic Points or Features identified in Table one of the report. There are slopes of more 50%, significant geologic	Not applicable.	There are slopes of more 50%, significant geologic features and scenic points potentially within the viewshed of the proposed project site. Generally, views of the Aesthetic Areas within Nevada are not affected by the project

LORS			
Source	Policy and Strategy Description	Consistency Determination	Basis for Consistency
	features and scenic points potentially within the viewshed of the proposed project site. The policies outlined in the Comprehensive Plan generally pertain to land use and not aesthetics.		in California. Views may be affected by the upgraded transmission facilities in Nevada.
Nye County, Nevada			
Nye County Comprehensive/Master Plan, June 7, 2011, Section 3.5.1, Solar Energy, Figures 7 and 8.	Figure 7 shows pending and approved renewable energy projects. Figure 8 shows those areas of the county best suited to solar development based upon a March 2010 analysis. ²⁴	Not applicable.	The greater Pahrump Valley is shown as “Better” for solar development, on a scale Best- Better- Good-Unsuitable. An area adjacent to Highway 160 is identified as best. This is presumably the same area identified in Figure 7 as “pending solar project”. This appears to be in the vicinity of the possible solar project listed in Visual Resources Table 5 Cumulative Impacts as Sandy Valley in Clark County..
Nye County Comprehensive/Master Plan, June 7, 2011, 6.1.7: Scenic Drives	Three scenic roads are identified on page 53: Lunar Crater Back Country Byway, The Extraterrestrial Highway and Tonopah Star Trails.	Not applicable.	None of the roads are in the proposed project vicinity.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Concern was raised about visual impacts of the very tall towers on the setting of the Old Spanish National Historic Trail by the National Trails Intermountain Region office of the National Park Service²⁵. These impacts are noted and are detailed above. Inyo County submitted comments regarding setbacks, landscaping, fencing, and an interpretive area²⁶. These comments are relevant to several technical sections. Conditions of Certification **VIS-2** and **VIS-6** reflect the comments of Inyo County as they pertain to

²⁴ Suitability Analysis for Nye County Solar Generation, Transmission and Related Support Facilities, March 2010.

²⁵ E-mail from Michael Elliott, National Trails Intermountain Region, NPS, March 21, 2012.

²⁶ Letter from Joshua Hart, Planning Director, Inyo County, March 20, 2102.

Visual Resources. Comments were received by Basin and Range Watch, including a photograph from Bonanza Peak Trail toward the project site. See **Visual Resources Figure 26** and discussion above regarding visual impacts in Nevada. Other comments received have been summarized in a Table found in **Appendix 1 – PSA Response to Comments, Visual Resources**.

STAFF’S CONCLUSIONS AND PROPOSED FINDINGS

Staff concludes that even with mitigation from recommended Conditions of Certification **VIS-1, VIS-2, VIS-3, VIS-4 VIS-5, VIS-6 and VIS-7**, the construction and operation of the Hidden Hills Solar Electric Generating Station would result in a significant, unavoidable and unmitigable aesthetic impact according to the California Environmental Quality Act (CEQA) Guidelines.

Staff recommends implementation of applicant-proposed Mitigation Measure 5b, (AFC, p. 5.13-32 to 33), which is intended to compensate for the visual clutter of the solar power towers would add to a portion of the view from Charleston View. The Applicant proposes assisting with a one-time clean-up program within the Charleston View rural residential subdivision. This clean-up program would entail the applicant making provisions to assist property owners with clean-up of their properties by providing free hauling and disposal of unwanted debris and vehicles.

Staff has reviewed **Socioeconomics Figure 1** showing the minority population is less than 50 percent within a six-mile radius of the proposed HHSEGS. The absence of an environmental justice population within that radius and, by extension, the lack of visual impacts to any environmental justice population leads Energy Commission staff to the conclusion that there are no visual resources environmental justice issues related to the construction of this project and no minority or low-income populations would be significantly or adversely impacted.

FINDINGS OF FACT

Based on the evidence, staff finds and concludes as follows:

1. The project would have a substantial adverse effect on various scenic vistas because of its vast size, height, and disruption of the existing landscape.
2. The project has BLM designated wilderness areas to the south and west of the site.
3. There are views of and from scenic resources in the vicinity of the project that would be substantially disrupted by the introduction of the project at the proposed site. Those scenic resources are the Spring Mountains National Recreation Area, the Nopah and Pahrump Valley Wilderness Areas and the Old Spanish National Historic Trail.
4. The project is not adjacent to a designated scenic highway.
5. The existing visual quality in the project area is high, and the project would degrade the existing visual character of the site and its surroundings.

6. The project's proposed construction activities would substantially degrade the existing visual character or quality of the site and its surroundings.
7. The project's temporary construction activities' impact on visual resources cannot be mitigated to less than significant impact.
8. The project area is dark at night, with little local lighting.
9. HHSEGS's new source of substantial light to nighttime views, including its aviation warning lights on the power towers, would be significant even after the effective implementation of Condition of Certification **VIS-3**.
10. The luminosity of the solar tower receivers, and their height and dominance, would be visually obtrusive for viewers, and is a significant impact that cannot be mitigated.
11. The project's potential impacts on visual resources were analyzed from seven defined key observation points (KOPs) at different locations surrounding the project site in both California and Nevada. The introduction of the project structures at six of the seven KOPs would have significant and unavoidable impacts on visual resources. These impacts would be significant and unavoidable at KOPs 1, 2, 3, 4, 5 and 7.
12. There would be no significant adverse impacts in California to visual resources resulting from the HHSEGS linears, which are located in Nevada.
13. The visual effects of HHSEGS in combination with past, present and reasonable foreseeable projects in the Pahrump Valley would be cumulatively considerable on Visual Resources in the viewshed of the greater Pahrump Valley.
14. The project would not comply with Inyo County laws, regulations and standards regarding project design, scenic views and other requirements related to Visual Resources.
15. The project is generally in compliance with applicable Nevada LORS. The Nevada LORS are not applicable to the project.

PROPOSED CONDITIONS OF CERTIFICATION

Staff proposes the following Conditions of Certification:

Surface Treatment of Project Structures and Buildings

- VIS-1** The project owner shall treat the surfaces of all project structures and buildings visible to the public such that a) their colors minimize visual intrusion by blending with the landscape or by providing architectural interest; b) their colors and finishes do not create excessive glare; and c) their colors and finishes are consistent with local policies and ordinances. Surface color treatment shall include painting or tinting of power towers, 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 in California shall be non-specular and non-reflective, and the insulators shall be non-reflective and non-refractive. The project owner shall submit for CPM review and approval, a specific surface treatment plan that would 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, and 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 Points 3 and 5, (Visual Resources Figure 20b and 22b 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.

Verification: At least 90 days prior to specifying to the vendor the colors and finishes of the first structures or buildings that are surface treated during manufacture, the project owner shall submit the proposed treatment plan to the CPM for review and approval and simultaneously to Inyo County 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 are ready for inspection and shall submit one set of electronic color photographs from the same key observation points 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.

Landscape Improvements, Permanent Fencing and Screening

VIS-2 The project owner shall provide landscaping that reduces the visibility of the power plant structures and is in accordance with local policies. Trees and other vegetation shall be placed along the facility boundaries, in conformance with the Conceptual Landscape Plan, Figures VR-1a, b and c, in the 11-AFC-02 Supplement A. In addition, the project owner shall provide screening plantings along the property borders on the west and east. The objective shall be to create landscape screening of sufficient density and height to screen the power plant structures to the greatest feasible extent within the shortest feasible time from adjacent properties. Selected plants shall avoid invasive exotic species as identified by the USDA²⁷ and Invasive Species Council of California (ISCC)²⁸. Landscape plantings and other elements must meet the requirements of the applicable General Plan and Zoning Regulations of Inyo County and any site development standards associated with those regulations.

The landscape plan shall also include the permanent perimeter fencing. All chain link or wind fencing shall include neutral-colored privacy slats to screen views of the interior. Concertina razor wire or similar security obstacles shall only be installed on the interiors of the fencing and shall not be visible from the exterior.

The project owner shall submit to the CPM for review and approval and simultaneously to Inyo County for review and comment a Landscape Documentation Package whose proper implementation will satisfy these requirements and the requirements of the Water Efficient Landscape Ordinance (WELO). The plan shall include:

- a.) a detailed Landscape Design Plan, at a reasonable scale (1"=40' maximum). The plan shall demonstrate how the requirements stated above shall be met. The plan shall provide a detailed installation schedule demonstrating installation of as much of the landscaping as early in the construction process as is feasible in coordination with project construction. The Landscape Design Plan shall include a Planting Plan with Plant List (prepared by a qualified landscape architect familiar with local growing conditions) of proposed species, specifying installation sizes, growth rates, expected time to maturity, expected size at five years and at maturity, spacing, number, availability, and a discussion of the

²⁷ NRCS Invasive Species Policy, Invasive Species Executive Order 13112, Invasive and Noxious Weeds, California State Listed Noxious Weeds.

²⁸ **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).

suitability of the plants for the site conditions and mitigation objectives, with the objective of providing the widest possible range of species from which to choose; specifications for groundcover, top-dressing of planting areas and weed abatement measures. Existing vegetation (if any) shall be noted on the Landscape Plan. The Landscape Design Plan shall specify all materials to be used for interior roads, walks, parking areas and hardscape materials (i.e. gravel) to be placed in areas that are not paved or planted, and exterior fencing or walls.

- b.) an Irrigation Plan in compliance with the Water Efficient Landscape Ordinance. The plan shall include the following: complete Irrigation Design Plan, specifying system components and locations, and shall include the Water Efficient Landscape Worksheet.
- c.) maintenance procedures, including any needed temporary irrigation, and a plan for routine annual or semi-annual debris removal for the life of the project; and
- d.) a procedure for monitoring and replacement of unsuccessful plantings for the life of the project.

The plan shall not be implemented until the project owner receives final approval from the CPM.

Verification: The landscape plan shall be submitted to the CPM for review and approval and simultaneously to Inyo County for review and comment at least 90 days prior to installation. If the CPM determines that the plan requires revision, the project owner shall provide to the CPM and simultaneously to Inyo County 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.

Planting must occur during the first optimal planting season following site mobilization. The project owner shall simultaneously notify the CPM and Inyo County within seven days after completing installation of the landscape plan, that the site is ready for inspection. A report to the CPM describing how the completed landscape meets the conditions of VIS-2 shall be submitted in conjunction with the inspection.

The project owner shall report landscape maintenance activities, including replacement of dead or dying vegetation, for the previous year of operation in each Annual Compliance Report.

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;
 - 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 Inyo County 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 Inyo County General Plan.

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 Inyo County 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 Fencing

VIS-4 Unless permanent fencing and or walls are constructed at the outset of construction, the project owner shall install temporary construction fencing on the project site along Old Spanish Trail Highway in such a way as to screen views of the construction activity and equipment. The construction fencing shall meet the following requirements: chain link fence shall have a neutral-colored privacy screening of at least 75% opacity material applied to the fence to reduce or eliminate views into the project site.

Verification: At least 60 days prior to site mobilization, the project owner shall submit to the CPM a Construction Fencing Plan. The plan shall include the following: written description and photographic images of the proposed construction fencing and privacy screening material.

Construction Lighting

VIS-5 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.) screening shall be provided to effectively prevent nighttime construction lighting from shining toward Charleston View; and
- d.) wherever feasible, safe and not needed for security, lighting shall be kept off when not in use.
- e.) FAA required security lighting shall be included on all construction structures per regulations.

Verification: Within seven days after the first use of construction lighting, the project 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.

Scenic Resources Interpretative Area

VIS-6 The project owner shall provide an Interpretive Area with parking and interpretive panels highlighting the views of wilderness areas and landforms in the project vicinity. A detailed plan shall be developed and shall include visitor interpretation of visual resource highlights which have been adversely impacted by the introduction of the project.

Verification: A conceptual plan for the Scenic Resources Interpretative Area located within the project vicinity in Inyo County shall be submitted to the CPM for review and approval within 180 days of receipt of a license to construct and operate HHSEGS. Following CPM approval of the conceptual plan, detailed plans for the interpretive area shall be submitted to the CPM for review and approval, and to Inyo County for review and comment 90 days prior to completion of the HHSEGS project. Plan details shall include:

- a.) Site plan clearly indicating primary project components and location;
- b.) Landscape plan, including visitor area surface treatments
- c.) Irrigation plan;
- d.) Parking area plan indicating lighting (if any), parking striping, ingress and egress;
- e.) Material finishes and details for all components;
- f.) Design plans for interpretive panels and displays, which take into consideration the following visual resource aspects:
 - Identification of the wilderness and national recreation areas and the major landscape features in the vicinity of the project site (i.e. wilderness areas, mountain ranges, named peaks and other landforms, including, at a minimum, Mount Charleston and the Spring Mountains, Nopah Peak and the Nopah Wilderness Area, Emigrant Pass, the South Nopah Wilderness Area and Pahrump Dry Lake). In addition to a description of the formation of these landforms and their geologic history, information shall include a discussion of the significance of these features from a Native American perspective and as landmarks and waypoints relative to the Old Spanish Trail - Mormon Ro
 - Introduction to the solar electric technology in use at HHSEGS site.
 - Pointers to the interpretive resources provided for in CUL-10.
- g.) The plan shall include a maintenance plan and schedule for the duration of the project.

If the Scenic Resources Interpretive Area is located within the project boundaries, a-b-c-d-e-f above may be incorporated into the landscape plans required in **VIS-2** and lighting plans required in **VIS-3**.

The Scenic Resources Interpretive Area shall be installed within 90 days of completion of the HHSEGS or in conjunction with landscape and lighting as required by **VIS-2** and **VIS-3** if located on the project site. The project owner shall simultaneously notify the CPM and Inyo County within seven days after completing installation of the interpretive area plan that the site is ready for inspection. A report to the CPM describing how the completed interpretive area meets the conditions of **VIS-6** shall be submitted in conjunction with the inspection.

The project owner shall report maintenance activities for the previous year of operation in each Annual Compliance Report.

Charleston View Tree Plantings

VIS-7 The project owner shall make provisions to plant trees on the properties of any Charleston View resident or property owner who indicate an interest in 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. This shall be available to the residents and property owners for the life of the project. The project owner shall meet the following requirements:

- a). 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 identified by the USDA and Invasive Species Council of California (ISCC). (See **VIS-2**)
- b). The arborist shall work with residents to select up to eight trees from this list of species and will assist the residents in identifying 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.
- c.) Tree planting is a one-time opportunity for property owners in Charleston View. Once installed, irrigation and maintenance of the trees will be the responsibility of the property owner. Trees that do not survive transplantation within 60 days shall be replaced by the project owner at no charge to the property owner. After the 60-day period ends, the project owner shall have no further responsibility for maintenance of the trees.

Verification: Within 120 days of beginning construction, the project owner shall contact property owners in Charleston View and the CPM by registered mail to notify them of the tree planting program. The project owner shall provide in the Monthly Compliance Report a summary of the program, including the following:

- a.) parcel numbers of property owners contacted;

- b.) actions taken to ensure property owners fully understand the program;
- 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.

REFERENCES

California Code of Regulations (CCR), Title 24, Part 2

California Department of Transportation, California Scenic Highway Program,
http://www.dot.ca.gov/hq/LandArch/scenic_highways/scenic_hwy.htm

California Title 14-Natural Resources, Division 1.5-Department of Forestry, Chapter 7-
Fire Protection, Subchapter 2 SRA Fire Safe Regulations, Articles 1-5, September 1,
1991

California Streets and Highways Code, sections 260 through 263 – Scenic Highways

Code of Federal Regulations (CFR), 2008, Title 43, Vol. 2, Subtitle B, Part 6300,
Management of Designated Wilderness Areas

EDB 1974—Environmental Data Bank of Independence, Environmental Impact Report
Parcels 86 and 87, Pahrump Valley, California, prepared for Roland H. Wiley,
September, 1974.

Federal Aviation Administration, Obstruction Marking and Lighting Advisory Circular
AC70/7460-1K, eff. 02/01/07

Inyo County, Notice of Determination, Conditional Use Permit #2010-02/St. Therese
Mission, June 23, 2010

Inyo County, Draft Mitigated Negative Declaration of Environmental Impact and Initial
Study, Conditional Use permit #2010-02/ St. Therese Mission

INYO 2012b – Inyo County/K. Carunchio (tn: 63719) Inyo County Letter from Inyo
County regarding Preliminary Estimates for the Fiscal Impacts of the
Construction and Operation. 02/16/2012

National Park Service, National Trails Intermountain Region, letter from Michael Elliott,
Cultural Resource Specialist, March 21, 2012.

National Scenic Byway (ISTEA 1991, Title 23, section 162)

National Scenic Byways Program, <http://www.byways.org/> and
<http://www.bywaysonline.org/>

The Wilderness Act, Public Law 88-577 (16 U.S. C. 1131-1136), 88th Congress,
Second Session, September 3, 1964

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* to *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*.

APPENDIX VR-2

VISUAL RESOURCE GLINT AND GLARE IMPACT ASSESSMENT

Gregg Irvin, Ph.D.

INTRODUCTION

The Hidden Hills Solar Electric Generating System (HHSGS) would be located on Old Spanish Highway, near the community of Charleston View and be would be located on approximately 3,277 acres (5.12 square miles) of privately owned land in Inyo County, California, adjacent to the Nevada border. The project site is approximately 18 miles south of Pahrump, Nevada, and approximately 45 miles west of Las Vegas, Nevada.

Each solar plant would use heliostats which are elevated mirrors 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 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. The solar field and power generation equipment would start each morning after sunrise and, unless augmented, would shut down when insolation^[1] drops below the level required keeping the turbine 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. The solar field for each solar plant would consist of approximately 85,000 heliostats.

ANALYSIS AND CONCLUSIONS

HELIOSTATS

Energy Commission staff has determined that the potential for a significant impact on Visual Resources from heliostat reflections would not exist for both ground based observers and airborne observers outside of the boundaries of the solar field project site during daytime conditions.

For ground-based observers 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 solar receiver steam generator (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 outside the footprint of the plant will not receive any direct reflections of sunlight.

^[1] Defined as "exposure to the sun's rays."

The effective implementation of traffic and transportation's recommended Condition of Certification **TRANS-9**, Heliostat Operations Positioning and Monitoring Plan (HPMP), will insure that significant precautionary measures have been applied to the planned heliostat control algorithms to reduce the probability of direct solar heliostat reflections to ground observers outside the boundaries of the solar field project site to a functional value of zero.

For airborne observers, i.e., pilots and passengers in aircraft in the surrounding airspace, there is the distinct potential (if not inevitable) for direct solar reflections from the heliostats. Only the population of heliostats which are in the standby position or in transit to a new position will have the potential to produce direct solar reflections on airborne observers. The irradiance of the heliostat reflections into the airspace will not exceed solar radiation concentrations above that of direct sunlight. Further, the exposure effect in producing a deleterious impact on the visual appearance of the project site 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 which will diverge beyond the standby ring range. Because of this divergence of the reflected light, the appearance to an airborne observer would not be that of a direct solar reflection (specular in appearance) but rather would appear as a diffuse and less bright source. Further, the appearance would become more and more visually diffuse and dimmer as a function of increasing distance/ altitude.

Transient exposure to divergent heliostat solar reflections will occur for airborne observers at certain geometries with respect to the solar field project site. Further such exposures will be relatively low in their probability of occurrence, and when present will be very transient in duration. Thus, any exposures will be brief and intermittent since the aircraft will be in motion with respect to the heliostats. Additionally, a sequence of multiple exposures from different heliostat reflections (a blinking effect as the aircraft passes through a sequence of heliostat beams) is possible for certain flight geometries.

The impact of heliostat reflections in producing glint and/or glare for airborne observers that would adversely affect the daytime view of the project and the surrounding area is considered as potentially moderate in effect but less than significant.

Once the project becomes operational, the visual impact of airborne exposure to diffuse heliostat solar reflections is unmitigable and therefore the probability of occurrence must be minimized. The effective implementation of staff-recommended Condition of Certification **TRANS-9**, Heliostat Operations Positioning and Monitoring Plan (HPMP), will insure that significant precautionary measures have been applied to the planned heliostat control algorithms to reduce the probability of diffuse solar heliostat reflections to airborne observers to the minimum extent possible.

SOLAR RECEIVER STEAM GENERATORS (SRSG):

The SRSG on the solar power towers will produce a sustained bright source of reflected light from the heliostats during daytime operations. 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. Both ground-based and airborne

observers outside of the boundaries of the solar field project site will experience similar levels of perceived brightness. There is no doubt that the illuminated tower SRSGs will produce a most prominent and sustained visual signature during operations. The issue from a Visual Resources perspective is will the SRSGs produce sufficient glare and/or excessive perceived brightness to adversely affect the daytime views in the area. This is an essential question since there are essentially no realistic mitigating procedures for the tower SRSG luminance levels. Further, since the SRSGs are reflecting the heliostat solar reflections (i.e., the SRSGs are not an emitting light source) the apparent brightness will remain fairly constant over large changes in the viewing distance.

Although during nominal operations the SRSGs are approximately 3,000 times less luminous than the Sun, they are on the order of 80-90 times more luminous than the background sky. In terms of perceived brightness, the SRSGs are anticipated to appear at least 5 times brighter than the background sky. At these stated luminance levels and perceived brightness levels there would be some constant level of moderate glare. 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 230,000 candelas (cd/m^2)

This level of luminance would be 32 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 potentially 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 30min 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 $230,000 \text{ cd}/\text{m}^2$ under nominal power generation conditions, would produce 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, as a source of glare, and hence as visual disruption effects, would

be less disruptive than inside the 8.5 mile viewing distance. Importantly, the perceived brightness and glare effects from the SRSGs are not considered as visually disabling at any viewing distance.

When combined with the additional visual signature of the 'tee pee' effect produced during conditions of high humidity or elevated levels of suspended airborne particulate, the overall visual signature and its prominence are substantially increased. Under these conditions, rather than the SRSGs in isolation producing the visual signature, the tower plus the enormous volume of the conic shaped 'tee-pee' visual signature will be present. Staff also concludes that the large visual extent, brightness and prominence of the overall visual signature of the tower area during these conditions creates an adverse impact in the daytime view within the viewing area.

Staff concurs with the visual resource analysis that the impacts of the visual change of the project will be significant and unavoidable with respect to visual quality at 6 of 7 KOPs. It is the magnitude of the visual impact that is the essential basis for concluding the significance of the adverse affect on the daytime view in the area. Once the project becomes operational, the visual impact of the SRSGs solar reflections is unmitigable.

FINDINGS OF FACT

Based on the evidence, staff finds and concludes as follows:

1. There will be no significant adverse impacts from heliostat reflections for both ground-based and airborne observers outside of the boundaries of the solar field project site during daytime conditions.
2. The visual impact of the Solar Receiver Steam Generators (SRSG) during power generation on visual resources is both significant and incapable of mitigation.

CONCLUSIONS OF LAW

Implementation of the Conditions of Certification for Traffic and Transportation, **TRANS-9**, Heliostat Operations Positioning and Monitoring Plan, will facilitate reducing the impact of heliostat reflections on visual resources to a minimum.

VISUAL RESOURCES

List of Comment Letters

		Visual Resources Comments?
1	Inyo County	X
2	Bureau of Land Management	
3	National Park Service	
4	The Nature Conservancy	
5	Amargosa Conservancy	X
6	Basin & Range Watch	X
7	Pahrump Paiute Tribe	X
8	Richard Arnold, Pahrump Paiute Tribe	
9	Big Pine Tribe of Owens Valley	
10	Intervener Cindy MacDonald	X
11	Intervener Center for Biological Diversity	
12	Intervener, Old Spanish Trail Association	
13	Applicant, BrightSource Energy, Inc.	X

Comment #	DATE	COMMENT TOPIC	RESPONSE
1	July 17, 2012	Inyo County	
1.2		Title 21- The County believes the idea of an Interpretive Center is a good start but under Title 21 additional mitigation aimed at reducing or offsetting the impacts to local residents is required. To that end, Resolution 2012-29 requires the construction of a community center.	Comment noted. Not required for Visual mitigation.
1.66		COC- The Applicant /owner shall provide a community center with parking lot.	Comment noted. Not required for Visual mitigation.

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1.75a		Policy LU-1.14 (1.15) Buffers	Included in FSA LORS Tables 2 and 6. VIS-2 includes perimeter screening.
1.86a		Goal VIS-1.1 Historical Character	Included in FSA LORS Tables 2 and 6. VIS-6 partially mitigates for loss of scenic views.
Comment #	DATE	COMMENT TOPIC	RESPONSE
5	July 21, 2012	The Amargosa Conservancy	
5.9		Night-Lighted Towers will be ever-apparent and destroy dark sky views	Towers will not be lit at night; only FAA lighting will be in use.
Comment #	DATE	COMMENT TOPIC	RESPONSE
6	July 23, 2012	Basin and Range Watch	
6.10		BLM VRM Class 1 Review	See Figures VR-3 & 4 and discussion in Regional Setting.
6.11		More KOPs at higher elevations	KOPs are based on factors which preclude some locations.
6.12		KOPs at high elevations in Spring Mountains National Recreation Area.	Staff has created a draft simulation for FSA, VR Figure 26.

Appendix 1 -- PSA Response to Comments, Visual Resources

6.13		KOPs at elevations showing flash glare	Staff has created a draft simulation for FSA, VR Figure 26.
6.14		Flash Glare Events	Staff found no adverse impacts. See TRANS-9 .
6.15		More KOPs at Stump Springs	Impacts were found to be significant at KOP 2.
6.16		Mitigation with Trees at Stump Springs	No feasible mitigation for KOP 2.
6.17		Visitor Center Hiding Facility	Scenic Resources Interpretive Area not intended to hide project facilities.
6.18a		KOPs at 5000 ft. in Nopah Range	KOPs are based on factors which preclude some locations.
6.18b		KOPs from High Elevations in Spring Mtns	Staff has created a draft simulation for FSA, VR Figure 26.

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6.18c		Dark Sky & Night Lighting Simulations	VIS-3 and VIS-5 provide mitigation for lighting.
6.18d		More KOPs from Stump Springs	KOPs are based on factors which preclude some locations.
6.18e		Multiple Simulations of Flash Glare	Staff has created a draft simulation for FSA, VR Figure 26.
6.18f		Simulations of Construction Dust Plumes	Dust from construction activity is temporary. See Air Quality section.
6.18g		KOP of Dying Vegetation at Stump Springs Due to Water Drawdown.	KOPs are based on factors which preclude some locations.
Comment #	DATE	COMMENT TOPIC	RESPONSE
7	July 23, 2012	Pahrump Paiute Tribe	
7.1		Significant Impacts to Visual Landscape	Staff finds significant and adverse impacts at 6 of 7 KOPs.

Appendix 1 -- PSA Response to Comments, Visual Resources

Comment #	DATE	COMMENT TOPIC	RESPONSE
10	July 21, 2012	Intervener Cindy MacDonald -- pg. 17-1	
10.1		Since heliostats will be in the "safe position" at night (horizontal), what is the projected increase and/or magnification of light pollution in the area during times of full moons and how far will this illumination extend throughout the Pahrump Valley?	Lighting is only in evening for periodic washing of heliostats.
10.2		Will there be any visual "glow" from the power towers if the plant is operational after the sun sets? If so, what will it look like, what magnitude would it be, how far away will it be visually "disruptive" across the landscape and how long will this extend throughout the night?	Visual glow will subside at sundown...no night time glow from towers or heliostats would occur. Please see Facility Design for further discussion.
10.3		What are the visual resource category for the BLM land in California that surround the proposed project site?	See Figures VR-3 & 4 and discussion in Regional Setting.
10.4		Are there other ways that the applicant can "screen" the perimeter besides trees or other vegetation that won't be an attractant to birds, insects or other wildlife?	Fencing is provided for in VIS-2 and provides some screening other than with plants.
10.5		Approximately how many of these non-native trees would be required to screen the perimeter and what would be their annual water requirements over the life of the project?	Landscape plans are submitted during compliance phase and water use will be calculated under the Water Efficient Landscape Ordinance. See VIS-2 .
10.6		If native soils cause heliostats to shift, sink and/or collapse due to soil saturation, how will the applicant control glint and glare and prevent adverse visual effects?	Refer to TRANS-9 and related analysis in TRANS & VR App. 2.
10.7		Is there any way through modeling to predict the worst-case scenario of the number of heliostat/mirror structures that could shift, sink and/or collapse due to soil saturation?	Refer to TRANS-9 and related analysis in TRANS & VR App. 2.

Appendix 1 -- PSA Response to Comments, Visual Resources

10.8		Is the computer software that will control the heliostat/mirror assemblies capable of accounting for and/or adjusting heliostat/mirror assemblies in the event of they shift, sink and/or collapse?	Refer to TRANS-9 and related analysis in TRANS & VR App. 2.
10.9		What are the potential adverse visual affects from glint and glare as a result of broken mirrors contained within the heliostat/mirror assemblies?	Refer to TRANS-9 and related analysis in TRANS & VR App. 2.
10.10		Is there anyway to predict the degree of broken mirrors in the heliostat/mirror assemblies during normal operations?	Refer to TRANS-9 and related analysis in TRANS & VR App. 2.
10.11		Does the computer software have the ability to control glint and glare positioning in the event mirrors in the heliostat/mirror assemblies are broken?	Refer to TRANS-9 and related analysis in TRANS & VR App. 2.
10.12		What are the visual effects of broken mirrors and/or mirror shards that are littered on the ground? Obviously, if mirror shards fall straight down and lie flat on the ground, it would only be aesthetically displeasing. However, if they don't lie flat and lodge themselves at angles, what are the visual impacts and can they affect public safety by impacting motorists on the nearby Old Spanish Trail Highway?	Refer to TRANS-9 and related analysis in TRANS & VR App. 2.
10.13		In the event a "catastrophic" storm event dislodges tens of thousands of mirrors, what would be the potential adverse impacts with respect to glint and glare from the broken and displaced mirrors?	Perimeter screening/fencing reduces the visual impacts.

Appendix 1 -- PSA Response to Comments, Visual Resources

10.12		Due to high level wind events and “gusts” known to occur in the area, what are the potential impacts of glint and glare resulting from broken mirrors, mirror fragments and mirror shards due to wind damage?	Refer to TRANS-9 and related analysis in TRANS & VR App. 2.
Comment #	DATE	COMMENT TOPIC	RESPONSE
13	July 23, 2012	BrightSource Energy, Inc.	
13.12		<p>Page 4.13-3, Regional Setting, 3rd paragraph: The PSA states: “Visual Resources Figure 1 shows the relationship between the proposed project site and the wilderness and recreation areas described above and the national historic trail in the area. Figure 1 clearly shows the ‘bowl’ whose bottom is the project site and whose sides are made up of areas of high scenic quality. It is this high-quality scenic landscape which is the backdrop for the proposed industrial-scale development of HHSEGS.” Figure 1 does not document the scenic quality of the project area landscape. Figure 1 only depicts roads, communities, jurisdictional boundaries, and the boundaries of designated wilderness and recreational areas, but does not identify scenic qualities of the landscape; therefore, “high quality scenic landscape” is an unwarranted conclusion to be drawn from this figure and it is not supported by substantial evidence. In addition, Figure 1 shows regional uses outside the viewshed of the project. For visual resource analysis purposes, areas outside the viewshed are irrelevant. “Industrial-scale” is a subjective and undefined term, which biases the PSA’s analysis. The project is large-scale, but if it is to be compared to industry, the PSA should explain which “industry.”</p>	<p>Wilderness Areas, National Forest and Recreation Areas are by their very nature areas of high scenic quality. The conclusions drawn by staff in this paragraph are supported by Visual Resources Figures 1 2, 3 and 4. "Industrial-scale" and likewise, "utility scale", are terms used in various media to describe large solar power generating facilities.</p>

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<p align="center">13.13</p>		<p>Page 4.13-3, Regional Setting, 4th paragraph: The PSA states: "The proposed project site is privately-owned land located in an area where most of the land is publicly-owned or managed by the Bureau of Land Management (BLM). The BLM lands surrounding the project site have been inventoried by the respective California and Nevada BLM field offices and both Visual Resource Inventory (VRI) and Visual Resource Management (VRM) classes have been applied." The accuracy of the above statements depends on the definition of the phrase "the area." The viewshed? The region outside the viewshed? The foreground, middleground, or background? It would be more accurate to state that "The proposed project site is privately-owned land. The land immediately adjacent to the project is privately owned land and BLM land. The land in middleground and background views of the project is a mix of BLM and private land." The project site, which is a triangular shape is bounded by BLM lands on one side. BLM lands do not "surround" the project site. A mix of BLM and private lands surround the Charleston View area.</p>	<p>The areas around the project site owned and managed by BLM referring to the area depicted in Figures 3 and 4. Staff has characterized it accurately as an area where most of the land is managed by BLM.</p>
<p align="center">13.14</p>		<p>Page 4.13-4, Regional Setting, 3rd full paragraph: The PSA states: "Visual Resources Figure 3 shows the Visual Resource Inventory Classes for the BLM lands in the vicinity of the project area. Nearly 50 percent of the land shown in Figure 3 is Class I, areas of the highest scenic quality and viewer sensitivity. These Class I areas extend beyond the boundaries of the wilderness areas. The Class II areas are seen in both mountains and valleys adjacent to Class I areas and on the Pahrump Valley floor. Class III areas appear to be the smallest component of the areas shown in the figure. Class IV are found mostly in the Pahrump Valley. The figure demonstrates that, according to the BLM rating system, there is a generally a high degree of scenic quality in the vicinity of the project site."</p>	<p>Staff disagrees with the applicant's analysis of Figure 3.</p>

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<p align="center">13.15</p>		<p>Page 4.13-4, Regional Setting, 4th full paragraph: The PSA states: “Visual Resources Figure 4 shows the VRM classes assigned to the area in the most recent RMP. Note the significant migration of Class I areas to Class II, III and IV, and the significant downgrade of the valley floor and alluvial fans to Class III and IV. The only remaining Class I designations are the Nopah and Pahrump Valley Wilderness Areas. The two figures clearly illustrate the high degree of scenic quality that exists with the viewshed of the proposed project site.” This statement is not supported by Visual Resource Figure 4. The Visual Resource Management classes shown on Visual Resource Figure 4 are not indicators of visual quality, but are rather indicators of the policy decisions BLM has made in developing its Resource Management Plan about how much visual change it has decided it will permit in specific areas. What Figure 4 shows is that the areas to the southeast, south, and west of the project site are private lands that are not under BLM jurisdiction, and where no visual resource management objectives have been assigned.</p>	<p>Policy decisions in the RMP allowed for more visual change to the landscape in areas where it was inventoried as Class I or II, the highest visual quality landscapes.</p>
<p align="center">13.16</p>		<p>Page 4.13-11, Visual Resources Table 2 (Applicable Laws, Ordinances, Regulations, and Standards), LOCAL, Row 1 – Policy and Strategy Description: The PSA states: “The proposed project would be located in parcels currently designated as REC, Resort/Recreational and OSR, Open Space and Recreation.” This is not correct. See Land Use section.</p>	<p>Removed from LORS Tables as it does not apply to Visual Resources.</p>
<p align="center">13.17</p>		<p>Page 4.13-11, Visual Resources Table 2 (Applicable Laws, Ordinances, Regulations, and Standards), LOCAL, Row 2 – Policy and Strategy Description: The PSA states: “The County shall require landscaping to screen industrial uses.” It is not clear that the County considers this an “industrial” use.</p>	<p>Industrial uses generally include power plants.</p>

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<p align="center">13.18</p>		<p>Page 4.13-11 Visual Resources Table 2 (Applicable Laws, Ordinances, Regulations, and Standards), LOCAL, Row 3 – Policy and Strategy Description: The PSA states: “The County shall require undergrounding of utility lines in new development areas...except where feasible for operational or financial reasons. Additional implementation measures are found in Table 4-4, page 4-44.”It is not clear that this is considered to be a “new development area.” This area has been subdivided and under development for decades.</p>	<p>Underground utility lines are preferred by the County.</p>
<p align="center">13.19</p>		<p>Page 4.13-11, Visual Resources Table 2 (Applicable Laws, Ordinances, Regulations, and Standards), LOCAL, Row 4 – Policy and Strategy Description: The PSA states: “The County shall promote efficient water use by encouraging and enforcing water-conserving landscaping and other measures.” This is not a Visual Resource LORS, although it mentions landscaping.</p>	<p>Landscape plans are reviewed by Visual Resources staff and submitted during compliance phase and are expected to comply with LORS. Visual Resources staff suggests the VR COCs that deal with landscape plans.</p>
<p align="center">13.20</p>		<p>Page 4.13-11, Visual Resources Table 2 (Applicable Laws, Ordinances, Regulations, and Standards), LOCAL, Row 7 – Policy and Strategy Description: The PSA states: “The County shall consider the visual and environmental impacts associated with placement of regional conveyance corridors. Table 7-7, page 7-33, lists implementation measures.” What is a conveyance corridor? Does the project propose one in the County?</p>	<p>Conveyance corridors refer to Canals, Pipelines and Transmission Cables, as stated in the Policy 7.8 heading.</p>
<p align="center">13.21</p>		<p>Page 4.13-12, Visual Resources Table 2 (Applicable Laws, Ordinances, Regulations, and Standards), LOCAL, Row 10 – Policy and Strategy Description: The PSA states: “Within communities, building equipment shall be screened from public view.” It is not clear that the Project is proposed “within a community” as that term is used in the ordinance.</p>	<p>Charleston View is a defined community in the Inyo County General Plan.</p>

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<p align="center">13.22</p>		<p>Page 4.13-12, Visual Resources Table 2 (Applicable Laws, Ordinances, Regulations, and Standards), LOCAL, Row 13 – Policy and Strategy Description: The PSA states: “Maximum height of buildings in OS Zone: Principal buildings 30 feet, accessory buildings 25 feet.” This is not a Visual Resource LORS any more than other zoning code provisions that address the dimension, location, or appearance of structures.</p>	<p>Removed from LORS Tables as it does not apply to Visual Resources.</p>
<p align="center">13.23</p>		<p>Page 4.13-12, Visual Resources Table 2 (Applicable Laws, Ordinances, Regulations, and Standards), LOCAL, Row 14 – Policy and Strategy Description, 1st bullet: The PSA states: “Potential adverse impacts may include scenic views which may be blocked or degraded, which may affect the attractiveness of the County for tourism. Other impacts may include light and glare. The County requires that adverse impacts are avoided or acceptably mitigated.” This is not an Applicable LORS. This is a declaration in the ordinance, but not adopted as part of the County code.</p>	<p>Staff disagrees with applicant's assertion that the ordinance does not apply.</p>
<p align="center">13.24</p>		<p>Page 4.13-15 A. Scenic Vista, 1st paragraph: The PSA states: “For the purposes of this analysis, a scenic vista is defined as a distant view of high pictorial quality perceived through and along a corridor or opening, or from a designated scenic area.” This is a novel definition. The question should be, according to the CEQA guidelines: Is the project site located in a <i>designated</i> scenic vista, or has the County designated the project site as an important visual resource?</p>	<p>The CEQA checklist is a starting point, not an end point, and additional questions may be asked relevant to the project being analyzed. Staff maintains that views "from" a scenic resource, in this case Wilderness Areas, National Recreation Areas and National Historic Trails, are highly relevant to the visual resource analysis of this project. See also Ivanpah Solar Electric Generating Systems Final Decision, Findings of Fact, No. 7, page 28.</p>

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<p align="center">13.25</p>		<p>Page 4.13- 15 A. Scenic Vista, 2nd paragraph: The PSA states: “Yes. As seen in Visual Resources Figures 1 and 3, the project is surrounded by identified areas of high scenic value.” An “identified area of high scenic value” is not a designated scenic vista.</p>	<p>Wilderness Areas, National Forest and Recreation Areas are by their very nature areas of high scenic quality.</p>
<p align="center">13.26</p>		<p>Page 4.13- 15 A. Scenic Vista, 2nd paragraph: The PSA states: “Views of the Nopah Range and Wilderness Area, Kingston Range and Pahrump Valley Wilderness Area and Spring Mountains National Recreation Area, including the prominent Mt. Charleston, would all be significantly and adversely impacted by the project.” A mere view of a mountain range is not a designated scenic vista. Moreover, there is no evidence to support this sweeping assertion. From which KOP in California does the project “significantly and adversely” impact a designated scenic viewpoint? Wilderness status protects the land that lies within the boundaries of the wilderness area, but there is no legal basis for presuming that this status provides for special treatment for views <i>toward</i> the wilderness area from locations outside of it.</p>	<p>See 13.25 above. Views of the Wilderness Areas, National Recreation Areas and Mount Charleston are impacted at KOPs 3, 4, 5 and 7.</p>
<p align="center">13.27</p>		<p>Page 4.13 15 A. Scenic Vista, 2nd paragraph: The PSA states: “As described earlier, these areas were inventoried by the BLM as Classification 1, the highest scenic value that can be assigned. Views from these scenic resources will also</p>	<p>The applicant has misunderstood the reference to VRI Classification (Inventory) as VRM.</p>

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<p align="center">13.28</p>		<p>Page 4.13 15 A. Scenic Vista, 2nd paragraph: “as will some views from alignments of the Mormon and Old Spanish National Historic Trails.” These “alignments” are not designated scenic vistas. An “alignment” is not a viewer. The relevant question is whether there are a significant number of viewers who are even aware of the alignment, if they will be present along this alignment, whether the project is visible from the alignment, and if so, how the views will be impacted</p>	<p>Number of viewers on the National Historic Trail alignment is unknown. Nevertheless, the views from the trail, whether viewers are motorists or on foot or horseback, will be impacted in a significant way, as seen in KOP 7.</p>
<p align="center">13.29</p>		<p>Page 4.13 15 A. Scenic Vista, 3rd paragraph: The PSA states: “KOPs 5 and 7 clearly show the impact of the project on the existing scenic view of Mt. Charleston, a prominent landmark of importance in pre history and current times.” On the contrary, these simulations make it clear that in these views, the project will not block or otherwise interfere with views toward Mount Charleston’s peak or ridgeline. These KOPs are neither designated scenic vistas nor scenic roads. It is a mistake to equate a mere “visual disturbance” on a scenic view with a “substantial adverse effect” on a designated scenic vista.</p>	<p>KOPs 5 and 7 were chosen in consultation with Visual Resources staff (4-27-2011) to represent the views from the Nopah Wilderness Area and the Old Spanish National Historic Trail, in addition to the views of motorists or others.</p>

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<p align="center">13.30</p>		<p>Page 4.13-15 A. Scenic Vista, 4th paragraph: The PSA states: "KOP 3 manifests the negative impact of the project on the motorists' view of the highly scenic Nopah Range and Wilderness Area." The roadway from which this view is seen is not a designated scenic highway and does not qualify as a scenic vista. In addition, the standard for a finding of significant impact is substantial adverse impact, not negative impact. Comparison of the existing view with the simulation of the view as it would appear with the project in place indicates that the current view already contains modifications, and that the visual changes brought about by the project would not constitute a "substantial degradation."</p>	<p align="center">Language changed to adverse.</p>
<p align="center">13.31</p>		<p>Page 4.13-16 Project Site and Construction Laydown Area: The PSA states: "Construction activities at the project site and construction laydown area would substantially degrade the visual character or quality of the site and surrounding areas as viewed from KOPs 3, 4, 5 and 7, due in large part to the construction of the power towers." Construction activities are temporary. Can temporary impacts be substantial? If it has low visibility, see below, how does it substantially degrade the site?</p>	<p>Construction activities at the project site and construction laydown area would substantially degrade the visual character or quality of the site and surrounding areas as viewed from KOPs 3, 4, 5 and 7, due in large part to the construction of the power towers.</p>

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<p align="center">13.32</p>		<p>Page 4.13-16 Project Site and Construction Laydown Area, 4th paragraph: "Construction-related truck traffic would be entering and leaving the project by way of what is now known as Topaz Street, at the westernmost boundary of the project site, and would introduce activity into the views not currently seen. The laydown area, where much of the storage and assembly would occur, is approximately one mile north of Old Spanish Trail Highway, and therefore would have low visibility from KOP 3 and the road. The construction of the power towers will be highly visible from all vantage points and therefore produce the most significant visual impact of the project." There is no KOP here. There is no assessment of the visual quality. The only activity is traffic, which already occurs at this location. Traffic does not constitute a "substantial degradation" of the visual quality of the site. Subject characterizations of visual impacts, such as this, which are not supported by a KOP analysis, should be deleted.</p>	<p>Staff disagrees with applicant's assertion that construction traffic and construction of a 750' power tower does not constitute a substantial degradation of the visual quality.</p>
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<p align="center">13.33</p>		<p>Page 4.13-16 and 17, Light or Glare, 1st paragraph: The PSA states: "Nighttime construction and security lighting would have the potential to produce glare or off-site light trespass. If bright exterior lights were not shielded or directed onsite, they could introduce significant light or glare to the vicinity, particularly for motorists on Old Spanish Trail Highway, as represented by KOP 3 and 5. This has the potential to cause distraction in the form of glare and confusion as to the light source origin for motorists, who are used to travelling along a fairly dark stretch of highway. Depending upon the project setbacks, without screening and lighting controls, the impact upon motorists on Old Spanish Trail Highway would be adverse and significant." The Staff Analysis should analyze the project as proposed. It is legally inappropriate to analyze the project without screening and lighting controls, when these features are proposed as part of the project. As a prelude to this discussion, there needs to be a clear statement of the kinds of nighttime lighting that will be installed at the site during the construction period and the extent to which it will be used. There will also be lighting at the laydown area and the heliostat construction area that will be on at night. The AFC analysis provides correct assessment of the impacts of the lighting at laydown and heliostat construction areas, which will be controlled and shielded, and which will be far from offsite viewers and screened to some degree by intervening desert vegetation.</p>	<p>Staff has analyzed the project as proposed. This is standard Energy Commission language. Applicant –proposed mitigation measures do not address nighttime construction lighting. (5.13-32). The FSA includes more direct language about mitigation for nighttime construction lighting.</p>
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<p align="center">13.34</p>		<p>Page 4.13-16 and 17, Light or Glare, 1st paragraph: The PSA states: "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." All true, but the cranes are temporary and not a distraction for motorists at distances of several miles.</p>	<p>Staff notes that Ivanpah Solar Electric Generating System (ISEGS), a power tower technology system previously analyzed and licensed by the Energy Commission, required FAA lighting. The FSA acknowledged the existence of FAA lighting during the operational phase and that staff was unaware of any thresholds for significance for FAA lighting. Staff determined for ISEGS that with all the other lighting controls in place, the FAA lighting would not likely constitute a significant impact. The Final Decision made Findings that the ISEGS nighttime lighting would be less than significant with implementation of the COC VIS-4. The ISEGS differs substantially from HHSEGS, however, in the height of the proposed towers and in the distance from the nearest residences or motorists. Therefore, the number of FAA lights and the proximity to sensitive viewers is greater for the HHSEGS project and constitutes an adverse impact.</p>
<p align="center">13.35</p>		<p>Page 14.13-17, Light or Glare, 1st full paragraph: The PSA states: "The construction lighting and activity have the potential to create significant and unavoidable visual impacts on residents, motorists and other viewers." What other viewers? From which KOPs?</p>	<p>See previous paragraph in staff's PSA referencing KOPs 3 and 5.</p>

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<p align="center">13.36</p>		<p>Page 14.13-17, Light or Glare, 1st full paragraph: The PSA states: "There is no mitigation for reducing the visual impact of the construction and lighting of the power towers, and would remain a significant and unavoidable visual effect." The lighting associated with the construction of the power towers will be temporary and short-term in nature, it will not constitute a significant impact. Has construction lighting of the towers or construction period aviation safety lighting found to be significant on any other project?</p>	<p>ISEGS Findings of Fact relative to construction activities was that VIS-3 would reduce impacts to less than significant. VIS-3 was then deleted from the conditions and the project overall was found to have significant adverse visual impacts. The project required an override on the part of the Commission. ISEGS differs from HHSEGS in both the height of the towers and the proximity to nearby residents and motorists. Staff concludes that while lighting and construction activities would be temporary, the impacts during that period are unmitigable due to the size and placement of the facilities.</p>
<p align="center">13.37</p>		<p>Page 14.13-17, Light or Glare, 2nd full paragraph: The PSA states: "Gas pipeline construction would occur primarily in Nevada on BLM-managed lands. Due to their temporary nature and low visibility, there would be no significant adverse impacts from construction of the pipelines." The FSA should not analyze impacts of project in Nevada.</p>	<p>Staff has appropriately analyzed impacts of the project componets in California on Nevada.</p>
<p align="center">13.38</p>		<p>Page 14.13-17, Conclusion, 1st paragraph, last sentence: The PSA states: "The adoption of the conditions of certification noted herein will mitigate some of the visual impacts at ground level but there is no mitigation for the visual impacts during construction of the power towers." Because any light-related impacts that may occur related to the construction of the power towers will be temporary and short-term, they will be less than significant.</p>	<p>See staff response to 35 above.</p>
<p align="center">13.39</p>		<p>Page 4.13-18, KOP 3, 1st paragraph, 2nd to last sentence: The PSA states: "The 17.5 acre campus-style environmental park will function primarily as a columbarium" Where did this term "environmental park" come from and what does it mean?</p>	<p>St. Therese Mission project documents and Inyo County Planning Department documents refer to St. Therese Mission as "an environmental park development on 17.5 acres..." . See document references below.</p>

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<p align="center">13.40</p>		<p>Page 4.13-18, Visual Sensitivity, 1st paragraph: The PSA states: “The view would be cohesive and highly scenic due to the panoramic nature of the horizon line formed by the Nopah Range were it not for the roadside elements in the foreground and construction activity in the middle ground.” Therefore, the view is not cohesive or highly scenic. This is like saying it would be a sunny day if it were not for the overcast sky</p>	<p>The KOP was structured by the applicant in a such a way to include the foreground elements seen by both passing motorists and future visitors to the St. Therese Mission. This does not change the fact that the view is largely a panoramic and scenic one except for the static nature of the KOP.</p>
<p align="center">13.41</p>		<p>Page 4.13-18, Visual Sensitivity, 1st paragraph, last sentence: The PSA states: “The overall scenic and panoramic view at KOP 3 creates moderate-high viewer concern for passing viewers.” Why moderate to high? What is the basis for this statement? This statement is unsupported by substantial evidence.</p>	<p>KOP 3 is an amalgam of viewer types, from drivers to passengers to visitors to the future St. Therese Mission. KOP 3 features a panoramic view, visible to all types of viewers, but especially to motorists. Motorists who are local, rural or travelling to a vacation destination tend to have a higher sensitivity than commuters or those in industrial areas. Motorist in this area belong to the former categories and therefore have a moderate to high degree of sensitivity.</p>
<p align="center">13.42</p>		<p>Page 4.13-19 and 20, Visual Change, 1st paragraph, last sentence: The PSA states: “But the towers do interrupt the highly scenic panoramic of the Nopah Range and Wilderness Area, therefore view disruption is moderate.” Where overall viewer sensitivity is moderate and view disruption is moderate, does the CEC typically find the impact “substantially degrades” the visual quality of the site or the surroundings? Please explain the applicable thresholds of significance and how they are being applied in this case. Conclusory statements unsupported by substantial evidence, such as this, violate CEQA.</p>	<p>See Visual Resources Table 4 and Appendix VR-1 for an explanation of how staff makes these determinations. Viewer sensitivity is a measure taken prior to the introduction of the project and view disruption is a measure of the change the project brings to the view. There is no inconsistency here.</p>
<p align="center">13.43</p>		<p>Page 4.13-20, 1st full paragraph: The PSA states: “This would create a potentially higher incidence of visual distraction from the motorist’s perspective at KOP 3.” Visual distraction or visual interest?</p>	<p>Staff does not characterize the introduction of two immense, 750' tall power towers with brightly glowing tops creating a halo of light into a rural, panoramic desert landscape as something of visual interest. Rather, it has the potential to be a distraction and irritant to drivers.</p>

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<p align="center">13.44</p>		<p>1. Page 4.13-20, 1st full paragraph: The PSA states: “If the sun were low in the horizon to the south (as in the winter months) or to the west (as in the summer months), the visual dominance and the potential view disruption of the scattering effect of light would add to the overall visual change, which under these circumstances would now both be characterized as high. This results in the overall visual change at KOP 3 as high.” Please explain in the analysis how often and for how long are these circumstances expected to occur.</p>	<p>Staff doesn't feel additional analysis of time extent is necessary.</p>
<p align="center">13.45</p>		<p>Page 4.13-20, 2nd full paragraph: The PSA states: “The contrast and dominance of the project structures in the landscape as seen in the simulation are high and the view disruption of the Nopah Range is high. The overall visual change at KOP 3 is high.” These characterizations are not reflected in KOP 3.</p>	<p>Staff disagrees.</p>
<p align="center">13.46</p>		<p>Page 4.13-20 KOP 3 Summary, 1st paragraph: The PSA states: “Taking into account the moderate visual sensitivity and the high overall visual change, visual impacts at KOP 3 would remain significant even with mitigation. Views of the dominant power towers and bright solar receivers cannot be effectively screened.” KOP 3 does not show high overall change in an already cluttered landscape. This conclusion does not take into account the effect of the continuing development of the Saint Therese Mission project on this view. With completion of the Mission’s structures and landscaping of the parking lot and other areas of the Mission site, views from this KOP toward the solar towers will be substantially screened.</p>	<p>Staff disagrees. Staff has already identified the partial screening effect of the build out of St. Therese Mission.</p>
<p align="center">13.47</p>		<p>Page 4.13-20 KOP 3 Summary, 1st paragraph: The PSA states: “Adoption of Condition of Certification VIS-6 will provide remedial mitigation for the loss of scenic views from KOP 3.” KOP -3 is not a “scenic view.” While another element is added to view, it is already degraded.</p>	<p>The KOP was structured by the applicant in a such a way to include the foreground elements seen by both passing motorists and future visitors to the St. Therese Mission. This does not change the fact that the view is largely a panoramic and scenic one except for the static nature of the KOP.</p>

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<p align="center">13.48</p>		<p>Page 4.13-20 and 21, KOP 4, 1st paragraph: The PSA states: “The community has uninterrupted views of Mount Charleston and the Spring Mountains, hence the name Charleston View.” These views are interrupted by the structures and vegetation within the community.</p>	<p>The low profile of the structures and plantings in Charleston View do not impinge upon the current residents' view of an 11,918' peak and related mountain range.</p>
<p align="center">13.49</p>		<p>Page 4.13-21, KOP 4, 1st partial paragraph: The PSA states: “The subdivision, laid out and permitted in the 1960s, never even began to approach its full build-out capacity.” This is not relevant to visual resources.</p>	<p>Relevance to the discussion of visual resources is found in the background description of the community.</p>
<p align="center">13.50</p>		<p>Page 4.13-21 Visual Sensitivity, 1st paragraph: The PSA states: “To the residents, who have chosen to live within this viewshed, it may be perceived as picture-postcard-like in its scenic value, and therefore of high quality. Other than the low-profile buildings and scattered plantings, there is little to obstruct the view, which is highly visible from the treeline above and down the linear corridor of Silver Street.” This is a subjective characterization. Some residents may perceive this area as “picture-postcard-like.” Other residents, such as those who have abandoned vehicles and artifacts on their property, may not share this</p>	<p>Comment noted.</p>
<p align="center">13.51</p>		<p>Page 4.13-21 Visual Sensitivity, 1st paragraph: The PSA states: “Census counts the population in the vicinity of Charleston View as 68. Therefore the number of permanent viewers is moderately high.” The question is not the number of viewers in the community, but the number of viewers at this KOP. It would be wrong to attribute all residents to this KOP, since some residents may not have this viewpoint from their residence. Has the Staff previously characterized the 68 residential viewers as moderately high?</p>	<p>See Footnote 14 in PSA (15 in FSA) which explains how staff measures numbers of residents.</p>

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<p align="center">13.52</p>		<p>Page 4.13-22 Visual Change, 1st paragraph: The PSA states: “The introduction of the structures for the HHSEGS facility into the view at KOP 4 dramatically alters the nature of the view from rural and highly scenic to highly industrial.” The analysis does not support the conclusion that KOP 4 is highly scenic. And, as explained previously, “industrial” is a subjective and undefined term.</p>	<p>Introduction of a power plant into a rural, desert landscape is reasonably described as a change to an industrial landscape.</p>
<p align="center">13.53</p>		<p>Page 4.13-22 Visual Change, 1st paragraph: The PSA states: “The industrial gray tone of the tower and the bright white solar receiver on top are in marked contrast from the low-key, natural desert palette.” The use of the descriptor “industrial” for the gray tone of the solar towers is prejudicial. The flat gray color of the solar towers will be neutral, and will not necessarily be inconsistent with the colors of the natural desert palette.</p>	<p>Gray tones are characteristic of power plants and industrial facilities.</p>
<p align="center">13.54</p>		<p>Page 4.13-22 Visual Change, 2nd paragraph: The PSA states: “The two 750-foot towers with their luminescent solar receiver caps dominate the landscape so completely that it will be hard to imagine the unbroken, highly scenic quality of the existing view.” The view is not highly scenic. The view is from a rural desert community without existing aesthetic controls. The description of change in view should be objective and the SA should not intermingle subjective viewer perception into the analysis.</p>	<p>Staff has provided a comparison for the reader to other large structures in the project vicinity.</p>

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<p align="center">13.55</p>		<p>Page 4.13-22 KOP 4 Summary, 1st paragraph: The PSA states: "Adoption of Condition of Certification VIS-6 will provide remedial mitigation for the loss of scenic views the change in the character of the view from KOP 4." How is this remedial?</p>	<p>The Scenic Resources Interpretive Area's primary function as identified in VIS-6 is to educate and inform the public about the visual resources in the area adversely impacted by the project. VIS-6 as drafted in the PSA included an opportunity for the applicant to highlight the technology in use as part of that educational outreach. The loss of scenic resources and non-conformance with LORS are the primary reasons for the mitigation, not the project technology as described in the applicant's comment. The education component makes it remedial, even though it does not provide mitigation to reduce impacts to less than significant.</p>
<p align="center">13.56</p>		<p>Page 4.13-22 KOP 4 Summary, 1st paragraph: The PSA states: "The planting of trees, however, does not provide complete mitigation for the visual impact of the towers. Therefore, the visual impacts would remain significant and unavoidable." The relevant question is not whether there is complete mitigation. The question is whether with the proposed mitigation, the project as mitigated will substantially degrade the view from KOP 4. The answer is no.</p>	<p>Staff disagrees.</p>
<p align="center">13.57</p>		<p>Page 4.13-23, Visual Sensitivity, 2nd paragraph: The PSA states: "The Old Spanish Trail Highway snaking through the valley and the broad expanse of sky and mountains with ample vegetation is a picture-postcard quality scene of high visual quality and has a high degree of visibility." This is a subjective characterization of the visual sensitivity. The adjectives are highly "value" laden—a "snaking" highway, "broad expanses," "ample" vegetation, "picture postcard" are all terms which impair the objectivity of the analysis.</p>	<p>A visual resource analysis, by its very nature, must use descriptive language to describe the scene for the reader.</p>

Appendix 1 -- PSA Response to Comments, Visual Resources

<p align="center">13.58</p>		<p>RE: KOP-5 What, if any, recreational use of the portion of the Nopah Wilderness falls within the potential viewshed of the Project? This is not a KOP from the solitude of the wilderness. This is a KOP from a road.</p>	<p>KOP 5, like several others, was chosen for a dual purpose: to portray both the view from the road and from the wilderness area. Correspondence from the applicant, dated 4-29-11, following a pre-filing site visit to determine KOP locations, indicates agreement that because of the similarity of the view from VP-6 and VP-7, that VP-6 from the Nopah Wilderness Area would not be used as a KOP in the AFC. Staff further refers the applicant to the AFC, p. 5.13-4, where the KOP is described as "this view is also generally representative of views that would be seen by any visitors to the lower slopes of the eastern front of the Nopah Range Wilderness Area".</p>
<p align="center">13.59</p>		<p>Page 4.13-24, 1st paragraph: The PSA states: "At a speed of approximately one mile per minute, the project's power towers will be in full view of the motorist for nearly five minutes, which is considered a high view duration. Likewise for the recreationist, who is hiking, or camping, possibly enjoying the solitude of the view, the duration would be high." There is no hiking or camping here and no solitude roadside.</p>	<p>The KOP, like several others, was chosen for a dual purpose: to portray both the view from the road and from the wilderness area. In a correspondence dated 4-29-11, following a pre-filing site visit to determine KOP locations, indicates agreement that because of the similarity of the view from VP-6 and VP-7, that VP-6 from the Nopah Wilderness Area would not be used as a KOP in the AFC.</p>
<p align="center">13.60</p>		<p>Page 4.13-24 Visual Change, 1st paragraph, 6th sentence: The PSA states: "The smooth gray concrete towers capped with a radiant solar generator do not blend in with the natural hues of the desert floor, mountains and sky." On the contrary, the neutral gray color of the solar towers will be generally compatible with the color of the desert soils and under hazy and dusty atmospheric conditions, will readily blend into the backdrop.</p>	<p>A "radiant solar generator" does not blend in with the natural hues of the desert floor, mountains and sky.</p>

Appendix 1 -- PSA Response to Comments, Visual Resources

<p align="center">13.61</p>		<p>Page 4.13-25, Visual Sensitivity, 2nd paragraph: The PSA states: "Viewers at this location are locals traversing the two-track path in their four-wheel drive vehicles and recreationists." Why is it assumed the viewers are "locals" or recreationists? Is there any objective data regarding the type or number of viewers at this location?</p>	<p>It is a reasonable assumption that the viewers are locals or recreationists based upon staff observation, the location of the track and the lack of data available from BLM or other sources.</p>
<p align="center">13.62</p>		<p>Page 4.13-25 and 26, Visual Sensitivity, 2nd paragraph: The PSA states: "Recreationalists would naturally have a higher degree of viewer concern, as they would be traveling more slowly and taking in the surroundings, including the panoramic view as shown in KOP 7 as well as the views to and within the Pahrump Valley Wilderness Area." This statement assumes a use different than off-road vehicle users. What is that use?</p>	<p>Recreationalists might be hikers or equestrians following the identified segment of the Old Spanish Trail.</p>
<p align="center">13.63</p>		<p>"....The publication of this auto tour may have the effect of increasing visitorship to the off-road trails and sites along the route in the future, thereby increasing the viewer concern." This is not relevant to this KOP and should be deleted.</p>	<p>As the KOP is representative of both the Old Spanish/Mormon Trail and views from the Pahrump Valley Wilderness (another dual-purpose KOP), it is relevant to note that there may be an increased degree of interest in the future and a higher number of viewers due to the publication of the BLM auto-tour.</p>

Appendix 1 -- PSA Response to Comments, Visual Resources

<p align="center">13.64</p>		<p>Page 4.13-26, Visual Sensitivity, 3rd full paragraph: The PSA states: "This is borne out as the KOP represents both the view from a wilderness area as well as from a point on a national historic trail, where viewer concern should be higher than average." It is not in the wilderness and, if it is on a historic trail, it should not be disclosed here. While this KOP may be on federally managed (BLM) lands, it is far from the boundaries of the wilderness.</p>	<p>The applicant participated in field-selecting the KOP in conjunction with staff, identifying the trail track using GPS coordinates and agreeing to use the KOP as representative of both the Old Spanish/Mormon Trail alignment as shown on NPS documents, Delorme Maps and the applicant's own VR Figures 5.13-1, DR 32-1 and Figure DR 37-1, and as a nearby representation of the view from the Pahrump Valley Wilderness. These discussions took place with staff on April 27, 2011, while in the process of selecting KOPs for the AFC. Please refer to Data Response 32 which describes the KOP 7 in detail, including, "it is intended to represent the view ...of recreational users who might travel to the Pahrump Valley Wilderness Area...the new KOP (7) would also represent a view on the alignment of the Old Spanish National Trail".</p>
<p align="center">13.65</p>		<p>Page 4.13-26, Visual Change, 1st paragraph: The PSA states: "Were the towers and related facilities closer to the viewer, the dominance would be high." They are not "closer," however. This is another example of the PSA assuming hypothetical circumstances ("were the towers closer") in order to find an impact, even if there is no substantial evidence to support such a conclusion.</p>	<p>Sentence removed in discussion of Visual Change KOP 7.</p>
<p align="center">13.66</p>		<p>Page 4.13-27, KOP 7 Summary, 1st paragraph: The PSA states: "Adoption of Condition of Certification VIS-6 will provide remedial mitigation for the loss of scenic views from KOP 7." As above. How is this remedial?</p>	<p>The Scenic Resources Interpretive Area's primary function as identified in VIS-6 is to educate and inform the public about the visual resources in the area adversely impacted by the project. It is also offered as mitigation for non-compliance with Inyo County LORS.</p>
<p align="center">13.67</p>		<p>Page 4.13-34, 1st full paragraph: The PSA states: "During operation, the proposed project has the potential to introduce light offsite to the roadway and surrounding properties, and up-lighting to the nighttime sky. If bright exterior lights were unshielded and lights not directed onsite they could introduce significant nighttime light to the vicinity."</p>	<p>This is standard Energy Commission language for light and glare analysis.</p>

Appendix 1 -- PSA Response to Comments, Visual Resources

<p align="center">13.68</p>		<p>Page 4.13-34, 3rd full paragraph: The PSA states: “The addition of the aviation safety lighting will substantially alter the nighttime appearance of the project area and will be prominently featured in the night sky due to the height of the towers and the number of lights required by the towers’ size.” This is not correct.</p>	<p>18 FAA lights will be highly visible at night.</p>
<p align="center">13.69</p>		<p>Page 4.13-34, 3rd full paragraph: The PSA states: “The applicant indicates there will be eighteen FAA warning lights on each tower. Once the project becomes operational, the visual impact of the federally required aviation safety lighting is unmitigable, and therefore would be significant.” As indicated previously, the required FAA aviation safety lighting will affect only a small area of the night sky, leaving most of the sky unaffected, and they will have no effect on ambient lighting conditions in the surrounding area or on the ability of viewers in the area to see the stars and planets. Thus, the impacts of this lighting would be less than significant.</p>	<p>Staff notes that Ivanpah Solar Electric Generating System (SEGS) is a power tower technology system previously analyzed and licensed by the Energy Commission. The FSA acknowledged the existence of FAA lighting during the operational phase and that staff was unaware of any thresholds for significance for FAA lighting. Staff found for SEGS that with all the other lighting controls in place, the FAA lighting would not likely constitute a significant impact. The Final Decision made Findings that the SEGS nighttime lighting would be less than significant with implementation of the COC VIS-4. The SEGS differs substantially from HHSEGS, however, in the height of the proposed towers and in the distance from the nearest residences or motorists. Therefore, the number of FAA lights and the proximity to sensitive viewers is greater for the HHSEGS project.</p>
<p align="center">13.70</p>		<p>Page 4.13-35, CUMULATIVE IMPACTS AND MITIGATION (Generally) As discussed in General Comments, the cumulative impacts analysis should not address projects in Nevada, nor projects outside the viewshed.</p>	<p align="center">Staff disagrees.</p>
<p align="center">13.71</p>		<p>Page 4.13-36 Visual Resources Table 5 – Projects Considered in the Cumulative Impacts Analysis: The PSA should address only projects in California and only projects in the viewshed.</p>	<p align="center">Staff disagrees.</p>

Appendix 1 -- PSA Response to Comments, Visual Resources

13.72		Page 4.13-40 Visual Resources Table 6 – Compliance with Applicable Laws, Ordinances, Regulations, and Standards, Local, Row 1 (Inyo County General Plan, Goals and Policies...), Consistency Determination column: “No” Would the Staff position if adopted, be cured by the GPA and rezoning or would a LORS override be required?	A General Plan Amendment would likely change this to "consistent"
13.73		Page 4.13-41 Visual Resources Table 6 – Compliance with Applicable Laws, Ordinances, Regulations, and Standards, Local, Row 4 (Inyo County Zoning Code Chapter 18.12.OS (Open Space)), Policy and Strategy Description column: The PSA states: “Maximum height of buildings in OS Zone: Principal buildings 30 feet, accessory buildings 25 feet.” This is not a visual LORS.	Removed from LORS Tables

References for # 39 above:

St. Therese Mission Project Brief, 2010.

Inyo County Planning Department Notice of Determination, June 23, 2010

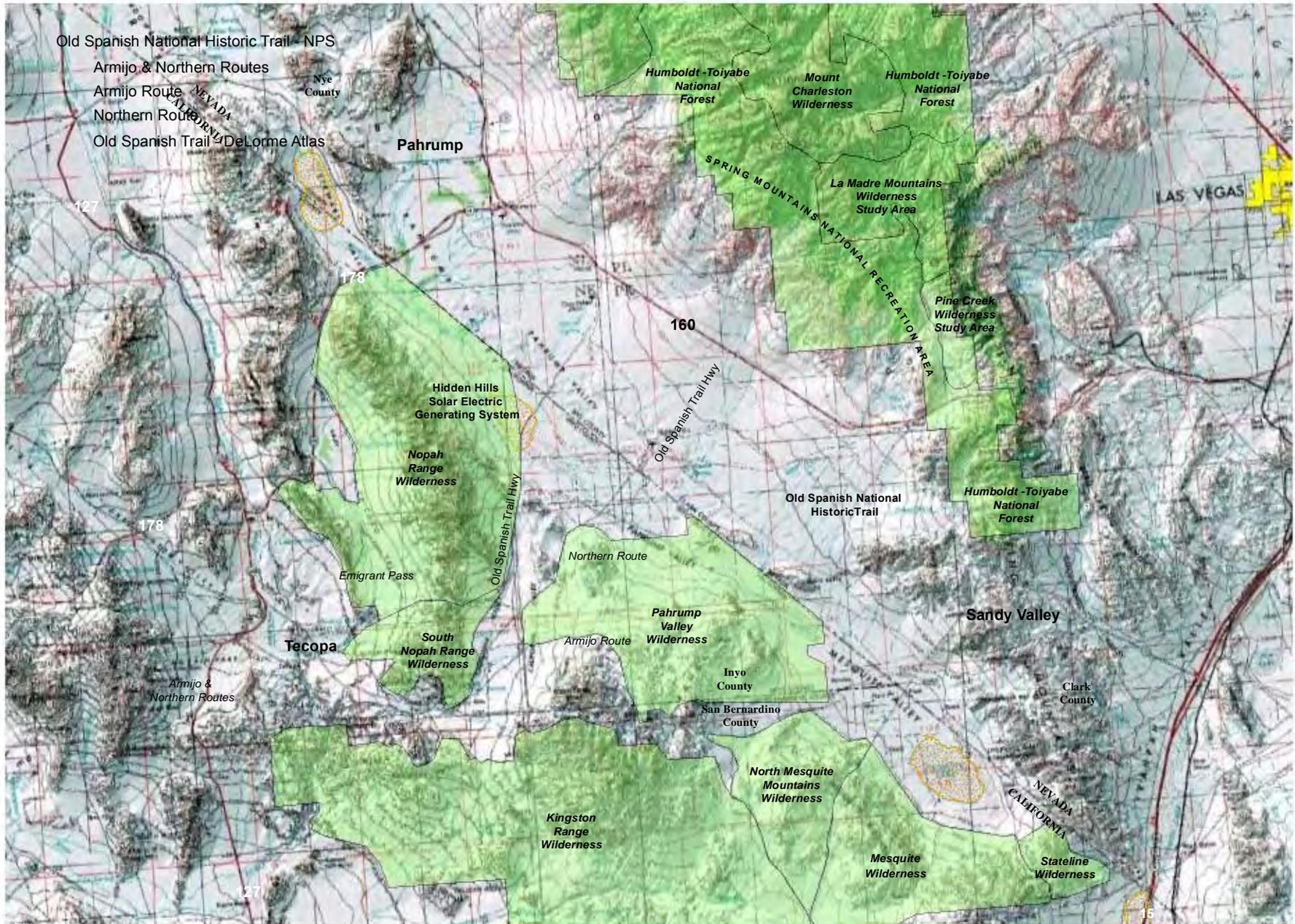
Inyo County Planning Department, Draft Mitigated Negative Declaration, Conditional Use Permit #2010-02/St. Therese Mission

Inyo County Planning Department, Appendix G, CEQA Initial Study & Environmental Checklist Form, CUP #2010-02 St. Therese Mission

Department of Fish & Game, CEQA Filing Fee No Effect Determination Form, 5/28/2010

VISUAL RESOURCES - FIGURE 1

Hidden Hills Solar Electric Generating System (HHSEGS) - Trails, Recreation and Wilderness Areas in the Project Vicinity



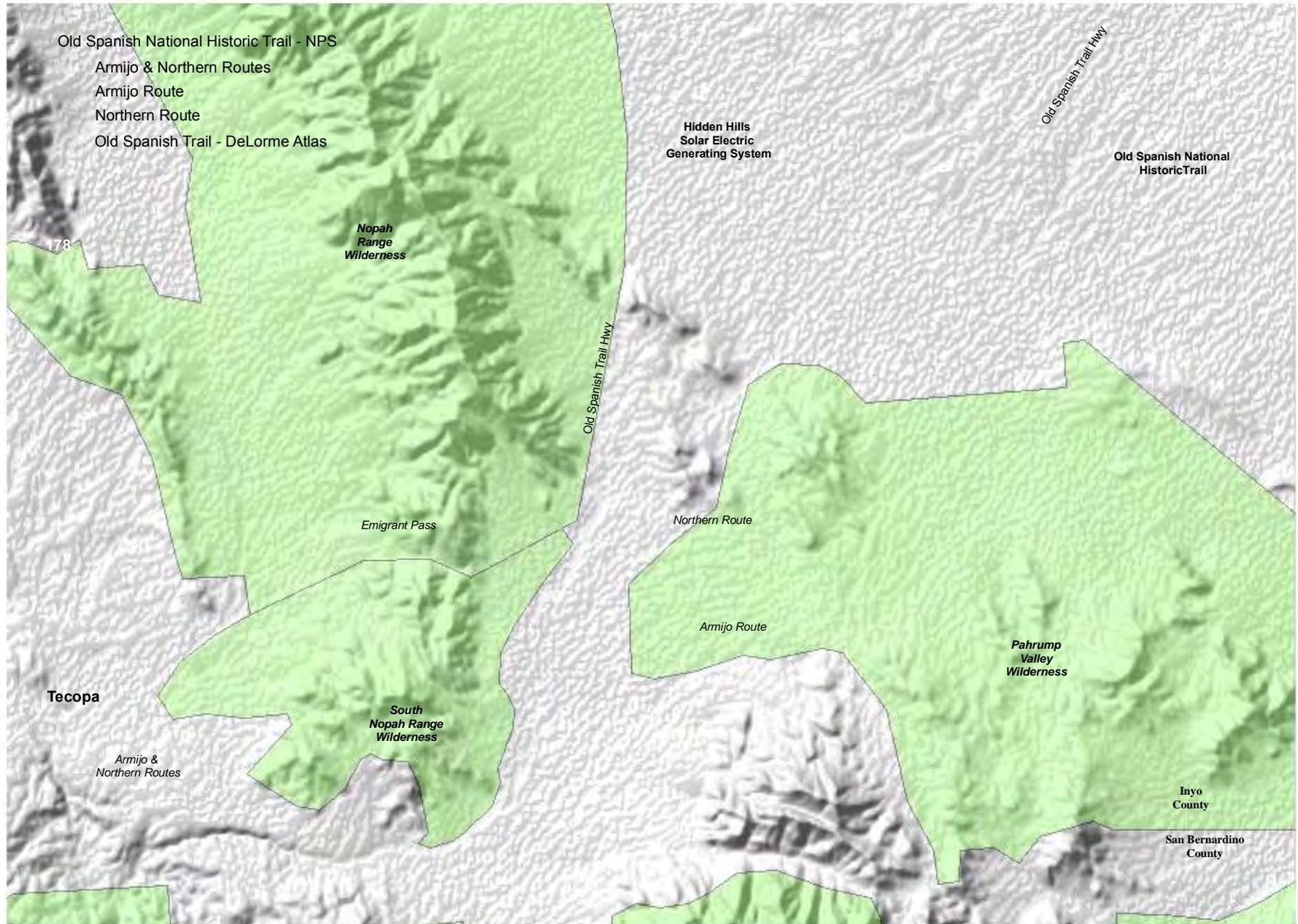
VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: CH2MHILL, MultiNet, DeLorme Atlas, National Park Service

VISUAL RESOURCES - FIGURE 2

Hidden Hills Solar Electric Generating System (HHSEGS) - Historic Trails in the Project Vicinity



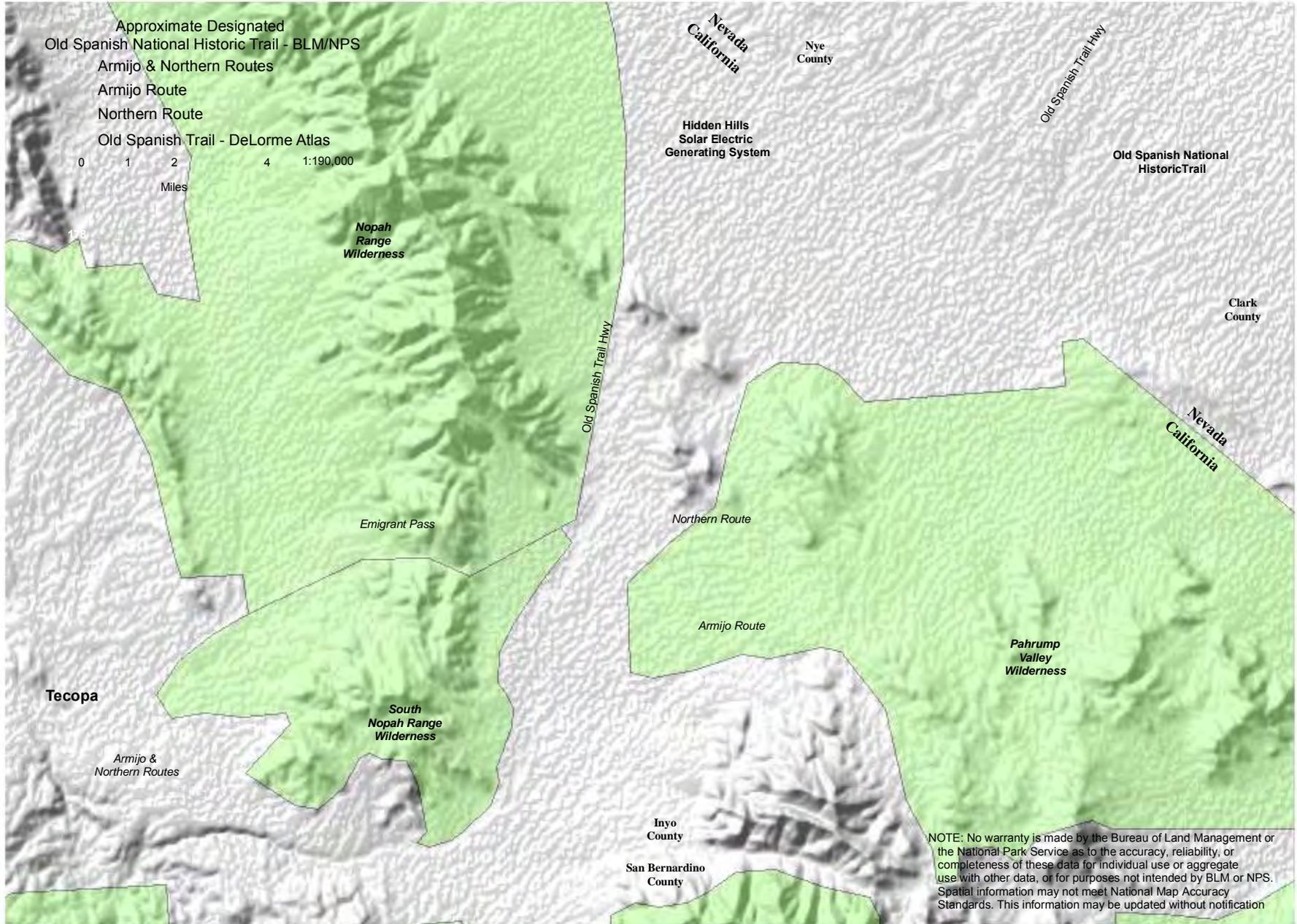
VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: CH2MHILL, MultiNet, DeLorme Atlas, National Park Service

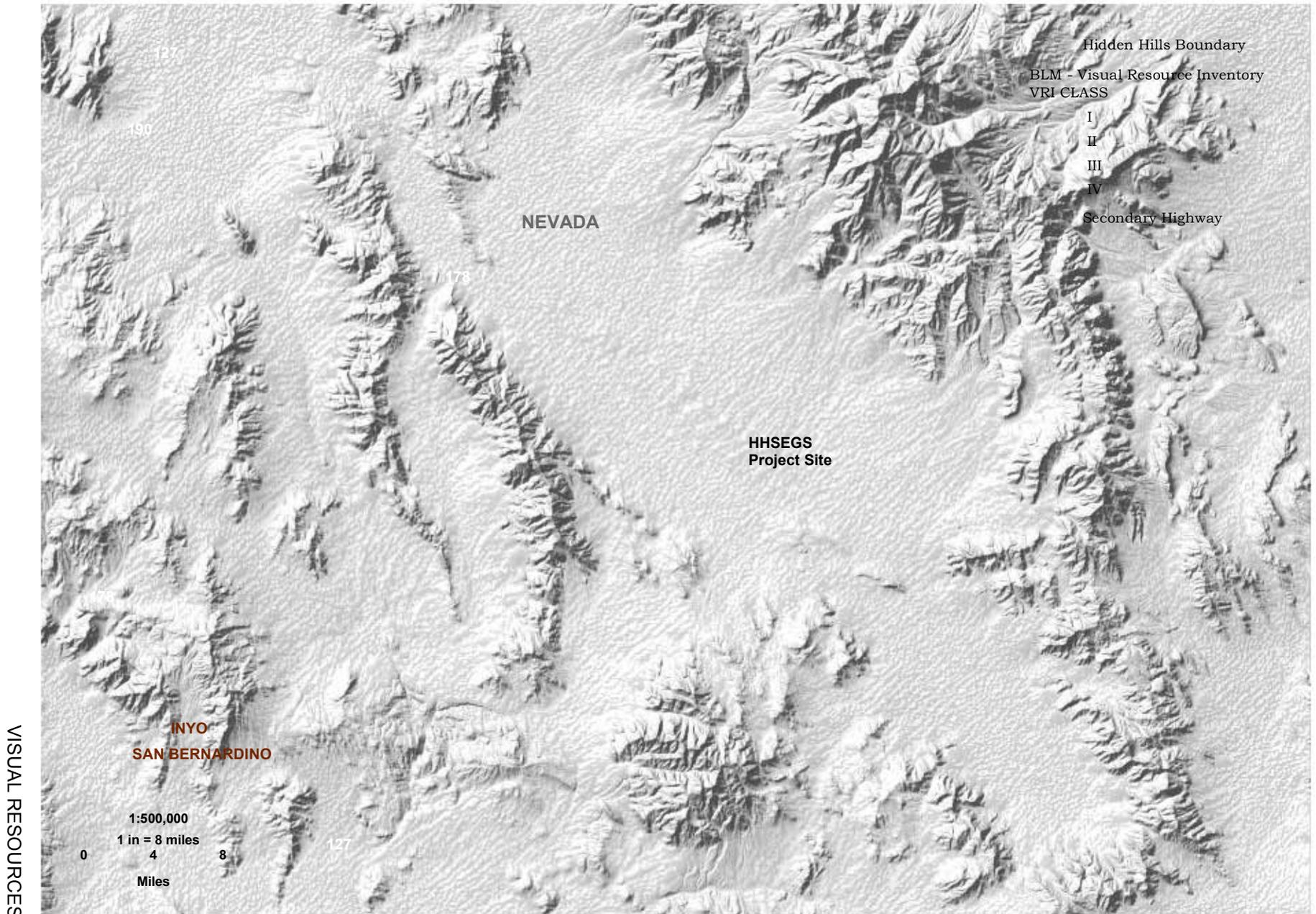
VISUAL RESOURCES - FIGURE 2

Hidden Hills Solar Electric Generating System (HHSEGS) - Historic Trails in the Project Vicinity



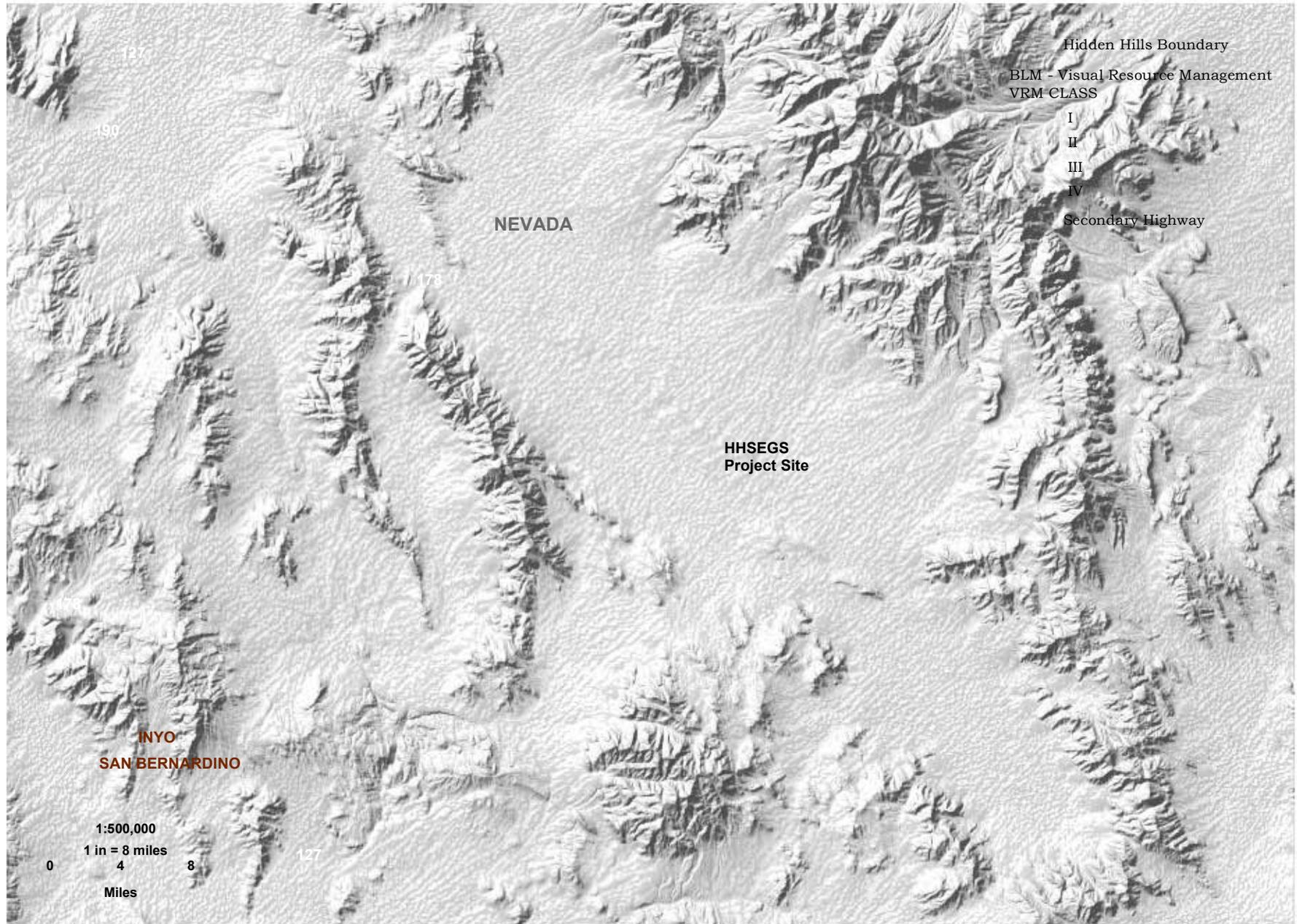
VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 3
Hidden Hills Solar Electric Generating System (HHSEGS) - BLM Visual Resource Inventory



VISUAL RESOURCES - FIGURE 4

Hidden Hills Solar Electric Generating System (HHSEGS) - BLM Visual Resource Management



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 5

Hidden Hills Solar Electric Generating System (HHSEGS) - Landscape Character Photo

View near KOP 7 toward the South Nopah and Kingston Ranges to the west showing the two-track path known as the Old Spanish/Mormon Trail.



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 6

Hidden Hills Solar Electric Generating System (HHSEGS) - Landscape Character Photo

View from south of Charleston View across the Pahrump Valley toward Mt. Charleston and the Spring Mountains.



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 7

Hidden Hills Solar Electric Generating System (HHSEGS) - Landscape Character Photo

Old Spanish/Mormon Trail looking eastward toward Mount Charleston near KOP 7



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 8

Hidden Hills Solar Electric Generating System (HHSEGS) - Landscape Character Photo

View of Nopah Range looking northwest from Old Spanish Trail Highway west of the project site.



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 9

Hidden Hills Solar Electric Generating System (HHSEGS) - Landscape Character Photo

View from Old Spanish Trail Highway north toward Pahrump Dry Lake.



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 10

Hidden Hills Solar Electric Generating System (HHSEGS) - Landscape Character Photo

View from State Line Road southwest across project site toward Charleston View.



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 11

Hidden Hills Solar Electric Generating System (HHSEGS) - Landscape Character Photo

View south toward Pahrump Valley Wilderness Area from Cathedral Canyon Road in Nevada.



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 12

Hidden Hills Solar Electric Generating System (HHSEGS) - Landscape Character Photo

View of Charleston View residence south of the project site along Old Spanish Trail Highway.



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 13

Hidden Hills Solar Electric Generating System (HHSEGS) - Landscape Character Photo

View of residence in Charleston View south of the project site.



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 14

Hidden Hills Solar Electric Generating System (HHSEGS) - Landscape Character Photo



View of existing transmission poles along Old Spanish Trail Highway in the vicinity of the project site.

VISUAL RESOURCES - FIGURE 14

Hidden Hills Solar Electric Generating System (HHSEGS) - Landscape Character Photo



View from Nevada Highway 160 Westbound looking toward the project site.

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SOURCE: Staff Photo

VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 15

Hidden Hills Solar Electric Generating System (HHSEGS) - Landscape Character Photo

View of a telecommunications tower north of Manse Road in the southern area of Pahrump, Nevada.



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 16

Hidden Hills Solar Electric Generating System (HHSEGS) - Landscape Character Photo

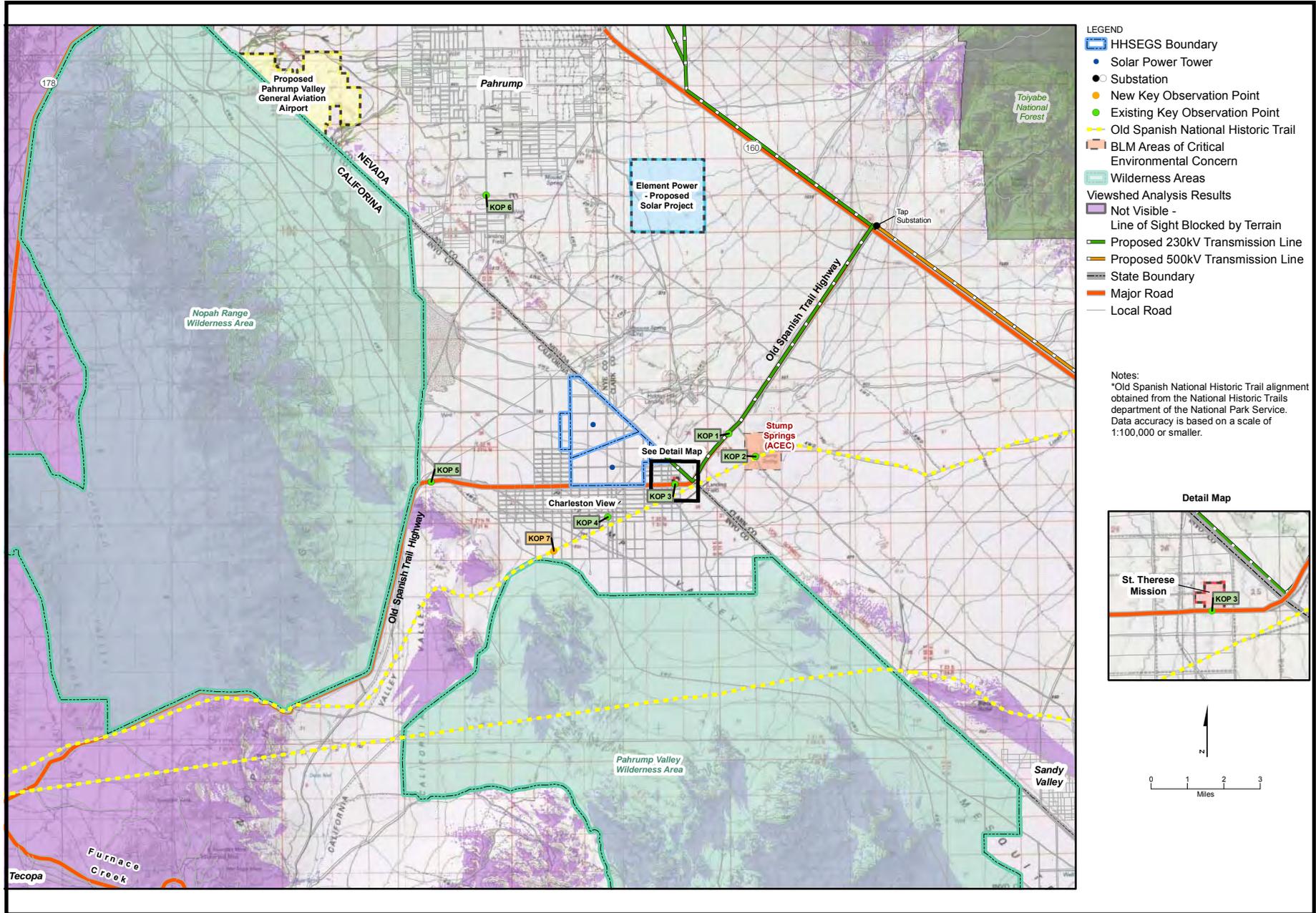
View of water storage tank at intersection of Manse Road and Nevada Highway 160.



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 17

Hidden Hills Solar Electric Generating System (HHSEGS) - Location of Key Observation Points



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 18a

Hidden Hills Solar Electric Generating System (HHSEGS) - KOP 1. Existing view toward the project site from Old Spanish Trail Highway traveling southbound, 1.75 miles northeast of the project site.



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 18b

Hidden Hills Solar Electric Generating System (HHSEGS) - KOP 1. Simulated view toward the project site from Old Spanish Trail Highway traveling southbound, 1.75 miles northeast of the project site.



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 19a

Hidden Hills Solar Electric Generating System (HHSEGS) - KOP 2. Existing view toward the project site from Stump Springs ACEC.



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 19b

Hidden Hills Solar Electric Generating System (HHSEGS) - KOP 2. Simulated view toward the project site from Stump Springs ACEC.



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 20a

Hidden Hills Solar Electric Generating System (HHSEGS) - KOP 3. Existing view toward the project site from the front of the proposed St. Therese Mission project.



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 20b

Hidden Hills Solar Electric Generating System (HHSEGS) - KOP 3. Simulated view toward the project site from the front of the proposed St. Therese Mission project.



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 20c

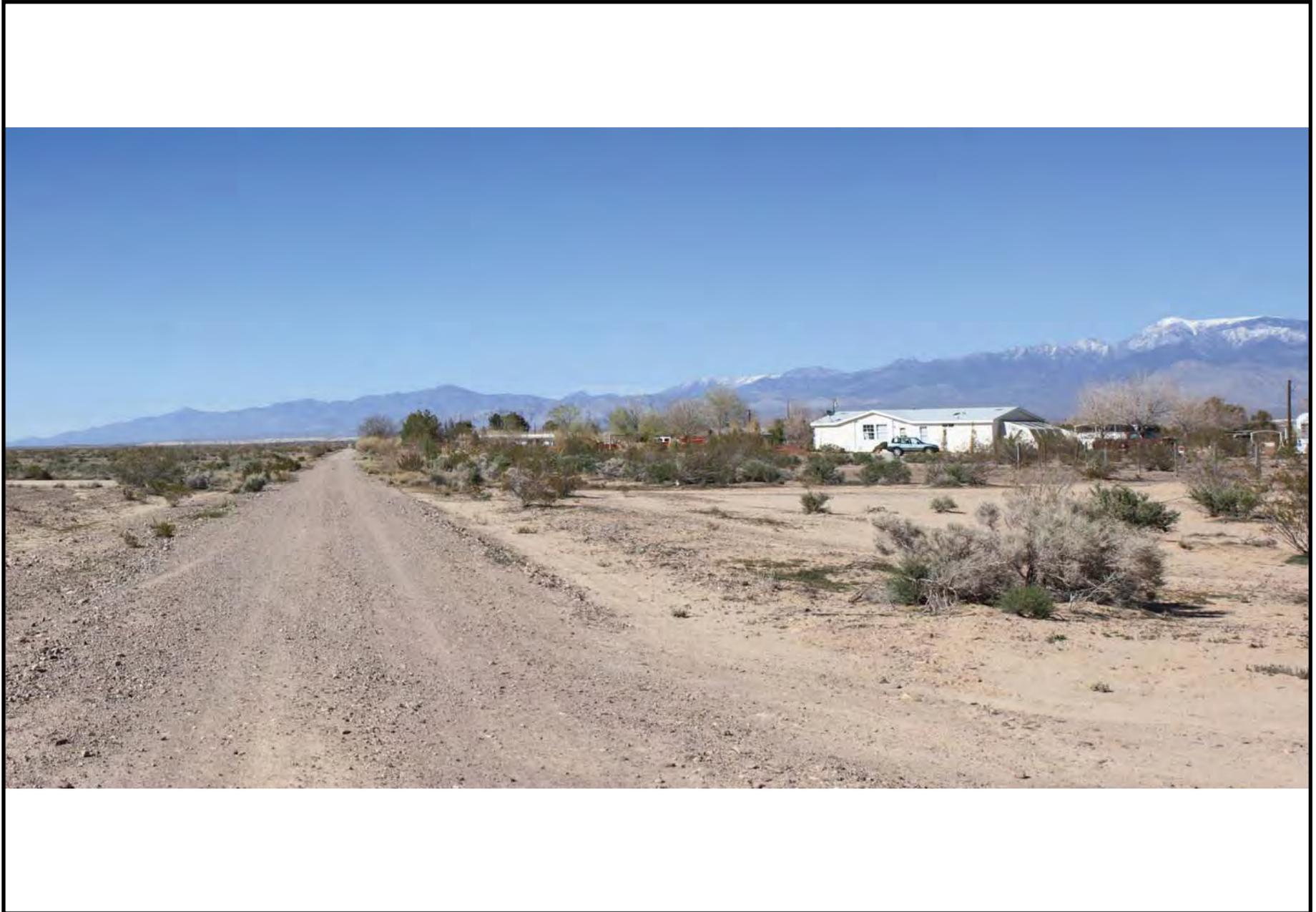
Hidden Hills Solar Electric Generating System (HHSEGS) - KOP 3. Simulated view toward the project site from the front of the proposed St. Therese Mission project, showing visual effect of Dust/Paticulates



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 21a

Hidden Hills Solar Electric Generating System (HHSEGS) - KOP 4. Existing view toward the project site from the rural residential community of Charleston View (aka Calvada Springs).



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 21b

Hidden Hills Solar Electric Generating System (HHSEGS) - KOP 4. Simulated view toward the project site from the rural residential community of Charleston View (aka Calvada Springs).



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 22a

Hidden Hills Solar Electric Generating System (HHSEGS) - KOP 5. Existing view toward the project site from Old Spanish Trail Highway traveling eastbound, 3.8 miles west of the project site.



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 22b

Hidden Hills Solar Electric Generating System (HHSEGS) - KOP 5. Simulated view toward the project site from Old Spanish Trail Highway traveling eastbound, 3.8 miles west of the project site.



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 23a

Hidden Hills Solar Electric Generating System (HHSEGS) - KOP 6. Existing view toward the project site from the rural residential area closest to the project site within the community of Pahrump.



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 23b

Hidden Hills Solar Electric Generating System (HHSEGS) - KOP 6. Simulated view toward the project site from the rural residential area closest to the project site within the community of Pahrump.



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 24a

Hidden Hills Solar Electric Generating System (HHSEGS) - KOP 7. Existing view toward the project site from Garnet Road, 1.75 miles south of Tecopa Road.



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 24b

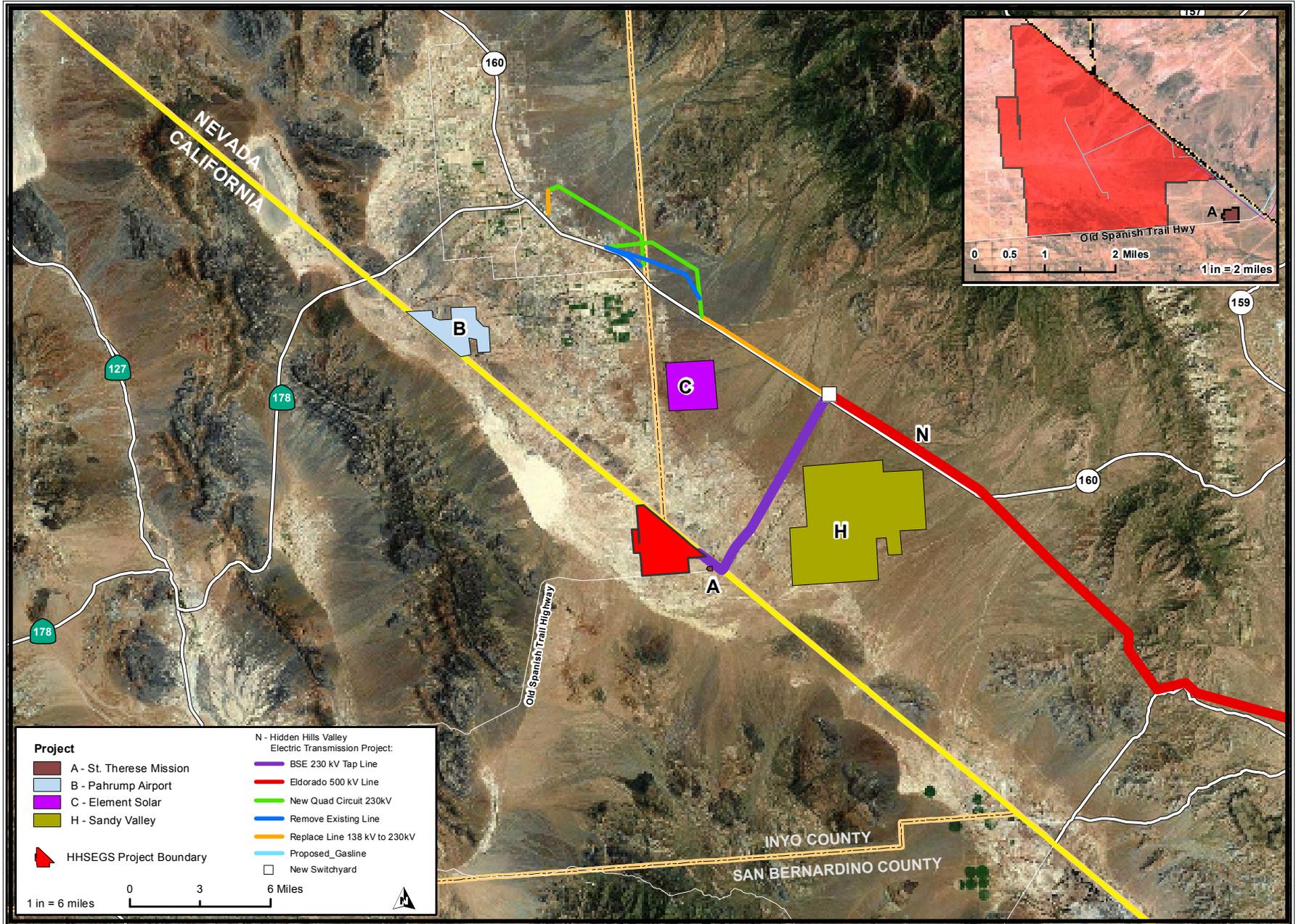
Hidden Hills Solar Electric Generating System (HHSEGS) - KOP 7. Simulated view toward the project site from Garnet Road, 1.75 miles south of Tecopa Road.



VISUAL RESOURCES

VISUAL RESOURCES - FIGURE 25

Hidden Hills Solar Electric Generating System (HHSEGS) - Cumulative Projects within the viewshed of HHSEGS

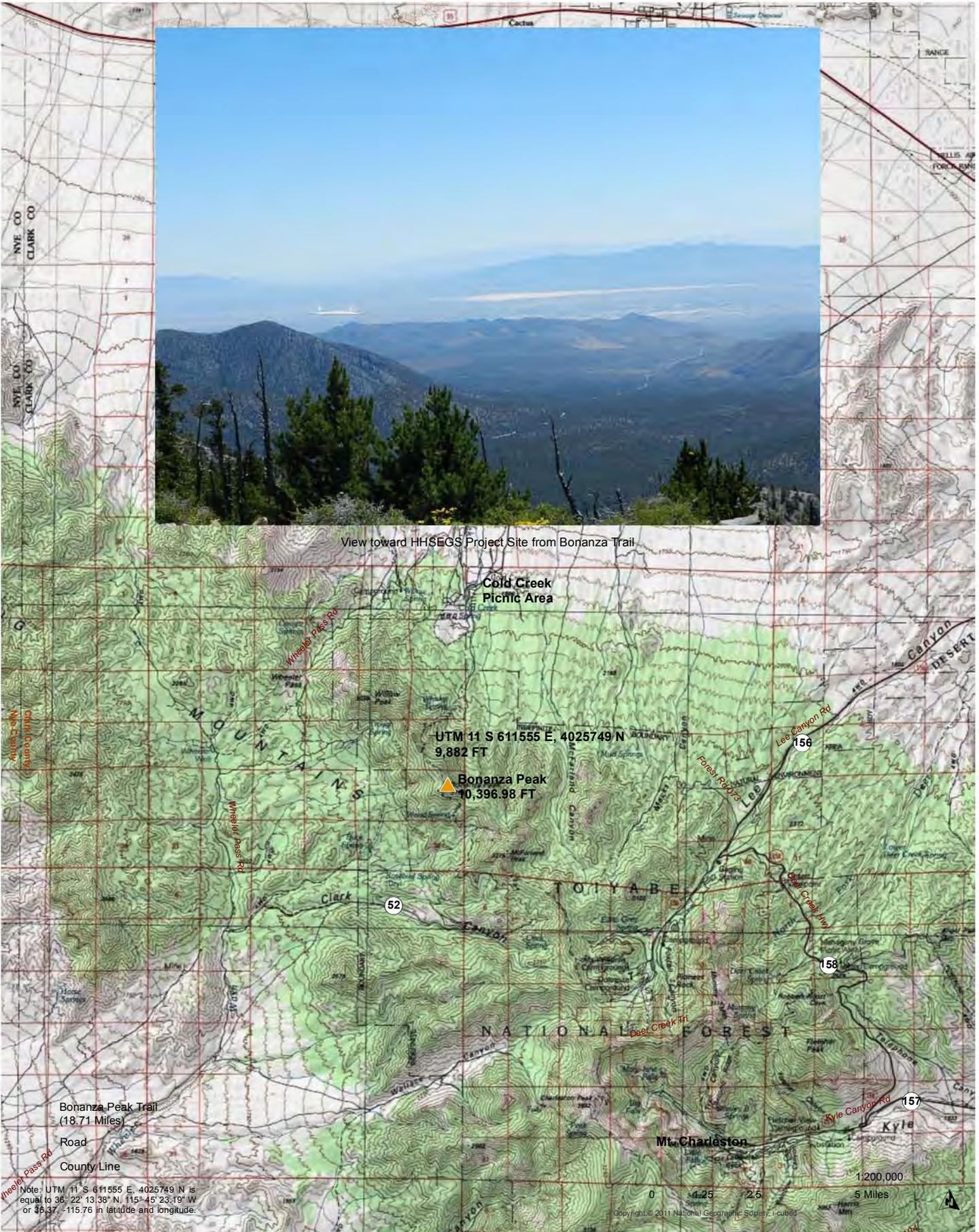


CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: BLM Southern Nevada District - Renewable Energy in Southern Nevada, BLM California - Renewable Energy Priority Projects, and Los Angeles Department of Water and Power.

VISUAL RESOURCES - FIGURE 26

Hidden Hills Solar Electric Generating System (HHSEGS) - Bonanza Peak Trail



WASTE MANAGEMENT

Testimony of Ellie Townsend-Hough, REA

SUMMARY OF CONCLUSIONS

Management of the nonhazardous and hazardous waste generated during construction and operation of the Hidden Hills Solar Electric Generating System (HHSEGS) 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 Final Staff Assessment (FSA) presents an analysis of issues associated with wastes generated from the proposed construction and operation of the HHSEGS. The technical scope of this analysis encompasses solid wastes generated during facility construction and operation. Management and discharge of wastewater is addressed in the **Soils and Surface Water** section of this document. Additional information related to waste management may also be covered in the **Worker Safety/Fire Protection** and **Hazardous Materials Management** sections of this FSA.

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 laws, ordinances, regulations, and standards 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 (shown in **WASTE MANAGEMENT Table 1**) is a major component of staff's determination regarding the significance and acceptability of the HHSEGS with respect to management of waste.

WASTE MANAGEMENT Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
<p>Title 42, United States Code, §§ 6901, et seq.</p> <p>Solid Waste Disposal Act of 1965 (as amended and revised by the Resource Conservation and Recovery Act of 1976, et al.)</p>	<p>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.</p> <p>RCRA Subtitle C establishes provisions for the generation, storage, treatment, and disposal of hazardous waste, including requirements addressing:</p> <ul style="list-style-type: none"> • 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. <p>RCRA Subtitle D establishes provisions for the design and operation of solid waste landfills.</p> <p>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.</p>
<p>Title 42, United States Code, §§ 9601, et seq.</p> <p>Comprehensive Environmental Response, Compensation and Liability Act</p>	<p>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:</p> <ul style="list-style-type: none"> • 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.
<p>Title 40, Code of Federal Regulations (CFR),</p>	<p>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</p>

<p>Subchapter I – Solid Wastes</p>	<p>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.</p> <ul style="list-style-type: none"> • 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. • Parts 260 through 279 address management of hazardous wastes, used oil, and universal wastes (i.e., batteries, mercury-containing equipment, and lamps). <p>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.</p>
<p>Title 49, CFR, Parts 172 and 173</p> <p>Hazardous Materials Regulations</p>	<p>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.</p>
<p>State</p>	
<p>California Health and Safety Code, Chapter 6.5, §§ 25100, et seq.</p> <p>Hazardous Waste Control Act of 1972, as amended</p>	<p>This 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.</p> <p>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.</p>
<p>Title 22, California Code of Regulations (CCR), Division 4.5</p> <p>Environmental Health Standards for the Management of Hazardous Waste</p>	<p>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.</p> <p>The standards addressed by Title 22, CCR include:</p> <ul style="list-style-type: none"> • Identification and Listing of Hazardous Waste (Chapter 11, §§

	<p>66261.1, et seq.)</p> <ul style="list-style-type: none"> • 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.) <p>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.</p>
<p>California Health and Safety Code, Chapter 6.11 §§ 25404–25404.9</p> <p>Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program)</p>	<p>The Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of the six environmental and emergency response programs listed below.</p> <ul style="list-style-type: none"> • 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 <p>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. Inyo County Department Hazardous Materials Division is the area CUPA.</p> <p>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/Fire Protection analyses sections.</p>
<p>Title 27, CCR, Division 1, Subdivision 4, Chapter 1, §§ 15100, et seq.</p> <p>Unified Hazardous Waste and Hazardous Materials Management Regulatory Program</p>	<p>While these regulations primarily address certification and implementation of the program by the local CUPAs, the regulations do contain specific reporting requirements for businesses.</p> <ul style="list-style-type: none"> • Article 9 – Unified Program Standardized Forms and Formats (§§ 15400–15410). • Article 10 – Business Reporting to CUPAs (§§ 15600–15620).

<p>Public Resources Code, Division 30, §§ 40000, et seq.</p> <p>California Integrated Waste Management Act of 1989.</p>	<p>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, 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.</p>
<p>Assembly Bill (AB) 341 (Chesbro) Chapter 476, Statutes of 2011</p>	<p>California State Measure AB 341 would make a legislative declaration that it is the policy goal of the state that not less than 75 percent of solid waste generated be source reduced, recycled, or composted by the year 2020. The bill was approved by the Governor October 5, 2011 and filed with Secretary of State October 6, 2011. AB 341 expands recycling to businesses and apartment buildings and requires the state to develop programs to recycle three quarters of the waste we generate.</p> <p>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.</p>
<p>Title 24, CCR, Part 11 2010 Green Building Standards Code (CalGreen)</p>	<p>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/builder 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.</p>
<p>Title 14, CCR, Division 7, § 17200, et seq.</p> <p>California Integrated Waste Management Board</p>	<p>These regulations further implement the provisions of the California Integrated Waste Management Act and set forth minimum standards for solid waste handling and disposal. The regulations include standards for solid waste management, as well as enforcement and program administration provisions.</p> <ul style="list-style-type: none"> • 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.
<p>California Health and Safety Code, Division 20, Chapter 6.5, Article 11.9, §25244.12, et seq.</p>	<p>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</p>

<p>Hazardous Waste Source Reduction and Management Review Act of 1989 (also known as SB 14).</p>	<p>a summary progress report due to DTSC every fourth year.</p>
<p>Title 22, CCR, § 67100.1 et seq. Hazardous Waste Source Reduction and Management Review.</p>	<p>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.</p>
<p>Title 22, CCR, Chapter 32, §67383.1 – 67383.5</p>	<p>This chapter establishes minimum standards for the management of all underground and aboveground tank systems that held hazardous waste or hazardous materials, and are to be disposed, reclaimed or closed in place.</p>
<p>Title 27, CCR , division 2, Subdivision 1, Chapter 3, Subchapter 4,</p>	<p>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.</p>
<p>California Porter-Cologne Water Quality Control Act of 1952: California Water Code, Division 7, Title 23, CCR, Division 3, Chapter 9</p>	<p>Requires adequate protection of water quality by appropriate design, sizing and construction of erosion and sediment controls.</p>
<p>State of Nevada Code of Regulation – Nevada Administrative Code (NAC) Section 444.440 – 444.645</p>	<p>Collection and disposal of solid waste regulations NAC 444.5705 “Class I site” defined. (NRS 444.560) “Class I site” means a disposal site which: 1. comprises at least one municipal solid waste landfill unit including all contiguous land and structures, other appurtenances and improvements on the land used for the disposal of solid waste; and 2. Is not a Class II or Class III site. NAC 444.571 “Class II site” defined. (NRS 444.560) “Class II site” means a disposal site: 1. Which is comprised of at least one municipal solid waste landfill unit; 2. Which accepts less than 20 tons of solid waste per day on an annual average; 3. For which there is no evidence of contamination of groundwater originating from the site; 4. Which serves a community that has no other practicable alternatives for waste management; and 5. Which is located in an area which annually receives no more than 25 inches of precipitation, The term includes all contiguous land and structures, other appurtenances and improvements on the land used for the disposal of solid waste.</p>

	NAC 444.5715 Class III site” defined. (NRS 444.560) “Class III site” means a disposal site which accepts only industrial solid waste.
NAC Sections 444.965 – 444.976	Hazardous Waste regulations
Local	
Policies	
Construction & Demolition (C&D) Debris Diversion Program (Inyo County Code, Title 7, Chapter 7.11)	All construction, demolition, and renovation projects within Inyo County, for which a building permit is required, shall comply with this requirement if they exceed eighteen cubic yards per day of generated construction and demolition debris.

SETTING

Proposed Project

The proposed HHSEGS will consist of two solar fields and associated facilities that will generate a total net output of 500 megawatts (MW). Solar Plant I will be located on approximately 1,483 acres. Solar Plant II will occupy approximately 1,510 acres. A 103-acre common area will consist of an administration building, warehouse, and maintenance complex and onsite switchyard. The temporary construction laydown area and parking will occupy 180 acres. The temporary construction laydown area in addition to the entire HHSEGS site would total 3,277 acres. All of these project components are located within California. The Nevada Office of the U.S. Bureau of Land Management will provide a detailed environmental impact analysis of the transmission line and the 32.4 mile natural gas pipeline alignments, most of which are in Nevada (HHSG 2011a, page 5.14-1).

The 3,277-acre project site is adjacent to the Nevada border and encompasses 172 undeveloped vacant parcels on privately owned land in Inyo County, California. The project is located along the northwest corner of Tecopa Road (also known as Old Spanish Trail Highway) and Gold Street in Inyo County. U.S. Geological Survey Topographical maps and historical aerial photographs show the undeveloped project site with graded dirt roads (in a north-south and east-west grid pattern) and vacant land, except for a former orchard area along Tecopa Road (HHSG 2011a, page 5.14-7).

Each solar plant will generate 250 MW net output for a total output of 500 MW. Each plant will use 85,000 heliostat mirror arrays, a Rankine-cycle non-reheat steam turbine, a solar receiver steam generator (SRSG), two natural-gas boilers, an air cooled condenser, associated auxiliary equipment, and a partial dry-surface air cooler (for auxiliary equipment cooling). Rows of heliostats (mirrors) would be used to concentrate solar energy on the SRSG located near the top of 750-foot distributed power tower, which converts water to steam. Steam from the SRSG will be routed via the main steam pipe to the Rankine-cycle steam turbine generator where the steam’s energy is converted to electrical energy. Each solar plant will include a natural gas-fired auxiliary boiler used to augment the solar operation when solar energy diminishes, during transient cloudy conditions and as a startup boiler

during the morning startup cycle, and a nighttime preservation boiler used to maintain system temperatures overnight. Steam condensing will be provided by air-cooled condensers. Groundwater will be treated in an onsite treatment system for use as boiler make-up water and to wash the heliostat mirror arrays.

Construction activities associated with the HHSEGS 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 Nevada Class III landfill licensed to accept such waste. The hazardous waste generated during this phase of the project would consist of used oils, universal wastes, solvents, and empty hazardous waste materials containers (HHS 2011a, § 5.14.2.1). 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 either a California or Nevada 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 HHSEGS 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, both liquid and solid. A septic system for sanitary wastewater would be located at the administration building/operations and maintenance area, located between Solar I and II (HHGS 2011a, page. 2-12). Each solar plant and the administration complex (located in the common area) will include a septic tank and leach field system for sanitary water streams. A thermal evaporator system will be used to reduce the volume of the process wastewater stream or stormwater streams that cannot be recycled back to the service water tank. The reject from the thermal evaporator will be trucked offsite for disposal at an approved facility (further discussion of waste water can be found in the **Water Supply** section of this **FSA**).

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 prepared¹ 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, 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.

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

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.

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

HHSEGS would be constructed in Inyo County on approximately 3,277 acres of privately owned land, of which 3,097 acres would be permanently disturbed. The project consists of 172 parcels of undeveloped land, with the exception of a small orchard. The project site is located along the northwest corner of the intersection of Tecopa Road (also known as "Old Spanish Trail Highway") and Gold Street in Inyo County. The project site is in the Pahrump Valley, which is situated in the southern portion of the Great Basin within the Basin and Range geomorphic province. Pahrump Valley is bordered by mountain ranges and adjoining valleys (HHSO 2011a, Volume II, ESA).

The Pahrump Valley groundwater basin is located beneath a northwest-trending valley which is located in southeastern Inyo County, California and southwestern Nye County Nevada. The primary source of recharge for the basin is the Spring Mountains in Nevada. The static water level occurs at approximately 100 to 150 feet below grade in the vicinity of the subject property (HHSO 2011a, Appendix 5.14A).

A Phase I Environmental Site Assessment (ESA) was conducted by Ninyo and Moore Geotechnical and Environmental Consultants for the proposed HHSEGS site. The July 5, 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 (HHSO 2011a, Appendix 5.14A). 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.

The following items were observed on site. (See **WASTE MANAGEMENT FIGURES 1 and 2**):

- Small orchard (**Figure 2**)
- Trash piles of solid waste (**Figure 1**)
- Six groundwater wells, five of the wells have no down hole pumps installed, four of the wells are open to the surface, one well is located in the former orchard area and has a downhole submersible pump (**Figure 2**)
- Two 4,000-gallon aboveground fire water storage tanks (**Figure 2**)

The small, abandoned orchard is located in the south-central portion of the project site along Tecopa Road, and is approximately 10 acres in size. The orchard's operation began around

1980 and ceased in 1999. Most of the orchard area was used for growing peaches. Melons may have also been grown on a portion of the property. There are no buildings or structures on or around the orchard. There is an old well located on the south side of the property, near Tecopa Road (CH2 2011e, Data Request 38) that was one of two test wells for a February, 2012 Groundwater Pump Test (CH2 2012l, Data Response Set 2A-3) as well as a September, 2012 Supplemental Groundwater Pump Test (CH2 2012kk, Data Response, Set 2A-4).

Staff spoke with the Inyo and Mono County Agricultural Commissioner who stated that there is no registered use of pesticides or herbicides associated with the orchard (Milovich 2011). A staff person at the California Department of Pesticides confirmed that the use of organochlorine pesticides stopped in the late seventies. Also the use of lead arsenates stopped in the 1950s (Smith 2012). Since the orchard began operation in 1980 after the use of organochlorine pesticides was banned, county records do not show there has been any documented use of pesticides at the site, and the area of orchard activity was relatively small. Staff believes the potential impacts to workers and the environment is low. Although the potential is low, staff has included Condition of Certification **WASTE-1** which would require that an experienced and qualified professional engineer or professional geologist be available for consultation during site characterization, soil grading or soil excavation to determine appropriate actions to be taken in the event contaminated soil is encountered.

Construction Impacts and Mitigation

Construction of the proposed power plant and associated facilities would last approximately 29 months and generate both nonhazardous and hazardous wastes in solid and liquid forms (HHSG 2011a, page 2-2). Before construction can begin, the project owner would be required to develop and implement a Construction and Demolition (C & D) Debris Plan and implement a Construction Waste Management Plan.

Non-Hazardous Wastes

Approximately 7.5 tons of non-hazardous waste will be generated from packing materials, waste concrete, insulation and empty nonhazardous chemical containers. Twenty-four tons of metal will also be generated from welding/cutting operations, packing materials, and empty nonhazardous chemical containers (HHSG 2011a, page 5.14-10). 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 HHSEGS will be disposed in a Nevada Class III landfill licensed to accept the waste (Nevada Administrative Code (NAC) Section 444.5715).

The State of Nevada is sparsely populated. The two metropolitan areas of Reno (Washoe County) and Las Vegas (Clark County) are served by large municipal solid waste landfills that account for 90 percent of all solid waste generated in the state. Landfills in Nevada are managed by three regional health districts: the Southern Nevada Health District is the solid waste management authority for Clark County; the Washoe County Health District is the solid waste management authority for Washoe County; and, the Nevada State Department of Environmental Protection is the waste authority for the remaining areas of the state (Handzo, 1/27/12). The two largest landfills (Apex in southern Nevada and Lockwood in the north)

receive about 90 percent of all the waste disposed. Reflecting the State's unprecedented population growth, the amount of solid waste disposed in Nevada has steadily increased. The importation of solid waste to Nevada has also increased significantly in recent years, gaining 700 percent for the period 1993 to 2005. Moreover, the probability for waste importation to Nevada remains high, as existing and potential new landfills become positioned to accept larger amounts of imported waste².

State of Nevada nonhazardous Class I and Class II solid waste municipal waste landfills accept municipal solid waste, including construction and demolition and some industrial waste (C&D). Class I landfills accept greater than 20 tons per day of solid waste, and Class II landfills can accept less than 20 tons per day of waste. Class III landfills, defined by Nevada Administrative Code (NAC) 444.731 are allowed to accept industrial waste. Class III landfills do not accept municipal solid waste or regulated hazardous waste.

California Department of Resources Recycling and Recovery (now CalRecycle formerly California Integrated Waste Management Board (CIWMB)) is California's 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 the Integrated Waste Management Act, CalRecycle requires jurisdictions such as Inyo 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), 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 responsible for waste management must prepare and implement a CalRecycle-approved waste diversion planning document (such as a Source Reduction and Recycling Element (SRRE) or a countywide regional agency Integrated Waste Management Plan) and submit an annual report to CalRecycle summarizing its progress in reducing solid waste as required by Public Resource Code, section 41821 while implementing the plan. Inyo County has provided Cal Recycle with a SRRE and an Integrated Waste Plan. The SRRE sets forth the County's basic strategy for management of solid waste generated within its borders, with emphasis on implementation of the SRRE. Inyo County's construction and demolition (C&D) program, waste generation totals, recycling and disposal are incorporated in their SRRE.

The Inyo County Public Works Building and Safety Department (ICBS) notifies Inyo County Integrated Waste Management (IWM) when an application for a construction or demolition project is submitted. Projects that generate more than eighteen cubic yards of construction waste are required to participate in Inyo County's C & D program. Inyo County will report the results of the C & D program to CalRecycle in their annual reports. Also the county would be

² <http://ndep.nv.gov/bwm/swmp/swp01.htm>

required to report, to CalRecycle, the amount of waste material disposed of outside of the county.

The HHSEGS project owner plans to export construction waste to Nevada. According to Title 14, California Code of Regulations (CCR) Section 18808.9, a public contract hauler who exports solid waste from California shall provide the county that the waste originated from with a report of the total volume of solid waste exported from each jurisdiction. The hauler shall identify the name of the disposal site and the state, county, or other authorized jurisdiction to which the waste was sent. Adoption of Condition of Certification **WASTE-2** would ensure that the applicant complies with the County's Monitoring and Diversion of Construction and Demolition Debris Ordinance (County Code, Title 7, Chapter 7.11) and reports to Inyo County and the Energy Commission the type and volume of waste that will be transported out of California.

To facilitate proper management of project construction wastes, staff also proposes Condition of Certification **WASTE-2** requiring the project owner to develop and implement a Construction Waste Management Plan. This condition would require the applicant to identify the type and volume of waste, and waste disposal and recycling methods to be used during construction of the facility. It would also require the applicant to provide reports pursuant to CCR 18808.9. Staff believes that compliance with proposed Condition of Certification **WASTE-2** would ensure the applicant's compliance with the County Code Title 7, Chapter 7.11, CalGreen Code requirements, Title 14, California Code of Regulations, section 18808.9, and that all project construction wastes are managed appropriately.

Non-hazardous liquid wastes would also be generated during construction, including sanitary wastes, dust suppression drainage, and equipment wash water. Process wastewater will be treated onsite and recycled for use at each of the two plants. The applicant is proposing to use an evaporator system for their process wastewater. A thermal evaporator system will be used to reduce the volume of the process wastewater or stormwater that cannot be recycled back to the service water tank. The reject from the thermal evaporator will be trucked offsite for disposal at an approved facility, and domestic wastewater will be disposed in a septic tank and an onsite leach field. Therefore, no industrial wastewater or sewer pipeline is proposed to be constructed. No pipeline is needed because reject wastewater and septic tank waste would both be trucked offsite (see the **Water Supply** and **Soils and Surface Water** sections of this document for more information on the management of project wastewater). Table 5.14-2 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. There is also a note in the AFC that the fluid will be sampled, and if the fluid is clean, the fluid will be discharged to the surrounding area for dust control.

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 (HHSG 2011a, Table 5.14-2). The amount of waste generated would be minor if handled in the manner identified in the AFC (HHSG 2011a, § 5.14.4.1.1). 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, California Code of Regulations, 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-3**. 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. The majority of the hazardous waste will be recycled.

Absent any unusual circumstances, staff considers project compliance with laws, ordinances, regulations and standards (LORS) to be sufficient to ensure that no significant impacts would occur as a result of project hazardous waste management activities.

Operation Impacts and Mitigation

The proposed HHSEGS would generate non-hazardous and hazardous wastes in both solid and liquid forms under normal operating conditions. Table 5.14-3 of the AFC (HHSO 2011a) 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 240 tons per year of non-hazardous waste, including 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 Nevada solid waste disposal facility (HHSO 2011a, § 5.14.4.1.2).

Before operations can begin, the project owner should be required to develop and implement an Operation Waste Management Plan pursuant to proposed Condition of Certification **WASTE-4**. This would facilitate proper management of project operation wastes by requiring the applicant to identify the type and volume of waste, and waste disposal and recycling methods to be used, during operation of the facility. It would also require the applicant to provide reports pursuant to Title 14, Cal. Code of Regulations, Section 18808.9. Reporting in accordance with the proposed operation waste management plan would also provide the necessary information for Inyo County to demonstrate compliance with their IWMP as discussed above.

Non-Hazardous Liquid Wastes

Non-hazardous liquid wastes would be generated during facility operation and are discussed in the **Soils 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-3**, 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-5**, 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 **FSA**.

Less than one ton per year of hazardous wastes would be generated during the 20-year anticipated operation of the HHSEGS 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, Cal. Code of Regulations, §§ 66262.10 et seq.). Should any operations waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner would be required by proposed Condition of Certification **WASTE-6** to notify the Compliance Project Manager (CPM) whenever the owner becomes aware of any such action.

Impact on Existing Waste Disposal Facilities

Non-Hazardous Wastes

The HHSEGS facility will generate nonhazardous solid waste that will add to the total waste generated in Inyo County, California. During construction of the proposed project, approximately 1,867 cubic yards of solid waste will be generated, and approximately 1,600 cubic yards³ per year will be produced during operation. Non-hazardous waste will not be disposed in California. The solid waste landfill closest to the project site is the Tecopa Landfill. The Tecopa Landfill is currently unstaffed and does not have the infrastructure to accept waste from the HHSEGS project. Waste will be disposed in Nevada, however, the project is located in California and recycling and disposal is under the authority of CalRecycle. Solid waste from the project will be disposed of in Nye or Clark County Nevada in a Nevada Class III landfill (HHSG 2011a, page 5.14-18).

CalRecycle implements programs that are designed to increase public participation in all aspects of diverting waste from landfill disposal, including waste reduction, reuse, recycling,

³ The waste volume estimates for solid/non-hazardous waste are staff generated numbers based on approximately 300 pounds per cubic yard (HHSEGS Tables 5.14-2 and Table 5.14-3). Staff used 202 gallons per cubic yard for liquid waste, and 50 lbs per cubic foot (for sludge) as conversion factors. See <http://www.calrecycle.ca.gov/lqcentral/library/dsg/apndxi.htm>

and composting, as well as promoting the safe disposal of waste that cannot be diverted. Public Resources Code, sections 41750-41770 require counties to prepare and submit to CalRecycle a county integrated waste management plan (CIWMP). The CIWMP outlines how the county manages its waste and discusses waste management problems they may face. It also provides an overview of the actions that have and will be taken to achieve compliance in accordance with Public Resources Code, section 41780. The CIWMP includes the Source Reduction and Recycling Element (SRRE) discussed above, a Household Hazardous Waste Element (HHWE) and Non-Disposal Facility Element (NDFE). For enforcement purposes, jurisdictions are evaluated on the effectiveness of their SRRE.

Once a California jurisdiction adopts a 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. (Vargas 2012).

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. 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, Cal. Code of Regulations, 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 (Vargas 2012).

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 (Pub. Resources Code, §41825).

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 Public Resources Code, section 41850 to fine the jurisdiction up to \$10,000 per day.

Inyo County submits an annual report that is reviewed by CalRecycle at a minimum of every four years to determine if it is meeting the 50 percent diversion requirement and implementing its programs. Because of the potential negative impact on Inyo County's 50 percent equivalent per capita disposal rate during the construction of the HHSEGS, staff

recommends the applicant should be required to comply with Condition of Certification **WASTE-2**. This would require the applicant to submit the necessary reports for compliance with Inyo County's Monitoring and Diversion of Construction and Demolition Debris Program and demonstrate that they have met the construction waste diversion requirements of 50 percent pursuant to the CalGreen Code⁴. The CPM, after receiving comments from the County, shall determine with the applicant if the plan is diverting recyclables to the maximum extent feasible. The applicant shall then divert all materials from the solid waste stream that can reasonably be diverted for alternate uses and required as a condition 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 could be generated but not diverted by the HHSEGS Project facility. These Class III landfills are located in Nevada. The remaining capacity for the five landfills combined is approximately 30 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 finds that disposal of the solid wastes generated by HHSEGS facility can occur without significantly impacting the capacity or remaining life of any of these facilities.

Hazardous Wastes

WASTE MANAGEMENT Table 2 displays information on the landfills in California: the Buttonwillow Landfill in Kern County, and the Kettleman Hills Landfill in King's County. 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 (HHSO 2011a, page 5.14-.3).

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 100 cubic yards of construction hazardous waste, and less than 100 cubic yards per year of operation hazardous waste would be generated from the HHSEGS facility. The total amount of hazardous wastes generated by the HHSEGS project would consume less than one percent of the remaining permitted capacity. Therefore, impacts from disposal of HHSEGS 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 (Cal. Code Regs., tit. 14, § 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 (see the **Socioeconomics** section of this **FSA**). The waste

4. <http://www.calrecycle.ca.gov>

management impacts of the proposed project, in combination with past, present and reasonably foreseeable projects in the area 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.

**WASTE MANAGEMENT Table 2
Local and Regional Landfills**

Landfill	Location	Permitted Capacity	Remaining Capacity	Estimated Closure Date
Nonhazardous	County	Cubic yards	Cubic yards	
Pahrump Valley	Nye, NV	2.5 million	N/A	2032
Republic Apex Regional	Clark, NV	6.0 million	4.8	2175
Republic Cheyenne Transfer Station	Clark, NV	N/A	N/A	N/A
Wells Cargo	Clark, NV	40.88 million	25 million	2050
US Ecology Beatty	Nye, NV	1.66 million	1 million	2020
Hazardous Waste Facilities				
US Ecology Beatty	Nye, NV	1.66 million	1 million	2020
Chemical Waste Management-Kettleman	Kings, CA	10 million*	6 million*	2044
Clean Harbors Buttonwillow	Kern, CA	14.3 million	9.2 million	2040

Source: Data Response 1D-4, Data Response 135., Table 5.14-4R3

*CalRecycle Solid Waste Information System (SWIS) facility directory 3/28/12

As proposed, the amount of non-hazardous and hazardous wastes generated during construction and operation of the HHSEGS 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 1,867 cubic yards of solid waste during construction, and 1,600 cubic yards per year during operation (HHSG 2011a, page 5.14-18). Waste recycling would be employed 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 the Table 2 have a remaining capacity of approximately 30 million cubic yards. Less than 100 cubic yards of construction hazardous waste, and less than 100 cubic yards per year of operation hazardous waste would be generated from the HHSEGS facility. Table 2 also shows that approximately 15 million cubic yards of landfill capacity is available in the Class I landfills. Bob Coyle, Vice President of Government Affairs, Republic Services of Southern Nevada, confirmed⁵ that over 2.2 million

⁵ Phone conversation between staff and Mr. Coyle on March 14, 2012

tons of waste was disposed in Clark County Nevada landfills in 2010. The proposed HHSEGS facility's contribution is insignificant and would be less than one percent of Nevada's waste generation.

One project, the St. Therese Mission, exists in the immediate vicinity of the project site. There are also three future foreseeable projects located in Nevada, near the proposed project site, including the Element Solar project, the Sandy Valley Solar project (located approximately 7 miles east), and the Pahrump Airport, which is approximately 10 miles north (see **Cumulative Effects Figure 2**). There is no landfill capacity for disposal of commercial or industrial waste in Inyo County. Future foreseeable projects would also be required to recycle to the maximum extent feasible and dispose of waste in neighboring states. No projects have been identified in the project vicinity that would create significant cumulative waste management impacts when considered together with HHSEGS.

COMPLIANCE WITH LORS

Energy Commission staff concludes that the proposed HHSEGS facility would comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during both facility construction and operation. The applicant will also comply with Conditions of Certification **WASTE-1** through **6**; these conditions require waste management and construction and demolition plans.

The applicant is required to recycle and/or dispose hazardous and non-hazardous wastes at facilities licensed or otherwise approved to accept the wastes. Because of the potential negative impact on Inyo County's 50 percent equivalent per capita disposal rate during the construction of the HHSEGS, CalRecycle will require that the applicant participate in Inyo County's Monitoring and Diversion of Construction and Demolition Debris Program. This will include the applicant providing a construction and operation waste management plan that would require approval by the Energy Commission's CPM and review by Inyo County. The project owner should also submit a plan to the CPM and Inyo County as to how it will divert, to the maximum extent feasible, the recyclable materials that are generated during operation at the facility (total materials generated are estimated to be 1,600 cubic yards per year).

The county shall determine with the applicant if the plan is diverting recyclables to the maximum extent feasible. The applicant shall then divert all materials from the solid waste stream that can reasonably be diverted based upon their approved plans (Vargas 2012). Because hazardous wastes would be produced during both project construction and operation, the HHSEGS facility would be required to obtain a hazardous waste generator identification number from U.S. EPA. The HHSEGS facility 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.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Please see **Appendix 1** for Waste Management Preliminary Staff Assessment (PSA) Response to Comments.

The County of Inyo Integrated Waste Management's letter dated January 11, 2012, (received by staff February 2012, INYO 2012b) stated that the Tecopa Landfill located in Inyo County was not available for disposal of non-hazardous construction or operation solid waste. The Tecopa Landfill is not staffed and does not have the infrastructure to accept the quantity of solid waste proposed by HHSEGS. The HHSEGS applicant will dispose of construction and operation waste in a Nevada landfill.

The letter also stated that an additional cost increase of \$52,000 per year would be needed for additional municipal solid waste collection and disposal due to the influx of construction workers potentially residing in the area surrounding the Hidden Hills project site. However, there is some uncertainty concerning the exact cost of recovery required from the impact of additional waste generated by construction workers. Inyo County staff continues to discuss with the applicant the potential impacts of incoming construction workers on a number of county services, and the issue was the primary focus of the May 9, 2012 Issues Resolution Workshop in Sacramento and discussed at the PSA Workshop held June 14, 2012 in Pahrump, Nevada. While the applicant's recent (CH2 2012jj, filed October 1, 2012) peak workforce estimate assumptions were over twice those initially assumed, Staff's **Socioeconomic** analysis continues to show that no additional housing, temporary or otherwise, will be needed as a result of HHSEGS construction and operation. Moreover, there is enough available housing in the area to accommodate those workers who temporarily relocate closer to the project site during construction.

CalRecycle has provided information concerning Inyo County and their compliance with state regulations. CalRecycle provided substantial pertinent information on state LORS and requirements that would be associated with the HHSEGS project. Conditions of Certification **WASTE-2** and **WASTE-3** take into account CalRecycle Integrated Waste Management Plan objectives.

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 both California and Nevada, recycled to the maximum extent feasible, and follows 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, and 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 ongoing project compliance with LORS, staff proposes Conditions of Certification **WASTE-1** through **6**. These conditions would require the project owner to do all of the following:

- Ensure the project site is investigated and any contamination identified is remediated, as necessary, with appropriate professional and regulatory agency oversight (**WASTE-1**).
- Comply with local and state waste recycling and diversion requirements (**WASTE-2**).
- Obtain a hazardous waste generator identification number (**WASTE-3**).
- 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-5**),
- Prepare a Construction and Operation Waste 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 (**WASTE-2** and **WASTE-4**).
- Report any waste management-related LORS enforcement actions and how violations would be corrected (**WASTE-6**).

- 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 contaminants. 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-1** and **WASTE-6**. 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 HHSEGS Project would not result in contamination or releases of hazardous substances that would pose a substantial risk to human health or the environment.
- 3) Regarding impacts of project wastes on existing waste disposal facilities, staff uses a waste volume threshold equal to ten (10) percent of a disposal facility's remaining capacity to determine if the impact from disposal of project wastes at a particular facility would be significant. 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 HHSEGS 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 HHSEGS project have a combined remaining capacity in excess of 10 million cubic yards. The total amount of hazardous wastes generated by the HHSEGS project would consume less than 1 percent of the remaining permitted capacity. Therefore, impacts from disposal of HHSEGS generated hazardous wastes would also have a less than significant impact on the remaining capacity at Class I landfills.

- 4) Staff has reviewed **Socioeconomics Figure 1** which shows the environmental justice population is not greater than fifty percent within a six-mile radius of the proposed **HHSEGS**. Energy Commission staff has not identified any significant adverse direct or cumulative **Waste Management** impacts resulting from the construction or operation of the proposed project, including impacts to the environmental justice population. Therefore, there is no **Waste Management** environmental justice issue related to this project, as there is no disproportionately high and adverse human health or environmental effects on any population, including minority or low-income populations.

PROPOSED FINDINGS OF FACT

Based on the evidence, we propose the following findings of fact:

1. Applicant's Phase I Environmental Site Assessment (ESA) for the site and linear corridors did not identify any recognized environmental conditions (RECs).
2. The HHSEGS project will generate a number of hazardous and non-hazardous wastes during construction and operation,
3. All hazardous and non-hazardous wastes generated in association with project construction and operation will be recycled, reused or remediated to the maximum extent practical.
4. Project-related wastes that cannot be recycled, reused or remediated will be disposed of in appropriate landfills for hazardous and non-hazardous wastes.
5. Disposal of project-related hazardous and non-hazardous wastes at appropriate landfill sites will not result in significant adverse impacts to the capacity or remaining operation life of any of the noted existing facilities.
6. The conditions of certification set forth below and in the **Water Supply** and **Soils and Surface Water** sections of this **FSA**, along with the HHSEGS project design measures, will ensure that the HHSEGS project will reduce potential project related waste management impacts to less than significant levels.
7. With implementation of the conditions of certification listed below, the HHSEGS project will comply with all applicable LORS related to waste management.
8. Disposal of project wastes will not result in any significant direct, indirect or cumulative impacts on existing waste disposal facilities.

PROPOSED CONDITIONS OF CERTIFICATION

WASTE-1 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-2 The project owner shall prepare a Construction Waste Management Plan for all wastes generated during construction 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 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;
- a method for collecting weigh tickets or other methods for verifying the volume of transported and or location of waste disposal; and,
- a method for reporting to demonstrate project compliance with construction waste diversion requirements of 50 percent pursuant to the CalGreen Code and Construction and Demolition Ordinance Inyo County Code, Title 7, Chapter 7.11.

Verification: The project owner shall submit the Construction Waste Management Plan to Inyo County for review and 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 also document in each monthly compliance report (MCR) 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 Construction Waste Management Plan; and update the Construction Waste Management Plan, as necessary, to address current waste generation and management practices.

WASTE-3 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 and operations.

Verification: The project owner shall keep a copy of the identification number on file at the project site and provide documentation of the hazardous waste generation and notification and receipt of the number to the CPM in the next scheduled MCR 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-4 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 to 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; and,
- an explanation to the CPM and Inyo County demonstrating how they will divert operation material 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 (ACR) 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-5 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 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 EPA'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; 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-6 Upon becoming aware of any impending waste management-related enforcement action by any local, state, or federal authority related to the HHSEGS, 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

- CEC 2011e – California Energy Commission/M. Monasmith (tn: 62595) Data Request Set 1A. 10/17/2011
- CEC 2011f – California Energy Commission/M. Monasmith (tn: 62786) Data Request Set 1B (#51-76). 11/04/2011
- CEC 2011g – California Energy Commission/M. Monasmith (tn: 62911) Data Requests, Set 1C. 11/17/2011
- CEC 2011h – California Energy Commission/M. Monasmith (tn: 63062) Data Request Set 1D. 12/06/2011
- CEC 2011r – California Energy Commission/M. Monasmith (tn: 62873) Photos of 10-27-11 Field Trip and 11-3-11 Site Visit. 11/10/2011
- CEC 2011t – California Energy Commission/M. Monasmith (tn: 62811) Revised Data Request Set 1B. 11/07/2011
- CEC 2012a – California Energy Commission/M. Monasmith (tn: 63340) Data Requests Set 2A. 01/09/2012
- CEC 2012b – California Energy Commission/M. Monasmith (tn: 63390) Data Requests Set 2B. 01/17/2012
- CEC 2012c – California Energy Commission/M. Monasmith (tn: 63392) Status Report #1. 01/17/2012
- CEC 2012d – California Energy Commission/L. Worrall (tn: 63485) Report of Conversation with J. Orr, Local 525. 01/23/2012
- CEC 2012e – California Energy Commission/E. Townsend-Hough (tn: 63487) ROC with J. Hanzo re: Waste Management. 01/27/2012
- CEC 2012f – California Energy Commission/M. Monasmith (tn: 63540) Data Requests Set 2C. 02/03/2012
- CH2 2011c – CH2MHill/J. Carrier (tn: 62913) Applicant's Data Responses, Set 1A. 11/16/2011
- CH2 2011d – CH2MHill/J. Carrier (tn: 63056) Applicant's Data Responses, Set 1B. 12/05/2011
- CH2 2011e – CH2MHILL/J. Carrier (tn: 62057) Applicant's Attachment DR20-1 Omitted from Data Response Set 1A. 12/05/2011
- CH2 2011f – CH2MHill/J. Carrier (tn: 63168) Applicant's Data Responses, Set 1C. 12/19/2011

CH2 2011g – CH2MHILL/J. Carrier (tn: 63259) Supplemental Data Response 1A. 12/30/2011

CH2 2011h – CH2MHILL/J. Carrier (tn: 63262) Supplemental Data Response 1B-2.
12/30/2011

CH2 2012a – CH2MHill/J. Carrier (tn: 63310) Applicant's Data Responses, Set 1D.
01/06/2012

CH2 2012b – CH2MHill/M. Finn (tn: 63425) Applicant's Data Responses, Set 1D-2.
01/20/2012

CH2 2012c – CH2MHill/J. Carrier (tn: 63499) Applicant's Data Responses, Set 1B-3.
01/31/2012

CH2 2012d – CH2MHill/J. Carrier (tn: 63635) Applicant's Data Response, Set 2A. 02/09/2012

CH2 2012e – CH2MHill/J. Carrier (tn: 63661) Applicant's Data Response, Set 2B. 02/16/2012

CH2 2012f – CH2MHill/J. Carrier (tn: 63792) Applicant's Data Response, Set 1D-4.
02/24/2012

CH2 2012g – CH2MHill/M. Finn (tn: 63961) Applicant's Data Response Set 1B-4 E-Copy.
3/5/2012

CH2 2012h – CH2MHill/M. Finn (tn: 63966) Applicant's Data Response Set 2C. 3/5/2012

CH2 2012i – CH2MHill/J. Carrier (tn: 64052) Applicant's Data Response Set 2A-2. 3/8/2012

CH2 2012j – CH2MHill/ M. Finn (tn: 64163) Applicant's Data Response Set 1B-5. 3/15/2012

CH2 2012k – CH2MHill/J. Carrier (tn: 64364) Applicant's Data Response Set 1C-2.
3/23/2012

CH2 2012l – CH2MHill/M. Finn (tn: 64505) Applicant's Data Response Set 2A-3. 3/30/2012

CH2 2012m – CH2MHill/J. Carrier (tn: 64509) Applicant's Data Response Set CBD-1.
3/30/2012

CH2 2012n – CH2MHill/J. Carrier (tn: 64513) Applicant's Data Response Set 1D-5.
3/30/2012

CH2 2012o – CH2MHill/J. Carrier (tn: 64579) Applicant's Data Response Set 1A-2. 3/30/2012

CH2 2012p – CH2MHill/J. Carrier (tn: 64558) Supplemental Data Response, Set 2, Boiler
Optimization Plan and Design Change. 4/2/2012

CH2 2012q – CH2MHill/J. Carrier (tn: 63792) Applicant's Data Response, Set 2D – E Copy.
4/2/2012

CH2 2012jj – CH2MHill/J. Carrier (tn: 67434) Applicant's Updated Workforce Analysis.
10/01/2012

CH2 2012kk– CH2MHill/J. Carrier (tn: 67576) Applicant's Data Response 141-2 – Long-term
Aquifer Performance Test. 10/05/2012

ESH 2012b – Ellison, Schneider & Harris/ Samantha G. Pottenger (tn: 63560) Applicants
Response to Staff Data Request #146. 02/06/2012

HHSG 2011a – BrightSource Energy/J. Woolard (tn: 61756) Application for Certification,
Volume 1 & 2. 08/5/2011

HHSG 2011b – BrightSource Energy/C. Jensen (tn: 62125) Supplement to AFC for
HHSEGS. 09/07/2011

HHSG 2011c – BrightSource Energy/C. Jensen (tn: 62322) AFC Supplement B. 09/23/2011

INYO 2012b – Inyo County/K. Carunchio (tn: 63719) Inyo County Letter regarding Preliminary
Estimates for the Fiscal Impacts of the Construction and Operation. HHSEGS.
02/16/2012

INYO 2012e – Inyo County/J. Hart (tn: 64136) Inyo County Letter to BrightSource Energy.
3/9/12

Milovich 2011 – California Energy Commission/E. Townsend-Hough. ROC with George
Milovich, Inyo & Mono Agricultural Commissioner. 12/13/2011.

Smith 2012.-. – California Energy Commission/E. Townsend-Hough. ROC with Cliff Smith,
California Department of Pesticides.

Vargas 2012 – California Energy Commission/E. Townsend-Hough. Written comments from
Melissa Vargas, Supervising Integrated Waste Management Specialist I, CalRecycle
03/16/12.

WASTE MANAGEMENT

List of Comment Letters

Traffic & Transportation Comments?

1	Inyo County	X
2	Bureau of Land Management	
3	National Park Service	
4	The Nature Conservancy	
5	Amargosa Conservancy	
6	Basin & Range Watch	
7	Pahrump Paiute Tribe	
8	Richard Arnold, Pahrump Piahute Tribe	
9	Big Pine Tribe of Owens Valley	
10	Intervenor Cindy MacDonald	X
11	Intervenor Center for Biological Diversity	
12	Intervenor, Old Spanish Trail Association	
13	Applicant, BrightSource Energy, Inc.	X

Comment #	DATE	COMMENT	RESPONSE
1	July 17, 2012	Inyo County	
1.8		...the County objects to using any private lands within Inyo county for mitigation purposes.	No Comment
1.110		The response to the County's estimate of waste management costs seems superficial at best, concluding that "at this time, the staff believes that no additional costs will be incurred by the County for this project". As far as we can tell, this belief is based on the fact that housing conditions at Ivanpah were such that no additional waste management costs were induced. Furthermore it was stated that Ivanpah is very close to Primm, which has a large supply of transient housing with considerable vacancies available in housing, and infrastructure capable of handling waste generated by additional residents.	Staff acknowledges the county's comments, however, Socioeconomics staff's analysis suggests that no additional housing will be needed during the project construction and additional municipal waste services will not be required.

Appendix 1 -- PSA Response to Comments, Waste Management

<p align="center">1.111</p>		<p>As we read it, the position ascribed to the staff in the Socioeconomic and Fiscal Impact Report authored by Dr. McCann, is that it is just too early to tell whether additional waste disposal services will be required during the construction or operation of the project. If and when the need for such facilities and costs arise as a result of the project, how will the County go about getting a determination that these costs are necessary for health and safety? Secondly, assuming that the need for such facilities is self-evident, who will be judged to be responsible for paying these costs, and will that judgment be enforced.</p>	<p>Staff acknowledges the county's comments, however, Socioeconomics staff's analysis suggests that no additional housing will be needed during the project construction and additional municipal waste services will not be required.</p>
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<p align="center">Comment #</p>	<p align="center">DATE</p>	<p align="center">COMMENT</p>	<p align="center">RESPONSE</p>
<p align="center">10</p>	<p align="center">July 21, 2012</p>	<p align="center">Intervenor Cindy MacDonald</p>	
<p align="center">10.1</p>	<p>18.1, #1 (page 18-1)</p>	<p>What are the applicable LORS regarding waste disposal requirements for industrial zones in the Inyo County General Plan or related zoning laws and/or ordinances?</p>	<p>Construction & Demolition (C&D) Debris Diversion Program (Inyo County Code, Title 7, Chapter 7.11)</p>
<p align="center">10.2</p>	<p>18.1, #2 (page 18-1)</p>	<p>Do California and/or Inyo County allow industrial facilities to discharge waste that could potentially seep into underground water tables residing below the proposed project site?</p>	<p>There are no wastes from the Hidden Hills Project that would/could seep in to the underground water table if the applicant followed all California and Inyo County regulations. Also, refer to Hazardous Materials and Soils and Surface Water sections of this FSA.</p>
<p align="center">10.3</p>	<p>18.1, #3 (page 18-1)</p>	<p>If so, are there any restriction on what can be discharged into leach fields and under what authority (LORS) are these restrictions established?</p>	<p>Please refer to the Soils and Surface Water section of this FSA.</p>

Appendix 1 -- PSA Response to Comments, Waste Management

10.4	18.2, #1 (page 18-2)	What waste disposal system is going to be utilized for the proposed HHSEGS, septic tanks with leach fields or septic tanks without leach fields that require sanitary wastes to be disposed of offsite?	Please refer to the Soils and Surface Water section of this FSA .
10.5	18.2, #2 (page 18-2)	If the septic tank/leach field system is utilized, what are the impacts of discharging this waste into the surrounding environment such as soils and above local water tables?	Please refer to the Soils and Surface Water section of this FSA .
10.6	18.2, #3 (page 18-2)	Since no detailed description or critical analysis has yet to occur regarding the engineering and design element of the pipe and drainage systems in relation to the septic tank/leach field waste disposal systems, how can the CEC Staff and/or public know if hazardous wastes and semi-hazardous wastes can potentially be disposed of and discharged into the surrounding environment via the septic tank/leach field system?	Please refer to the Soils and Surface Water section of this FSA .
10.7	18.2, #4 (page 18-3)	What data is available that can confirm no hazardous or semi-hazardous materials will be disposed of via the septic tank/leach system?	Please refer to the Soils and Surface Water section of this FSA .
10.8	18.2, #5 (page 18-3)	Where is the engineering design description in the AFC project data (or subsequent documents) that clearly depicts the septic tank/leach field systems will only be connected to toilets, showers, and sinks associated exclusively with domestic type waste disposal?	Please refer to the Soils and Surface Water section of this FSA .
10.9	18.2, #6 (page 18-3)	If the septic tank/leach field system is utilized, what mitigation measures can be used to prevent potential soils and underground water systems from being effected by cumulative waste discharges over the life of the proposed project?	Please refer to the Soils and Surface Water section of this FSA .

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<p align="center">10.10</p>	<p align="center">18.2, #7 (page 18-3)</p>	<p>Would Staff recommend as a Condition of Certification, the allowance of onsite septic tanks but eliminate the connected leach fields to ensure the applicant would have to dispose of all wastes offsite versus allowing wastes to seep into local soils and groundwater over the life of the project?</p>	<p>Please refer to the Soils and Surface Water section of this FSA.</p>
<p align="center">10.11</p>	<p align="center">18.3, #1 (page 18-4)</p>	<p>What is the percentage of increases for solid and hazardous waste generated by the proposed project compared to currently generated solid and hazardous wastes within a six-mile radius of the proposed project's vicinity?</p>	<p>It is estimated that HHSEGS will generate approximately 280 tons of solid waste (non-hazardous waste) during construction and about 240 tons per year from operation. The total non-hazardous waste landfilled in Inyo County in 2010 was 24,303 tons. The percentage using the most conservative number is 1.2 percent of the amount of non-hazardous waste disposed of in Inyo County in 2010. The nearest Class III landfill is over 20 miles from the western boundary of the Hidden Hills project site. There will be approximately 4 tons per year of hazardous waste generated and disposed for the project. This would be 0.77 percent of the total of the remaining Class I waste capacity in California. The nearest Class I landfill is 320 miles away. Note that the percentage for hazardous material is very low is also extremely conservative, the figure does not take into account that 90% of the material will be recycled.</p>

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<p align="center">10.12</p>	<p>18.3, #2 (page 18-4)</p>	<p>Based on a site specific analysis of generated wastes resulting from the proposed project should it be approved compared to currently existing generated wastes within a six-mile radius of the proposed project, would the CEC staff still find impacts of solid and hazardous wastes increases less than significant?</p>	<p>Staff believes that there are no significant or potentially significant issues surrounding solid or hazardous waste disposal from the Hidden Hills project in either California or Nevada. The majority of non-residential, non-hazardous waste is from county road work and is disposed of in Inyo County landfills.</p>
<p align="center">10.13</p>	<p>18.4, #1 (page 18-5)</p>	<p>What is the cumulative significance of continuing to place undue burdens on the State of Nevada to fulfill California's waste disposal obligations for the projects it approves?</p>	<p>Staff believes that there are no significant or potentially significant cumulative issues surrounding solid or hazardous waste disposal from the Hidden Hills project in either California or Nevada.</p>

Appendix 1 -- PSA Response to Comments, Waste Management

<p align="center">10.14</p>	<p>18.4, #2 (page 18-5)</p>	<p>If the proposed project is approved, it can potentially cause cumulative growth inducing impacts to the area, none of which can be serviced by Inyo County or the State of California. At what point will California take responsibility for the wastes generated in this area and develop adequate infrastructure components to address the areas needs?</p>	<p>Staff believes that there are no significant or potentially significant issues surrounding solid or hazardous waste disposal from the Hidden Hills project in either California or Nevada. The majority of non-residential, non-hazardous waste is from county road work and is disposed in Inyo County landfills. CalRecycle has a Local Assistance and Market Development Program to assist counties with landfill and recycling needs.</p>
<p align="center">10.15</p>	<p>18.5, #1 (page 18-7)</p>	<p>Based on the identified issues surrounding site access in relation to adequate roadways and California Vehicle Code, Section 31303, is the only viable disposal site for hazardous wastes located in Nevada?</p>	<p>The nearest Class I landfill, Kettleman City, that is available for disposal is 320 miles away therefore, Nevada is the most convenient area to dispose of hazardous waste.</p>

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<p align="center">10.16</p>	<p>18.5, #2 (page 18-7)</p>	<p>What are the fiscal impacts to Inyo County for continually having to pay Nevada for infrastructure service support such as the utilization of Nevada sites for hazardous waste disposal?</p>	<p>Staff does not know what the cost is to dispose of waste in Nevada. However, where waste from Inyo county is disposed will not change because of the Hidden Hills project. The disposal of hazardous waste is not free and will be paid for in both California and Nevada. The state of California has two hazardous waste landfills. The nearest Class I landfill to the project site is 320 miles away.</p>
<p align="center">10.17</p>	<p>18.5, #3 (page 18-7)</p>	<p>Are Nevada LORS comparable and/or equivalent to California LORS requirements for hazardous waste disposal?</p>	<p>Yes, and when/if a regulation is more stringent in California as compared to Nevada, Nevada adopts the California regulation when it comes to disposal.</p>
<p align="center">10.18</p>	<p>18.5, #4 (page 18-7)</p>	<p>Are there any identified jurisdictional issues between Nevada hazardous waste LORS and California hazardous waste LORS that cannot be resolved?</p>	<p>Staff is not aware of any jurisdictional issues between California and Nevada that are not resolved.</p>
<p align="center">10.19</p>	<p>18.5, #5 (page 18-7)</p>	<p>What jurisdiction, if any, does the CEC have regarding ensuring Nevada is willing to accept all Conditions of Certification for waste disposal should the proposed project be approved?</p>	<p>None, all of the conditions of certification are written for California. Staff worked with Nevada regulators to verify which Nevada regulations will effect the HHSEGS project prior to writing the Preliminary Staff Assessment. Nevada landfills have indicated that they would be willing to accept project wastes.</p>
<p align="center">10.20</p>	<p>18.5, #6 (page 18-7)</p>	<p>Will the CEC staff do a complete review of Nevada hazardous materials LORS and initiate pre-project approval agreements with all relevant agencies to ensure that hazardous waste will be adequately and appropriately disposed of?</p>	<p>Staff worked with Nevada regulators to verify which Nevada regulations will effect the HHSEGS project prior to writing the Preliminary Staff Assessment.</p>

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<p align="center">10.21</p>	<p>18.6, #1 (page 18-8)</p>	<p>Given the complexity surrounding solid and hazardous waste disposal generated by the proposed project in relation to the lack of infrastructure for waste disposal in the project vicinity, does the CEC Staff consider the necessary negotiations, resolutions, mitigation measures, regulatory efforts and fiscal impacts to be a significant disadvantage of siting the proposed project at this location?</p>	<p>Staff believes that there are no significant or potentially significant issues surrounding solid or hazardous waste disposal from the Hidden Hills project in either California or Nevada. The majority of non-residential, non-hazardous waste is from county road work and is disposed in Inyo County landfills.</p>
<p align="center">10.22</p>	<p>18.6, #2 (page 18-8)</p>	<p>Does the CEC Staff believe that all significant and potentially significant issues surrounding solid and hazardous waste disposal can be successfully resolved prior to project approval or will these issues only be vetted during the development and approval of the Operation Waste Management Plan?</p>	<p>Staff believes that there are no significant or potentially significant issues surrounding solid or hazardous waste disposal from the Hidden Hills project in either California or Nevada.</p>
<p align="center">10.23</p>	<p>18.7, #1 (page 18-9)</p>	<p>Can the CEC know about the potential inclusion of temporary worker housing at or near the proposed project site and not include any data, analysis, potential impact discussions or proposed mitigation measures under CEQA equivalency requirements- and still approve the siting of the proposed project?</p>	<p>Staff's Socioeconomics analysis shows that no additional housing, temporary or otherwise will need to be constructed as a result of project construction and operation. There is enough available housing in the area to accommodate those workers who temporarily relocate closer to the project site during construction.</p>
<p align="center">10.24</p>	<p>18.7, #2 (page 18-9)</p>	<p>Should temporary worker housing be utilized on or near the proposed project site, what is the maximum number of units that would be authorized and what would be their corresponding waste disposal needs?</p>	<p>Staff's Socioeconomics analysis shows that no additional housing, temporary or otherwise will need to be constructed as a result of project construction and operation. There is enough available housing in the area to accommodate those workers who temporarily relocate closer to the project site during construction.</p>
<p align="center">10.25</p>	<p>18.7, #3 (page 18-9)</p>	<p>Was the unresolved issue of municipal waste generation ever discussed at either workshop held on June? If so, what were the details of that discussion, what did it cover, what impacts were identified, what volume of waste were projected from temporary construction worker influx, and costs were associated with this waste disposal?</p>	<p>The issue of municipal waste was not discussed at the workshop. It was determined that no additional housing, temporary or otherwise will need to be constructed as a result of project construction and operation. There is enough available housing in the area to accommodate those workers who temporarily relocate closer to the project site during construction.</p>

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10.26	18.8, #8 (page 18-10)	How can the 200,000 to 400,000 gallons of recycled water be counted on for dust control if its discharge depends on the fluid sample levels of contamination.	The water would have to be disposed in the proper facility if contaminated. See Soils and Surface Water for additional information.
10.27	18.8, #9 (page 18-10)	What happens to this recycle water if fails to register as clean? How will it be disposed of?	See Soils and Surface Water Condition of Certification SOILS-6
10.28	18.9, #10 (page 18-10)	Will the applicant just dilute the recycled water until it registers as clean? If so how much additional water would this require?	Please refer to the Soils and Surface Water section of this FSA .
10.29	18.8, #11 (page 18-10)	If the fluid samples fail to register as clean and the applicant dilutes it with additional water until it can register as clean enough for discharge, isn't the same amount of non-clean chemicals being discharged into the environment? If so, what is the cumulative affect of this discharge to soil, water and biological resources over the life of the proposed project?	Please refer to the Soils and Surface Water section of this FSA .
Comment #	DATE	COMMENT TOPIC	RESPONSE
13	July 23, 2012	Applicant, BrightSource Energy, Inc. -	
13.1		Correct acreage number (not 3,900)	3,900 acres was a typo, correct acreage number of 3,277 appears on page 5-14.7 of FSA
13.2		Page 4.14-5, Table 1 LORS, Title 24, CCR, Part 11 2010 Green building Standards Code (CalGreen): suggest that this LORS be deleted because Inyo County has a local construction and demolition (C&D) debris diversion ordinance that achieves the same objective of diversion of 50 percent of construction water from Landfills. The CalGreen code only applies if there is no local ordinance.	There is no diversion percentage specified in the Inyo County ordinance.

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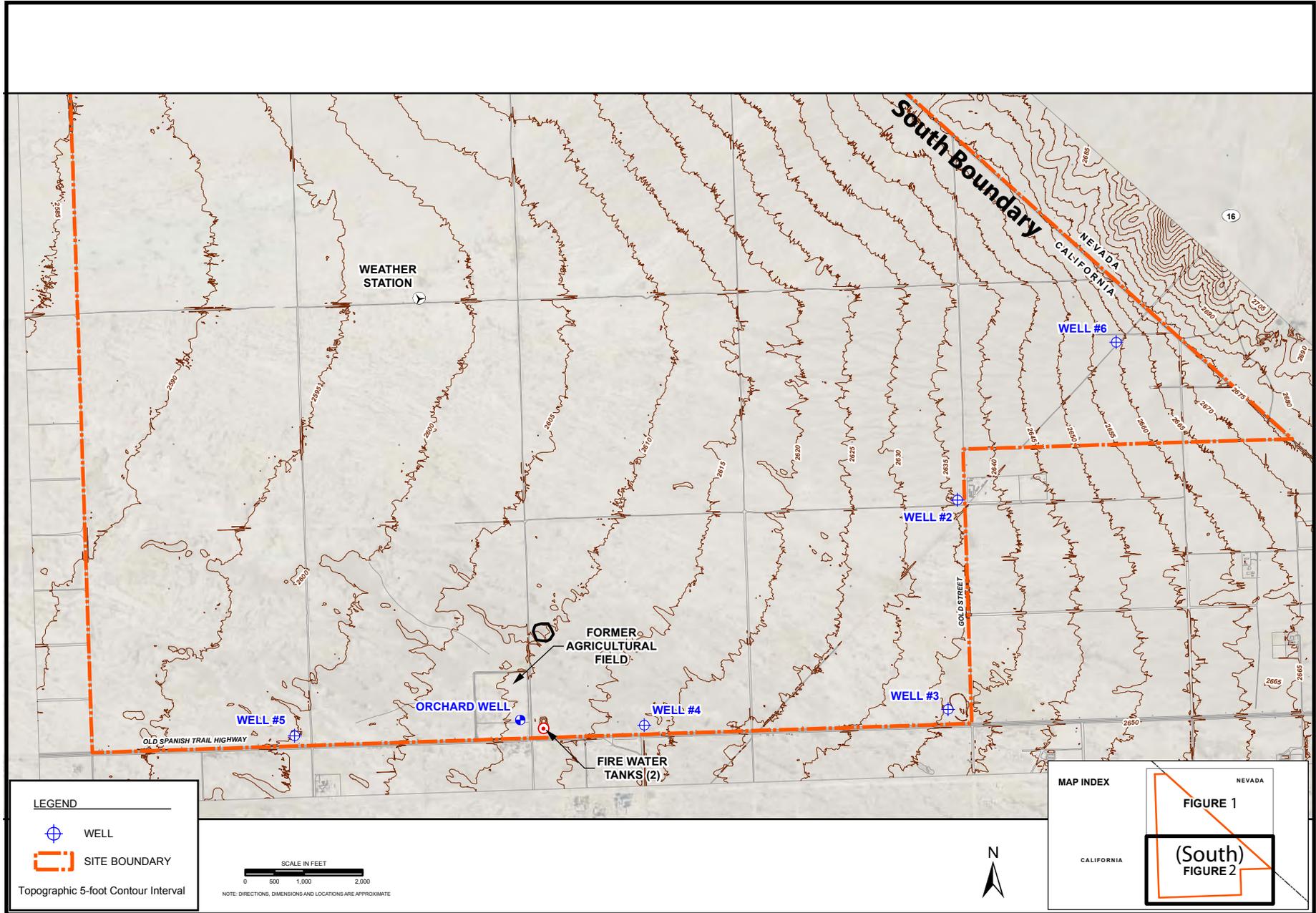
<p align="center">13.3</p>		<p>Page 4.14-6, Table 1 LORS, Title 8, CCR Section 1529 and 5208: Suggest that this LORS be deleted, as this applies to existing facilities that need to be demolished that have asbestos-containing materials. It should not apply to the HHSEGS because there are no existing structures at the site that need to be demolished.</p>	<p align="center">Staff concurs and has made the requested change.</p>
<p align="center">13.3</p>		<p>Page 4.14-6, Table 1 LORS, Title 8, CCR Section 1529 and 5208: Suggest that this LORS be deleted, as this applies to existing facilities that need to be demolished that have asbestos-containing materials. It should not apply to the HHSEGS because there are no existing structures at the site that need to be demolished.</p>	<p align="center">Staff concurs and has made the requested change.</p>
<p align="center">13.4</p>		<p>Page 4.14-8, 2nd paragraph, 2nd sentence: According to the State of Nevada, Class I and II landfills can also accept non-hazardous non-recyclable waste. Suggest that sentence be reworded as follows: Waste would be recycled, where practical, and non-recyclable waste would be deposited in a Nevada Class III <u>licensed to accept such waste</u>.</p>	<p align="center">Staff concurs and has made the requested change.</p>
<p align="center">13.5</p>		<p>Page 4.14-11, Construction Impacts and Mitigation, Nonhazardous Waste, 1st paragraph, last sentence: Suggest that the sentence be reworded as follows: The non-hazardous waste that cannot be recycled from the HHSEGS will be disposed in a Nevada Class III landfill licensed to accept the waste (Nevada Administrative Code (NAC) Section 444.5715).</p>	<p align="center">Staff concurs and has made the requested change.</p>

Appendix 1 -- PSA Response to Comments, Waste Management

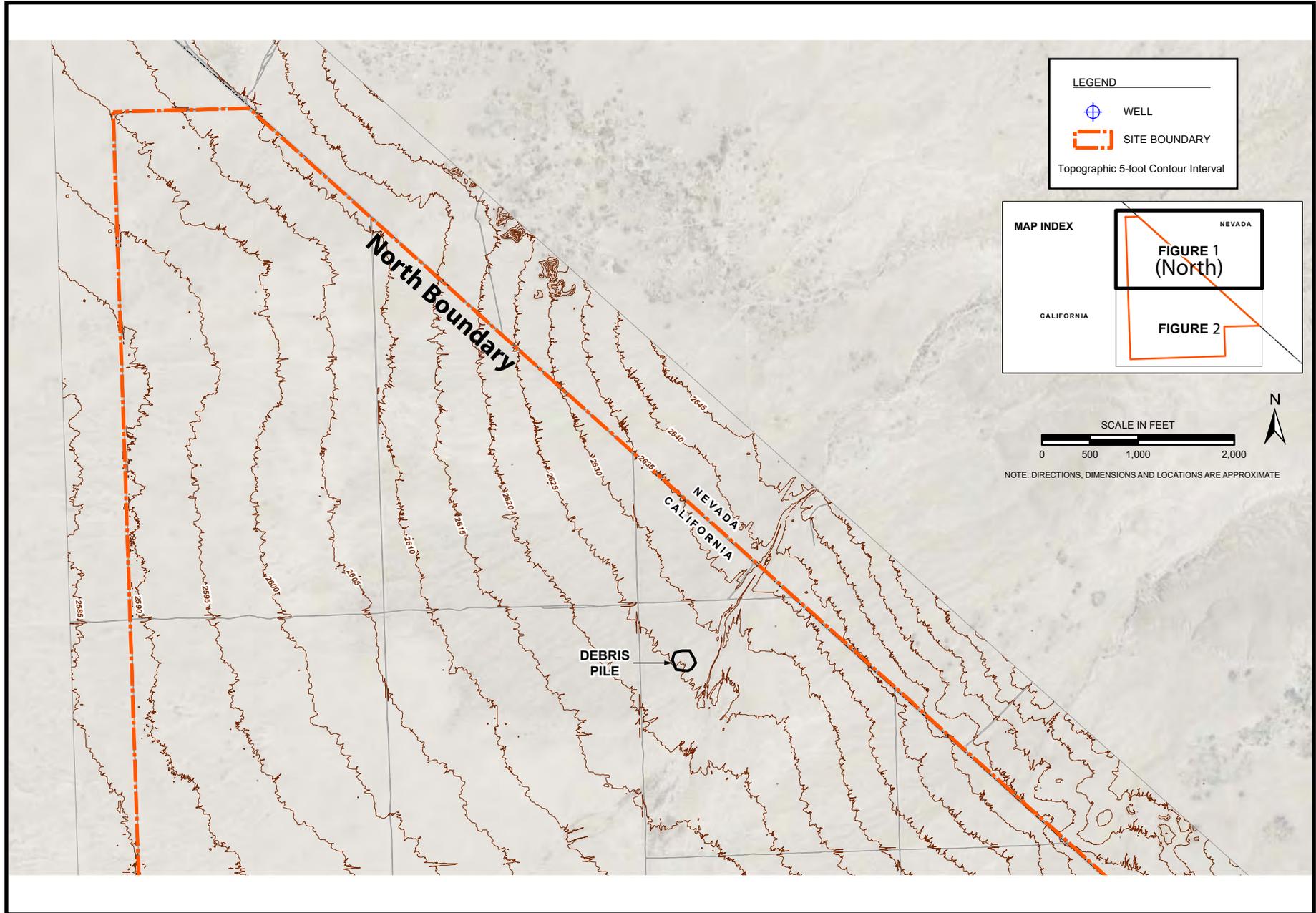
<p align="center">13.6</p>		<p>Page 4.14-17, 2nd paragraph, 4th sentence: Suggest revising the sentence as follows: The CPM, after receiving comments from the County, shall determine with the applicant if the plan is diverting recyclables to the maximum extent feasible.</p>	<p align="center">Staff concurs and has made the requested change.</p>
<p align="center">13.7</p>		<p>Page 4.14-22 Conclusion #4: Please revise</p>	<p align="center">Staff concurs and has made the requested change.</p>
<p align="center">13.8</p>		<p>Pages 4.14-22, Conclusions #5: suggest deletion of conclusion No. 5. Waste that will be generated onsite by the project is already covered by the waste management analysis. No new residences are foreseen as part of the project so no other increase in waste generation is anticipated beyond what is already described in the analysis.</p>	<p align="center">Staff concurs and has made the requested change.</p>
<p align="center">13.9</p>		<p>Page 4.14-23, Finding of Fact #9: suggests deletion of this statement, as it is not a finding of fact: The project owner will work with Inyo County and Energy commission staff to determine what mitigation measures, if any, should be proposed in the Final Staff Assessment to address potential help off set expected impacts to county services, if any, including municipal solid waste disposal.</p>	<p align="center">Staff deleted the statement</p>

WASTE MANAGEMENT - FIGURE 2
 Hidden Hills Solar Electric Generating System (HHSEGS) -Site Plan (South)

WASTE MANAGEMENT



WASTE MANAGEMENT - FIGURE 1
Hidden Hills Solar Electric Generating System (HHSEGS) -Site Plan (North)



WASTE MANAGEMENT

WATER SUPPLY

Testimony of Mike Conway, John Fio, Gus Yates, CHG, and Paul Marshall, CHG

INTRODUCTION AND SUMMARY OF CONCLUSIONS

This assessment analyzes the potential impacts on groundwater resources by the proposed Hidden Hills Solar Electric Generating System (HHSEGS). Refer to the **Soil and Surface Water** section of this Preliminary Staff Assessment for a detailed analysis of the potential impacts on water quality and hydrology.

Energy Commission staff evaluated the potential impacts to: local groundwater supplies, local well owners, groundwater dependent habitats, and compliance with all applicable laws, ordinances, regulations and standards (LORS) and state policies. Staff concludes that construction and operation of the proposed HHSEGS project would increase groundwater consumption in an over-drafted groundwater basin. The project could potentially have significant cumulative impacts to the groundwater basin and direct impacts to local groundwater supplies and biological resources. However, these impacts may be mitigated to levels that are less than significant if the mitigation measures proposed in the Application for Certification (AFC) and staff's proposed conditions of certification are implemented. Additionally, the project would comply with applicable LORS and state policies if such mitigation measures are implemented.

Based on the assessment of the proposed Hidden Hills Solar Electric Generating System (HHSEGS), Energy Commission staff concludes that:

1. The proposed project would exacerbate overdraft conditions in the Pahrump Valley groundwater basin. **WATER SUPPLY-1** would require the proposed project to mitigate for its groundwater use by offsetting it with groundwater pumping reductions that would constitute a real water savings for the basin. Such mitigation could only be effective if pumping reductions are associated with a real pumping history and could not be replaced by other unused water rights.
2. Potential project impacts must be consistent with those analyzed. Staff thus proposes Condition of Certification **WATER SUPPLY-2** which limits the applicant's water use and **WATER SUPPLY-3**, which requires the applicant to construct and report well-related information in accordance with appropriate LORS and install metering devices to ensure accurate reporting of water use.
3. The proposed project pumping could exacerbate water level declines in the project vicinity. To prevent such declines from becoming significant impacts, staff proposes a monitoring plan: **WATER SUPPLY-4** monitors groundwater conditions for potential impacts on existing neighboring wells, groundwater dependent vegetation, the Stump Spring Area of Critical Environmental Concern (ACEC), and groundwater quality. The monitoring is designed to prevent potential impacts to groundwater dependent vegetation, among the other concerns noted above, and therefore also compliments conditions recommended in the **Biological Resources** section. **WATER SUPPLY-5** mitigates for pumping induced drawdown impacts in existing wells. **WATER SUPPLY-6** recommends a plan to monitor land subsidence as a

result of declining water levels and aquifer dewatering that potentially may occur as a result of pumping.

4. Given the lack of evidence for a hydraulic connection, the relatively large intervening distance (about 20 miles), and uncertainty in potential flow barriers and permeability contrasts within the subsurface it would be speculative to conclude that project pumping would adversely affect the Amargosa River. There is no available data that identifies groundwater flow paths or confirms a hydraulic connection between PVGB and the Amargosa River, so the water consumed by project pumping may or may not be a source of inflow to the Amargosa River. Although staff concludes that a significant impact due to project pumping is unlikely, **WATER SUPPLY-1** which requires an offset of project water use in the PVGB would ensure there is likely no net overall change in subsurface outflow from the PVGB that might affect the Amargosa River.
5. Staff recommends Condition of Certification **WATER SUPPLY-7**, which would require the applicant to obtain a permit to operate a non-transient, non-community water system with the Inyo County Environmental Health Department at least sixty (60) days prior to commencement of construction at the site. This condition would ensure that the applicant meets all provisions of Title 22, Section 3 to provide a suitable domestic water supply.

With implementation of the Conditions of Certification listed below, the proposed HHSEGS project would comply with all applicable LORS, and would not result in any unmitigated significant impacts related to water supply resources.

LAWS, ORDINANCES, REGULATION, AND STANDARDS (LORS)

The following federal, state, and local environmental LORS in **WATER SUPPLY Table 1** listed for the HHSEGS project and similar facilities require the best and most appropriate use and management of groundwater resources. Additionally, the requirements of these LORS are specifically intended to protect human health and the environment. Actual project compliance with these LORS is a major component of staff's determination regarding the significance and acceptability of the HHSEGS project with respect to the use and management groundwater resources.

WATER SUPPLY Table 1
Laws, Ordinances, Regulations, and Standards

Federal LORS	
-	-
State LORS	
California Constitution, Article X, 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.
California Water Code Section 13240, 13241, 13242, 13243, & Water Quality Control Plan for the Lahontan Region (Basin Plan)	The Basin Plan establishes water quality objectives that protect the beneficial uses of surface water and groundwater in the Region. The Basin Plan describes implementation plans and other control measures designed to ensure compliance with statewide plans and policies and 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 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 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 22	Title 22, Division 4, Chapter 15 specifies Primary and Secondary Drinking Water Standards in terms of Maximum Contaminant Levels (MCLs). These MCLs include total dissolved solids (TDS) ranging from a recommended level of 500 milligrams per liter (mg/l), an upper level of 1,000 mg/l and a short term level of 1,500 mg/l. Other water quality MCLs are also specified, in addition to MCLs specified for heavy metals and chemical compounds.
California Safe Drinking Water Act	Requires public water systems to obtain a Domestic Water Supply Permit. The California Safe Drinking Water Act requires public water systems to obtain a Domestic Water Supply Permit. Public water systems are defined as a system for the provision of water for human consumption through pipes or other constructed conveyances that has 15 or more service connections or regularly serves 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 Inyo County to the County. Under the Inyo County Code Title 3, 5.15-6 Division 3, Chapter 6, Public Water Supply Systems, the County Department of Environmental Services monitors and enforces all applicable laws and orders for public water systems with less than 200 service connections. The proposed project would likely be considered a non-transient, non-community water system.
California Code of Regulations, Title 20,	The regulations under Quarterly Fuel and Energy Reports (QFER) require power plant owners to periodically submit specific data to

Division 2, Chapter 3, Article 1	the California Energy Commission, including water supply and water discharge information.
Local LORS	
Inyo County General Plan	The General Plan includes water resources related goals and implementation measures to protect water resources from overutilization, degradation, and export. Applies to project use of groundwater.
Inyo County Code Title 14, Chapter 14.28	This chapter of the county code defines what is required of water well owners and operators in Inyo County. This chapter requires that well owners pay permit fees to the county for well construction permit review, meet county well construction specifications, and properly destroy abandoned wells.
Inyo County Code Title 7, Section 7.52.090	Fees related to small water systems. Requires that every applicant for and every holder of an environmental health services permit to operate a small water system in Inyo County shall, upon application and annually, respectively, pay a fee.
Inyo County Code Title 7, Section 7.52.070	This section of the county code defines fees required of water well owners and operators in Inyo County.
Inyo County Code Title 7, Section 7.52.060	This section of the county code defines fees required of onsite waste water disposal system owners and operators in Inyo County.
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 would 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. 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 would be consistent with maximum benefit to the people of the State, would not unreasonable affect present and anticipated beneficial uses, and would 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 WDRs which would result in the best practicable treatment or control of the discharge necessary to assure that: a) a pollution or nuisance would not occur and b) the highest water quality consistent with maximum benefit to the people of the state would be maintained.
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.
State Water Resources Control Board Res. No. 88-63	States that all groundwater and surface water of the State is considered to be 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.

The California Safe Drinking Water and Toxic Enforcement Act	The California Health & Safety Code Section 25249.5 et seq. prohibits actions contaminating drinking water with chemicals known to cause cancer or possessing reproductive toxicity. The RWQCB administers the requirements of the act.
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Water Rights

The proposed HHSEGS site overlies the Pahrump Valley groundwater basin which is located within both California and Nevada. California and Nevada have different laws governing a landowner's right to use groundwater. It is important therefore to explain the differences between the two systems and their influence on mitigation options for the proposed HHSEGS project. Below is a summary of the water rights system in each state.

California- The California Constitution requires that water be used for beneficial purposes. In non-adjudicated water basins, California law does not require groundwater users to obtain a water right. No agency has comprehensive authority to regulate groundwater statewide (Bryner and Purcell, 2003). Overlying landowners generally have the right to pump and use as much groundwater as needed as long it is put to a reasonable and beneficial use. Through court decisions and precedent, appropriation of groundwater for use outside a groundwater basin has been allowed and established in the form of an appropriative right. However, these rights are usually subordinate to the overlier's rights. In basins where a law suit is brought to adjudicate water use, the overlier's groundwater rights and appropriators are determined by the court. The court also decides 1) who the pumpers are, 2) how much water the pumpers can extract, and 3) who the watermaster would be to ensure the basin is managed in accordance with the court decree. The California portion of the Pahrump Valley basin is not adjudicated and no rights have been apportioned in accordance with a court decree.

Nevada- The Nevada Constitution requires that water be used for beneficial purposes. Underground waters belong to the public and are subject to appropriation. The Nevada Division of Water Resources has the sole authority to regulate groundwater use in the state (Bryner and Purcell, 2003). Beneficial use also extends to include the appropriative rights system of water allocation such that a user must demonstrate an actual beneficial use of water. Users cannot speculate on water rights or hold onto water rights that they do not intend to use in a timely manner. If water right holders do not use the water in a timely manner, they lose such right (Nevada State Engineer, 2012).

SETTING

Regional setting

The HHSEGS site is located in Pahrump Valley, which is located in the southern extent of the Great Basin. The Great Basin is a large topographically closed drainage basin that extends primarily throughout Nevada and western Utah (**WATER SUPPLY Figure 1**). The Great Basin is characterized by interior drainages with lakes and playas, and series of horst and graben structures (subparallel, fault-bounded ranges separated by down-dropped basins). The down dropped basins are typically filled with alluvium and playa deposits shed from the adjacent mountain ranges.

Pahrump Valley

The Pahrump Valley is a topographically closed basin that straddles the California/Nevada border (**WATER SUPPLY Figure 2**). It is approximately 30 miles wide and about 40 miles long, and is bounded on the northeast and southwest by fault block mountain ranges comprised of carbonate and clastic rocks (Spring Mountains and the Resting Spring and Nopah ranges), and a tertiary granitic pluton in the south (Kingston Range). Within these boundaries is a 650 square mile basin filled with alluvium to a depth of about 2,000 feet. The alluvium overlies Paleozoic carbonate rocks that are typically folded, faulted, and fractured.

Groundwater associated with the Pahrump Valley basin fill forms a local groundwater-flow system, whereas groundwater associated with the underlying fractured carbonate rocks is part of a larger regional groundwater system. The connection between the relatively shallow local groundwater in the valley basin fill and the deeper regional groundwater (often referred to as the “carbonate aquifer”) is unclear. Groundwater in the Pahrump Valley basin fill is known as the Pahrump Valley Groundwater Basin (PVGB) (DWR 2004). The PVGB is principally recharged by precipitation falling in the Spring Mountains, and the basin supports several springs and numerous extraction wells. In the carbonate aquifer, groundwater moves to the northwest and into Ash Meadows and to the southwest through the Nopah Range. Little is known about the quantity and relative proportions of local and regional groundwater discharged by the various sinks in the valley and springs and rivers down gradient to the valley.

The Pahrump-Stewart Valley Fault Zone runs approximately parallel to the California-Nevada State Line and divides the Pahrump Valley into two groundwater sub-basins (**WATER SUPPLY Figure 2**). In the northwest, limited water levels measured in basin fill wells suggest that the fault zone does not impede groundwater flow through that portion of the valley (Comartin, 2010). In contrast, in the southwest, where the project site is located, the fault may significantly impede groundwater movement out of the valley. For example, regional groundwater-flow modeling conducted by the USGS indicated an effective hydraulic conductivity across the fault of 1.8×10^{-7} feet per day, which is several orders of magnitude smaller than the hydraulic conductivity of the adjacent alluvium (Faunt et al., 2004a). Malmburg (1967) also noted a steeper gradient along this fault zone as shown in the mapping of potentiometric contours. Given this characterization, groundwater flow across the fault and into California in the southern part of the valley could be limited by the low permeability fault zone.

The Amargosa River is a unique perennial stream that is believed to be supported by the regional groundwater flow system. It originates in the mountains of southwestern Nevada and flows south and west, terminating in the sinks and playas of Death Valley. The river is located 15 to over 20 miles southwest of the Pahrump Valley where it flows along the western flank of the Resting Spring and Nopah Mountain Ranges. Despite the large drainage area, most of the river and its tributaries are ephemeral. The perennial reaches are supported primarily by groundwater discharge from the local alluvial and deeper regional carbonate aquifers. As shown in **WATER SUPPLY Figure 2** the USGS

inferred ground-water throughflow moves northwesterly out of PVGB through the Nopah and Resting Spring Range, toward the river and mixes with ground water flowing southward from Alkali Flat. Groundwater throughflow out of the southern part of the valley toward the river is likely less significant as a result of the fault zone (Faunt et al., 2004b).

Wells and Water Levels

In the last 100 years, the PVGB has been the subject of multiple hydrogeologic reports, but none of the reports focused on the southern part of the basin where the proposed project is located. Pahrump Valley historically had abundant groundwater reserves, but pumping throughout the 1900s caused a steady rate of water table decline in the alluvial aquifer. **WATER SUPPLY Figure 3** shows the available long-term water levels records for wells located in the PVGB, which are concentrated at the northern end of the basin. The well data suggest a general decline in water levels in the northern part of the basin between 1950 and 2000 (Buqo, 2004). The observed decline in these wells of record has averaged about one foot per year. In contrast, water level data for the southern half of the basin is relatively scarce. The proposed HHSEGS site is bordered by domestic wells located primarily to the south in the community of Charleston View. Most of these wells were drilled after 1950. The available water level data from the southern half of the PVGB was used to construct a map of the potentiometric surface shown in **WATER SUPPLY Figure 4**; the explanation for this map is included as **WATER SUPPLY Figure 5**.

Basin Balance

Water budget estimates reported by Comartin (2010) indicate that the Pahrump Valley receives approximately 22,000 AFY of recharge from precipitation falling in the Spring Mountains. Groundwater outflows include evapotranspiration, southwesterly underflows into California, and groundwater pumping. Comartin (2010) estimated evapotranspiration at about 10,000 AFY, but did not provide an estimate for underflow and pumping; underflow is thought to vary primarily with the basin pumping stresses (Comartin, 2010).

Reported groundwater extractions are substantially greater than estimated safe yield for the PVGB. The Nye County Water Resources Plan states that the safe yield of the basin is between 12,000 and 19,000 AFY (Buqo, 2004). On the Nevada side of the PVGB, 69,000 AFY of groundwater extractions are permitted, but the actual reported groundwater use is substantially less than the permitted extraction rate. Reported groundwater extractions ranged from a maximum of 47,100 acre-feet (1968) to a minimum of 23,000 acre-feet (2000). These reported annual extraction rates only include the pumping covered by water rights issued by the Nevada State Engineer, and may be less than actual groundwater use because pumping by domestic wells can only be estimated. Using the Nevada State Engineer's estimate for residential water use of 0.5 AFY per residence (well), domestic water use estimated for 2011 was 5,553 AF (Nevada State Engineer, 2012).

In the California part of the basin, there are approximately 68 residents and 34 residential structures within six miles of the proposed project site. Most of these water

users are part of the Charleston View development. Staff estimated residential water use by this development at about 17 AFY.

Subsidence

During the last 100 years, the northern Pahrump Valley basin has experienced land subsidence due to water-level declines associated with excessive groundwater pumping (Buqo, 2004; Malmburg, 1986). The valley center is particularly susceptible to subsidence because of the high clay content throughout the saturated thickness of the valley-fill aquifer. Subsidence has not been monitored, but **WATER SUPPLY Figure 6** shows a map of the estimated extent of historical subsidence based on the pumping distribution, water level declines, and alluvial clay content in subsurface deposits. Most subsidence would typically occur where groundwater pumping and water-level declines were greatest.

See the **Geology and Paleontology** section of this **FSA** for an analysis and further description of threats posed by subsidence unrelated to groundwater pumping.

Springs and Groundwater-Dependent Vegetation

Certain types of plants in arid regions, such as mesquite, cottonwoods, and willow trees, often rely on groundwater for survival and occur only where the water table is shallow. These plants are called phreatophytes. Pumping groundwater in those areas can adversely impact phreatophytes by lowering water levels in the root zone. Groundwater pumping in the northern PVGB was associated with significant declines in mean annual discharge at Bennetts and Manse Springs (Belcher et al., 2004). **WATER SUPPLY Figure 7** shows the trends in spring discharge from these two springs between 1870 and 1980.

Malmburg (1967) mapped mesquite trees along multiple creek drainages 3 to 5 miles northeast, east, and southeast of the HHSEGS project, but primarily on the Nevada side of the Pahrump-Stewart Valley Fault System, as shown in **WATER SUPPLY Figure 8**. In the 1990s, the US Bureau of Land Management (BLM) conducted surveys and mapped the groundwater-dependent species in the region. **WATER SUPPLY Figure 9** shows the areas mapped by BLM (BLM, 2006). The BLM map shows more extensive vegetation occurrence than Malmburg's (1967) map, but it is not clear whether the difference stems from different mapping methods and categories or from real changes in vegetation on the landscape. This figure also shows the location of all known springs within 6 miles of the project site.

Because of their need for relatively shallow groundwater conditions, phreatophytes are also associated with areas that have seeps and springs. One of the areas mapped as having phreatophytes is located 4-miles east of the HHSEGS project site within the BLM-designated Stump Spring Area of Critical Environmental Concern (ACEC). The Stump Spring ACEC is protected for its biological and cultural resource values that include mesquite coppice dunes and mesquite washes. Declining water levels in the PVGB has therefore made protection of this area a priority (BLM, 2006). **WATER SUPPLY Figure 10** shows the proposed site relative to the mapped ACEC boundary

and a monitoring well that has been installed to measure water level changes at Stump Springs.

Faults

Numerous faults are inferred in the immediate vicinity of the proposed project site. Some faults are inferred from topographical evidence of fault scarps and others from geophysical studies. The faults bound blocks that step up east along and into the Spring Mountain Range. All of the faulting in the region is part of the regional Amargosa-Pahrump fault system, which trends northwest - southeast. **WATER SUPPLY Figure 9** shows the inferred faults in the vicinity of the project site (Workman et al., 2002). The USGS modeled the effective hydraulic conductivity across the fault at 1.8×10^{-7} feet per day, which is several orders of magnitude smaller than the hydraulic conductivity of the adjacent alluvium (Faunt et al., 2004). Springs appear to lie along or in close proximity to the inferred fault traces. It is common for faults to create spring conditions because they form hydraulic barriers along the displaced rocks and sediments causing groundwater to flow to the surface, or displacement exposes water bearing sediments and flow discharges at the surface. The mesquite coppice dunes and washes appear to be aligned along faults where shallow groundwater may occur.

For further discussion of the regional fault system, see the **GEOLOGY AND PALEONTOLOGY** section of this FSA.

Water Quality

The California Department of Water Resources (DWR) describes groundwater quality in the PVGB as suitable for all beneficial uses. The water quality varies in character from calcium-magnesium-bicarbonate to magnesium-calcium-bicarbonate, and the reported total dissolved solid (TDS) concentrations range from 145 to 540 mg/L (DWR, 2004).

The Nye County Water Resources Plan describes the groundwater quality in the PVGB as good. This Plan notes however that the northern part of the valley contains a very high density of septic systems and could benefit from community sewage treatment infrastructure. There are 33 land sections containing more than 100 septic systems, which increase the risk of domestic well contamination (Buqo, 2004).

There is limited data on water quality in the southern part of the basin. The Charleston View community located just south of the project site has 12 documented wells that appear to be primarily for domestic use, which suggests that groundwater is of acceptable quality for most uses. Recent water quality analyses from wells on the project site show that the groundwater quality is relatively low in Total Dissolved Solids (between 250 and 360 ppm, based on the applicant's 2011 and 2012 data) and has a bicarbonate character. There are approximately 68 residents and 34 residential structures within six miles of the proposed project in California. These residences all use septic systems for on-site wastewater disposal. Using a typical factor of about 70 gallons per day per person, for non-consumptive use and return flow through these systems, the Charleston View homes located in a 5 square mile area could be percolating up to 5 AFY of sanitary wastewater (Nishikawa, et al., 2003).

Water Use

Six water supply wells would be drilled as part of the HHSEGS project. Two wells would be required at each of the two power blocks and two more would be installed at the administration complex. Each pair of wells consists of a main well and a back-up well. Wells at the power block would supply make-up water, mirror wash water, and water for domestic uses.

Under operating conditions, each power block would require between 30 to 50 gallons per minute (gpm), and domestic water use of about 3.5 gpm (average water use of almost 45 gpm per power block). The operating plant water use would therefore average about 90 gpm, which equates to an annual average use of about 140 acre-feet per year (AFY). If the project were to operate for 30 years, it would pump a total of 4,200 Acre Feet (AF).

Construction water use could be as high as 288 AFY for almost three years. If permitted, construction would take place beginning in the second quarter of 2013 and be completed in the fourth quarter of 2015 (29 months). The total pumping for this period would be 696 AF.

Total combined pumping for construction and operation would be about 4,900 AF.

Each power block would have a 250,000 gallon raw water tank. Of that capacity, 100,000 gallons would be used in power plant operation and the other 150,000 gallons would be stored for emergency fire water.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section provides an evaluation of the expected direct, indirect, and cumulative impacts to groundwater resources that would be caused by project construction, operation, and maintenance. 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 facts. If mitigation is warranted, 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.

Staff concluded that the depletion or degradation of groundwater resources, including its beneficial uses, are the most significant impacts associated with the proposed project. The thresholds of significance for these issues are discussed below.

Water Resources

Staff evaluated the potential of the project's proposed water use to cause a substantial depletion or degradation of groundwater resources for all beneficial uses. Staff considered compliance with the LORS and policies presented in **WATER SUPPLY**

Table 1 and whether there would be a significant California Environmental Quality Act (CEQA) impact. Compliance with LORS and policies includes the Energy Commission and State Water Resources Control Board policies against using freshwater for power plant cooling unless other sources or other methods of cooling would be environmentally undesirable or economically unsound. A discussion of the applicable policies is contained in the “Water Use LORS and State Policy Guidance” subsection of this FSA section.

To evaluate if significant CEQA impacts to groundwater resources would occur, the following criteria were used.

- a) Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume (deplete groundwater storage)?
- b) Would the project contribute to any lowering of groundwater levels and impact the production rate of pre-existing wells to a level which would not support existing or planned uses for which other permits have been granted or cause physical damage to the well?
- c) Would the project contribute to any lowering of the groundwater levels and affect protected species or habitats?
- d) Would the project substantially degrade groundwater quality?

Where a potentially significant impact was identified, staff or the applicant proposed mitigation to ensure the impacts would be less than significant.

DIRECT IMPACTS

This section discusses potential impacts from project groundwater pumping in the PVGB. These include whether the project would substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume (deplete groundwater storage). During the next 33 years, almost 4,900 acre-ft of groundwater would be consumed from a basin with declining water levels and reported use levels that exceed the estimated sustainable yield.

Basin Water Levels

The volume of groundwater stored in a basin varies with changes in water inflows and outflows. Groundwater storage and well water levels increase when inflow exceeds outflow. Conversely, groundwater storage and water levels decrease when inflow is less than outflow. Significant adverse impacts can occur when groundwater storage perpetually declines, which include the increase in extraction costs, costs related to well deepening or replacement, land subsidence, water quality degradation, and elimination of habitat associated with springs and shallow groundwater levels.

The PVGB has experienced significant declines in groundwater levels and spring discharge during the last 100 years. The northern half of the valley has experienced average water level declines of approximately one foot per year since the 1950s (see **WATER SUPPLY Figure 3**) (Buqo, 2004). Data going back to the 1950s is limited for

the southern half of the Valley, but staff obtained water level records for two southern basin wells reported by the United States Geological Survey that indicate a long-term decline similar to that observed in the north (the Hidden Hills irrigation well and the Orchard well).

WATER SUPPLY Figure 11 shows the water level record for the Hidden Hills irrigation well. This well experienced a significant decline in the 1980s and has not recovered. Since the 1970s the water levels have steadily declined by about 0.25 feet per year.

WATER SUPPLY Figure 12 shows the water level record for the Orchard well. The Orchard well has also experienced a steady decline in water levels since 1959. The observed long-term trend in this well is about 0.37 feet per year.

Staff obtained relatively detailed water level records from the Nye County Nuclear Waste Repository Project Office (NWRPO¹) for several other wells located in the southern portion of the PVGB. These wells have relatively recent data records, which begin in November 2005 and end in November 2011. Staff utilized these water level records to calculate average water level changes in the southern PVGB and establish baseline conditions for the impact assessment.

Staff employed a USGS program (Helsel, 2006) to compute the Mann-Kendall test for trend and Sen's slope (Sen, 1968). The Mann-Kendall test is routinely employed in the environmental sciences to determine if the data exhibit a statistically significant trend because it is not heavily influenced by outliers or missing data. If the data does exhibit an upward or downward trend, the Sen's slope statistic determines the rate of increase or decrease represented by the data. **WATER SUPPLY Figures 11 through 16** shows the water level data and estimated trends for PVGB wells.

The statistical calculations are summarized in **WATER SUPPLY Table 2** and **WATER SUPPLY Table 3**. Results indicate that the water levels for all the wells have statistically significant downward trends at the 95-percent confidence level (significance level, $\alpha = 0.05$). Staff utilized the statistical results to consider water level trends on either side of the California-Nevada state line, which corresponds to the low permeability Pahrump-Stewart Valley Fault Zone. Staff chose the median trend to characterize the long-term water level changes in California and Nevada wells separately; the median is utilized because it is less influenced by outliers (Nevada Department of Transportation (NDOT)). **WATER SUPPLY Table 2** shows that the median water level decline calculated in the California wells is 0.23 feet per year (ft/yr); **WATER SUPPLY Table 3** shows that the median water level decline observed in the Nevada wells on the other side of the fault zone is 1.15 feet per year.

¹http://www.nyecounty.com/LSN/index/EWDP/water_data.htm

**WATER SUPPLY Table 2
Groundwater Level Trends in Southern Pahrump (CA Wells)**

Well Name	Years	Number of Records	Median,ft/yr
Dry Lakebed	2005 - 2011	46	0.00
Old Orchard	2005 - 2011	44	-0.23
Quail	2005 - 2011	45	-0.31
Stateline	2005 - 2011	45	-0.24
Arithmetic Mean			-0.19
Median			-0.23

**WATER SUPPLY Table 3
Groundwater Level Trends in Southern Pahrump (NV Wells)**

Well Name	Years	Number of Records	Median,ft/yr
Beyond Sherrys	2005 - 2011	46	-1.91
NDOT	2005 - 2011	32	-7.00
Hidden Hills Irrigation	2005 - 2011	45	-0.39
Jeep Trail	2005 - 2011	44	0.60
Arithmetic Mean			-2.18
Median			-1.15

Overdraft can be characterized by groundwater levels that decline over a period of years and never fully recovers, even in wet years. In the PVGB, water levels have been declining both north and south of the fault zone for years. Project pumping and increased groundwater consumption would exacerbate water level declines and reductions in groundwater storage. The applicant also acknowledges that project pumping would substantially deplete groundwater supplies in the PVGB and exacerbate ongoing overdraft conditions. The applicant therefore proposes to offset the impact through acquisition and retirement of water rights in an amount equal to the proposed project pumping. Staff believes this could be appropriate mitigation if it is shown that the water rights acquired offset actual active groundwater use in the PVGB. Staff also believes it is possible there are other methods that could be implemented to offset project pumping such as developing alternative supplies, funding water conservation programs, or capturing and recharging flood flows that would otherwise drain to the playa and evaporate (See the **Soils and Surface Water** section and **SOILS-5** and **SOILS-6** for further discussion). Staff recommends adoption of Condition of Certification **WATER SUPPLY-1** which requires the project owner to develop and implement a plan prior to project construction and provide water use offset within the PVGB that is equal to project pumping, thereby ensuring no new net increase in groundwater consumption.

To ensure that the water use analyzed is consistent with that used by the proposed project, staff proposes Condition of Certification **WATER SUPPLY-2**. This condition would limit project pumping to an average of 288 acre-feet per year during the 29 months of construction and to 140 acre-feet per year for project operations.

Furthermore, this condition requires that water use is metered and reported consistent with these limitations. Staff also proposes Condition of Certification **WATER SUPPLY-3** to ensure that project wells are constructed to state standards.

Aquifer Tests

The depth and extent of water level drawdown in and around a pumping well is determined by the pumping rate, aquifer transmissivity and aquifer storativity. Well hydraulic equations used to estimate drawdown are dependent on the values of these parameters. The drawdown calculated using these equations is used by staff to evaluate the potential impact on water resources. Information on aquifer parameter values in the vicinity of the site is limited. Staff obtained two reported transmissivity estimates and one storativity estimate from a local 1966 aquifer test (HHSEGS 2011a). These values are included in **WATER SUPPLY Table 4** below.

In February 2012 the applicant conducted an aquifer test to further evaluate site aquifer water transmitting and storage properties. Staff and other interested parties reviewed and commented on the results of the test and noted several deficiencies with the methodology. There has been further disagreement between the applicant and staff regarding the characterization of the aquifer system. Specifically, there is disagreement in regard to the water sources extracted by the pumped wells, the adequacy of the water level monitoring network, and the magnitude and extent of expected pumping impacts manifested in the aquifer system. Although staff disagreed with the applicant on how the data should be used to estimate local and regional aquifer response to pumping, staff acknowledges the results provide additions to a limited dataset. The applicant also recently completed another aquifer test in October 2012 while staff was completing this analysis for the FSA. Staff completed a preliminary review of the results and found that the values were within the range of values from the February 2012 aquifer test. The applicant's transmissivity and storativity estimates from the February 2012 aquifer test are included below in **WATER SUPPLY Table 4**.

In **WATER SUPPLY Table 4**, staff also identified the minimum and maximum transmissivity and storativity estimates. The range in these values suggests there is significant variability in aquifer characteristics at and near the site. This variability translates into uncertainty in estimated impacts from the project. In order to capture the possible range in pumping impacts, staff employed the range of values to represent best- and worst-case estimates of the potential impact (minimum and maximum estimated drawdown, respectively).

**WATER SUPPLY Table 4
Estimates of Aquifer Properties**

Storage	Transmissivity (gpd/ft)	Source, Method
NA	4,675	AFC (Broadbent and Associates, Inc. 2003)
0.064	7,225	AFC (Geotechnical Consultants, Inc. 1966)
0.0014	1,634	Applicant, estimate from Feb 2012 pump test, MW-1, Hantush
0.0067	6,914	Applicant, estimate from Feb 2012 pump test, MW-5, Hantush
0.0028	1,175	Applicant, estimate from Feb 2012 pump test, MW-3, Hantush
0.0028	6,914	Applicant, estimate from Feb 2012 pump test, MW-2, Hantush
0.0031	660	Applicant, estimate from Feb 2012 pump test, MW-4, Hantush
0.013	4,171	Average
0.064	7,225	Max
0.0014	660	Min

Groundwater-Dependent Vegetation and Stump Springs

Staff considered whether the proposed pumping could impact groundwater dependent mesquite vegetation located about 1.5 miles from the project supply wells and at Stump Spring ACEC (**WATER SUPPLY Figure 10**). The presence of mesquite vegetation generally indicates a relatively shallow water table, and therefore may be impacted by project groundwater consumption and water level declines. In the Biological Resources section of this FSA, staff discusses the unique value of this vegetation and why it should be protected from the potential effects of project pumping.

Stump Springs is located about 4.5 miles from the project. It supports an extensive area of mesquite vegetation. Stump Springs is an intermittent spring and lacks a reliable flow record, but it was reportedly flowing in 1845 (BLM, 2006) and also by the USGS in 1919 (Grover, 1919). As discussed in the **Biological Resources** section, BLM reports that Stump Spring is currently discharging and supports three shallow, seasonal pools that range between 30 and 70 feet long, and one to two feet deep. BLM has constructed a monitoring well in the ACEC known as the Stump Springs monitoring well. The well is located about one-half mile east of the actual spring location and currently has a water level of 28 feet below ground surface (bgs).

The mechanism controlling Stump Spring discharge is not well understood. Stump Spring is located along an inferred fault structure, assumed to be part of the Pahrump-Stewart Valley Fault Zone, or Stateline Fault System (Guest et al., 2007). The opportunity may exist for confined water to rise to the surface along these fault

structures, thereby creating a spring. This faulting has also resulted in terracing along the eastern alluvial slope of Pahrump Valley, and these terraces provide the opportunity for the water table to intersect the land surface and discharge groundwater thereby creating a spring. Additionally, the 50 foot thick clay layer mapped by Grover (1919) may confine groundwater and create artesian conditions that produce spring flow, or the clay layer could impede the downward migration of any recharge and create a perched water table that also contributes to spring flow. **WATER SUPPLY Figure 17** illustrates the areal extent of the clay layer exposed in the vicinity of Stump Springs (Grover, 1919).

These local hydrogeologic conditions could influence the hydraulic connection between Stump Springs and the proposed project water supply wells, but data is lacking and the degree of connectivity is poorly understood. As shown in **WATER SUPPLY Figure 7**, water levels around Manse and Bennetts springs have shown significant decline with historic groundwater pumping. This suggests there is a strong correlation between groundwater pumping and spring discharge at this location. Pumping conditions in the vicinity of the HHSEGS site may be different however, due to the potential presence of a fault barrier. The presence of one or more inferred faults between the project wells and Stump Springs could limit the hydraulic connection between project pumping wells and Stump Springs. BLM, other agencies, and the public have repeatedly commented throughout the project licensing review process that Stump Spring is a unique cultural and biological resource that must be protected. Staff therefore was conservative and utilized the range in aquifer parameters discussed above and assumed groundwater is hydraulically connected across the fault to consider the worst case scenario when estimating potential impacts to these sensitive biological receptors.

Drawdown Impacts to Receptors

The staff assessment employed well hydraulic equations and the principle of superposition to isolate estimated impacts due to project pumping. The principle of superposition states that linear systems can be added together to determine the conditions of the composite system (Reilly et al., 1987). The approach is particularly useful when determining pumping effects in an aquifer system with complex or unknown stresses because it isolates the pumping effect studied from other stresses to the groundwater system. In this application, the drawdown calculated by the well hydraulic equations is considered the impact due solely to the pumping well. Accordingly, this isolated drawdown distribution can be added to the existing pre-pumped water level surface to estimate the actual change in water level surface due to the new pumping.

Staff utilized the Theis equation (Theis, 1935) and the range in aquifer parameters reported in **WATER SUPPLY Table 4** to estimate a range in drawdown from pumping. The Theis equation assumes that the pumped aquifer is confined; there is no recharge; the water pumped comes from a single, infinite, and horizontal aquifer of uniform thickness; the aquifer is homogeneous and isotropic; all flow to the well is radial and horizontal; Darcy's law is valid; the pumping well and observation wells fully penetrate the aquifer; the pumping well effectively has an infinitesimal diameter; and, the well is 100 percent efficient (Fetter, 1994). The drawdown calculated with the Theis equation would be greater than observed if actual aquifer conditions are not confined, or if

recharge to the pumped aquifer occurs. Hence, the Theis equation produces conservative results when, for example, it is applied to partially or semi-confined aquifer conditions.

The following equations (Equation 1 and Equation 2) were used to apply the Theis solution and predict drawdown (s) at given distances.

$$u = (r^2S)/4Tt \quad (\text{Equation 1})$$

$$dh = (Q/4\pi T) W(u) \quad (\text{Equation 2})$$

Where,

r = radial distance from the pumping well (L)

S = aquifer storativity (dimensionless)

T = aquifer transmissivity (L²/T)

t = time (T)

h = hydraulic head (L)

Q = pump rate (L³/T)

W(u) = well function of u

In contrast to the approach employed by staff, the applicant's groundwater analysis considered three different equations to estimate aquifer parameters from the pumping test data and assess potential impacts from project pumping: Hantush, Hantush-Jacob, and Neuman-Witherspoon equations (CH2 2012l, CH2 2012dd). The three equations are all similar in that they represent leaky-aquifer conditions, which occur when water pumped from a well is supplied from water in storage and recharge from an adjoining aquifer and aquitard located either above or below the pumped aquifer. Many of the aquifer assumptions inherent to the Theis equation are similar to those for these leaky aquifer equations, except that the leaky aquifer equations allow for water to come from sources other than the main aquifer.

Staff agrees with the applicant that the water level response in some of the wells could possibly indicate local leaky aquifer conditions. However, the analysis of a leaky aquifer test requires drawdown data for the pumped aquifer, the adjoining aquifer that supplies the recharge (the leakage), and the leaky-bed (the aquitard) that separates the two aquifers (Kruseman et al., 1994). The well log data and water level changes monitored during the applicant's test are insufficient to identify the pumped aquifer, leaky aquifer, and intervening aquitard. For example, the monitoring wells are shallow relative to the substantially deeper depths from which the groundwater was pumped during the February 2012 aquifer test. Furthermore, the hydrogeologic information available is insufficient to confidently identify the adjoining aquifer that supplied the recharge during the test, what the water level changes were in the leaky aquifer as a result of the deeper pumping (if different from the water-bearing materials monitored by the shallower monitoring wells), the thickness and extent of the intervening aquitard, and the depth and thickness of the pumped aquifer. Staff therefore was conservative in its approach and employed the Theis equation for a confined aquifer for the impact analysis.

Stump Springs

Stump Springs is a BLM identified Area of Critical Environmental Concern (ACEC) and is surrounded by mesquite that may be dependent on groundwater for survival. The ACEC area supports a range of plant and animal species and is also a valuable cultural resource. See the **BIOLOGICAL** and **CULTURAL RESOURCES** sections of this FSA for more information about the Stump Springs area.

Staff employed the Theis equation to estimate the range of drawdown impacts. To represent the uncertainty in reported aquifer transmissivity and storativity, staff utilized the range of transmissivity and storativity values reported by the applicant in the AFC and the results of their aquifer tests (**WATER SUPPLY Table 4**). To account for uncertainty in aquifer conditions, the transmissivity and storativity values were chosen to show the range in potential drawdown impacts. This analysis assumes that the project pumps 4,900 AFY over a 33 year period consistent with the applicant's description.

WATER SUPPLY Figure 18 summarizes staff's estimate of the potential drawdown at the distance of the Stump Springs monitoring well and the latent effects on water levels after pumping ends. The range of drawdown estimated at the distance of the Stump Springs monitoring well is 0 (minimum transmissivity and maximum storativity) to 19 feet (minimum transmissivity and storativity); all other aquifer parameter combinations fall between these two limits. These results are considered maximum potential impacts because they ignore the Pahrump-Stewart Valley Fault Zone, which likely limits the hydraulic connection between project pumping and groundwater northeast of the fault zone associated with Stump Springs.

The applicant's AFC also employed the Theis equation to calculate the spatial distribution of drawdown impact from 25 years of pumping from two wells at a combined rate of 87 gpm. They utilized transmissivity values that ranged from 3,612 to 14,450 gpd/ft and a storativity value of 0.01, which are near the average values of the dataset reported in **Water Supply Table 4** (HHS 2011a); staff's analysis employed the range of this same data set. The applicant has since changed their approach that includes the contribution of leakage and calculates a substantially smaller drawdown impact. However, there is no data regarding pumping impacts on the leaky aquifer which could be either above or below the pumping well. Consequently there is no reliable estimate of the pumping impact on the leaky aquifer.

Staff describes the maximum areal extent of the estimated pumping drawdown, ignoring the fault zone and assuming no hydraulic barrier exists between project wells and Stump Springs. In **WATER SUPPLY Figure 19**, staff shows the relatively worst-case scenario for drawdown at Stump Springs using transmissivity equal to 660 gpd/ft and storativity equal to 0.0014. **WATER SUPPLY Figure 20** shows a relatively best-case scenario for Stump Springs using transmissivity equal to 660 gpd/ft and storativity equal to 0.064. If the intervening Pahrump-Stewart Valley Fault zone acts as a low permeability barrier then drawdown from project pumping would be limited on the opposite side of the fault zone where the mesquite and Stump Spring are located. The **Biological Resources** section of this FSA concludes that any measurable drawdown at Stump Springs or Mesquite Vegetation stands would be a significant impact. Accordingly, staff noted the wide range in estimated drawdown calculated by the variability in aquifer

parameter values. Given the significant variability and limited data available to characterize aquifer parameters, staff believes it is necessary to consider the uncertainty in aquifer conditions and evaluate the range in potential impacts that may occur at Stump Springs.

Stump Springs and the region sub-parallel to and adjacent to the Pahrump-Stewart Valley Fault Zone support approximately 1,915 acres of mesquite and associated habitat. Any incremental decline in water levels in this region could result in adverse impacts to groundwater dependent vegetation. Staff therefore proposes Condition of Certification **WATER SUPPLY-4**, which would require the applicant to monitor groundwater levels on and near the site and evaluate whether project pumping would result in measurable drawdown beneath offsite biological receptor areas. Using generally accepted methods, the monitoring data would be used to project potential drawdown beneath the biological receptor area locations. **WATER SUPPLY- 4** specifies a projected decline of 0.5 foot at the project boundary as a trigger for a potential impact. This trigger was chosen based on the close proximity of mesquite on the eastern project boundary and the ability to detect a statistically significant change in water levels that can be attributed to project pumping. Using 0.5 foot as a trigger staff anticipates this would correspond to some small decline in water level at the mesquite locations. This condition would support Condition of Certification **BIO-23** which would require the applicant to stop, modify, or reduce groundwater pumping until the applicant can show 1) the pumping can be reduced or modified to maintain groundwater levels above the 0.5 ft. drawdown threshold at the project boundary; 2) the drawdown trigger was exceeded due to factors other than the project pumping and the project did not contribute to the drawdown; or 3) through vegetation monitoring and soil coring described in this condition and predictive hydrologic trend analysis described in **WATER SUPPLY-4**, that a greater groundwater drawdown will not result in significant adverse impacts to the groundwater dependent vegetation.

Amargosa River

The Amargosa River is 185 miles long and begins in Nye County, Nevada and flows south through Tecopa, California before bending northwards and eventually terminating in Death Valley (**WATER SUPPLY Figure 1**). The Amargosa River is a federally designated Wild and Scenic river and is also designated as an Area of Critical Environmental Concern (ACEC). A portion of the river west of the site is shown on **WATER SUPPLY Figure 2**. The river is thought to get most of its water from base flow (groundwater rising to the surface) rather than from surface drainage (Stonestrom et al., 2007). Recent models of the Death Valley regional flow system suggest that the Amargosa River may receive its water from the regional groundwater (carbonate aquifer) system which spans multiple water sheds (Belcher et al., 2004). The degree of connectivity between the regional or carbonate aquifer system and intervening valley basin fill aquifers such as the PVGB is poorly understood.

The proposed project consumes groundwater and therefore reduces groundwater flow that would otherwise move down-gradient of the site. There is no available data that identifies groundwater flow paths or confirms a hydraulic connection between PVGB and the Amargosa River, so the water consumed by project pumping may or may not be a source of inflow to the Amargosa River. The inferred potentiometric surface (**WATER SUPPLY Figure 4**) indicates PVGB groundwater in the alluvial aquifer moves in a

southwesterly flow direction, but data is not sufficient to confirm that these flows discharge to the Amargosa River. It is more likely that the contributing flow, if any from this portion of the basin, occurs in the deeper regional aquifer system which is recharged up-gradient from the site. A letter submitted to the Energy Commission from the Amargosa Conservancy described a geochemical data analysis that concluded groundwater flow from the PVGB and through the Chicago Valley into the Amargosa River is limited (ARM 2011a).

Given the lack of evidence for a hydraulic connection, the relatively large intervening distance (about 20 miles), and uncertainty in potential flow barriers and permeability contrasts within the subsurface it would be speculative to conclude that project pumping would adversely affect the Amargosa River. However, the principle of conservation of mass dictates that any groundwater consumed by the project is water that would otherwise accrue to down-gradient basins, which could possibly include discharge to the Amargosa River. Staff is not able to determine if there is a measurable change at the river because there is inadequate information available to quantify the hydraulic connection between the basin and river.

Staff understands that the BLM, as well as other agencies and interested parties considers any drawdown at the river a significant impact because of the river's Wild and Scenic designation. However, the potential for an impact relies on the river being hydraulically connected to the project pumping well and that aquifer water-transmitting and storage properties are constant and continuous down gradient of the project site. It ignores the potentially complex interaction between groundwater in the alluvium, groundwater in the deeper regional aquifer, and their combined influence on discharge to the river. Furthermore, project induced drawdown at the river is unlikely given the known heterogeneity in hydrogeologic conditions and potentially complex flow patterns between alluvial aquifers, the deeper carbonate aquifer, and the river and other discharge locations. Staff therefore concludes that a significant impact at the Amargosa River due to project pumping is unlikely. However, **WATER SUPPLY-1** which requires an offset of project water use in the PVGB would ensure there is likely no net overall change in subsurface outflow from the PVGB that might affect the Amargosa River.

Drawdown Impacts at Existing Wells (Well Interference)

All operating wells within a groundwater basin contribute to a lowering of water levels at other well locations. The overlap of drawdown among two or more wells is the "well interference," and is significant if it results in a loss of yield or exposes the well screen. The magnitude of drawdown impact is controlled by five factors: (1) the rate of pumping; (2) the duration of pumping; (3) the depth of the well screens (water-intake depth of well); (4) aquifer parameters (hydraulic conductivity and storativity, which are determined by the aquifer materials); and, (5) aquifer boundary conditions. A loss of yield is appreciable if the interference renders an existing nearby well incapable of meeting 1) maximum daily demand, 2) dry-season demand, or 3) annual demand.

Based on the estimates of the impact at Stump Springs, the neighboring well owners could experience water level declines between 1 and 50 feet after 33 years of project pumping (See **WATER SUPPLY Figure 19 and 20**).

Staff considered two additional impact scenarios that tested potential effects of the Pahrump-Stewart Valley Fault Zone acting as a barrier to groundwater flow. Because the proposed project is located near the fault zone, staff approximated its effect on drawdown beneath areas to the southwest by doubling the simulated pumping rate. This approach mimics the effect of all proposed project groundwater use extracted from approximately one-half of the aquifer located southwest of the fault. Staff considered the scenarios shown in **WATER SUPPLY Figure 19** and **WATER SUPPLY Figure 20** assuming the fault is an impermeable barrier (the maximum and minimum drawdowns, respectively). The estimated drawdown in the Charleston View Community for these conditions ranged from 77 to 13 feet, respectively.

Increased Cost of Pumping

If the total hydraulic head in neighboring domestic wells is lowered, then well yield would be reduced and an increase in pumping cost is expected. Pumping costs can be estimated with the following equation (3).

$$C = 0.746Qhc / 3960e_p e_m \quad (\text{Equation 3})$$

Where

C = total cost per hour

Q = pump rate (gpm)

h = total head (ft)

c = cost per kWh

e_p = pump efficiency

e_m = motor efficiency

Staff estimated potential increases in pump cost incurred by an owner experiencing a 10-foot decline in water levels using a pump (e_p) and motor (e_m) efficiency of 80-percent (0.80) and a cost for energy equal to \$0.16 per kWh. Using these values, pumping costs could increase by about 15 percent. Staff believes that the decrease in well yield that would result in a 15 percent increase in pumping costs is a significant impact. Staff proposes Condition of Certification **WATER SUPPLY-4** which would require the monitoring of local domestic wells to determine if project-induced water level decline is observed at the southern end of the project boundary. Staff also proposes Condition of Certification **WATER SUPPLY-5** which provides a method for calculating the reimbursement necessary to offset costs from decreased well yield. This condition utilizes an equation similar to Equation 3 above, but applied to a particular well under its own set of unique circumstances.

Physical Damage

Exposure of neighboring well screens represents the potential for physical damage to a well. A reasonable threshold of significance is if the project causes the static water level (the water level when the pump is off) at wells to fall below the top of their well screens. The shallowest well screen in the basin is not used to define the threshold because it constrains groundwater use by all other existing users. In contrast, the deepest well is also not used because many existing users can be significantly impacted before reaching the top of the deepest well screen. Additionally, in practice some wells may

have static water levels that are already below the top of the screen and a relatively small amount of additional drawdown would be of little consequence because the risk of screen collapse due to corrosion is already present. At other wells, pumping water levels (the water level when the pump is on) can be below the top of the screen. Corrosion is not usually a high risk in these situations, and a small increment of additional drawdown would presumably not substantially increase the likelihood for damage to occur. Accordingly, staff utilized the average top-of-screen depth as the threshold indicating potential physical damage to existing wells.

Staff analyzed the potential drawdown effects from project pumping on existing nearby wells. The California Department of Water Resources (DWR) maintains the record of well completion reports for the California portion of the basin only. A search of the records returned 12 wells within a 7-mile radius of the project site (**WATER SUPPLY Table 5**).

**WATER SUPPLY Table 5
Wells of Record Southern Pahrump, California**

Well Number	Depth to Bottom of well (ft)	Depth of Screened Interval (ft)
1	280	60-280
2	1,106	NA
3	220	160-220
4	200	160-200
5	1,351	NA
6	300	110-300
7	600	180-400, 420-600
8	310	90-110, 150-190, 230-250, 270-310
9	175	140-175
10	212	112-212
11	260	220-260
12	220	160-220

The median depth of the wells is 280 feet, and the median depth to the top of the screen is 150 feet below land surface. Current groundwater levels at the project site are about 130 feet below ground surface. Water level measurements at these wells are in close proximity to the Charleston View community. If water levels are roughly the same as at the site then predicted maximum drawdown of 50 to 77 feet could result in exposure of screens or other physical damage.

Staff proposes Condition of Certification **WATER SUPPLY-4** to monitor and mitigate potential physical damage to neighboring domestic wells beyond baseline conditions.

Subsidence

Ground subsidence can occur as a result of water level decline in aquifer systems. When the fluid pressure in an aquifer is reduced as a result of changes in the

groundwater level, a shift in the balance of support for the overlying materials causes the “skeleton” of the aquifer system to deform. Reversible deformation occurs in all aquifer systems as a result of the cyclical rise and fall of groundwater levels associated with short and longer term climatic cycles. Permanent ground subsidence can occur when pore water pressures in the aquifer fall below their lowest historical point, and the particles in the aquifer skeleton are permanently rearranged and compressed. Soils particularly susceptible to such consolidation and subsidence include compressible clays in a confined aquifer system. This type of deformation is most prevalent when confined alluvial aquifer systems are overdrafted. Subsidence due to overdraft like that occurring in the PVGB can occur and significantly impact the aquifer storage capacity. Differential settlement caused by subsidence can also change drainage patterns and cause ponding and flooding or change runoff directions. It can also damage structures and linear features such as roads and utilities.

The applicant stated in Data Response Set 1A, number 45, that subsidence is not an issue because the maximum projected drawdown at identified structures is about 9 feet. However, staff’s analysis showed that potential drawdown at local structures could be greater than 50 feet. Furthermore, dePolo et al (1999) have mapped fissures in the Pahrump Valley and concluded they are likely related to subsidence from groundwater withdrawals. Applicant aquifer test results confirm semi-confined to confined aquifer conditions and substantial thicknesses of clay beds occur beneath the site, which are both conducive to subsidence.

Given past and current groundwater pumping in the basin, subsidence could be occurring and project pumping could exacerbate subsidence rates and magnitude. It is unclear however, if subsidence is occurring on or near the site and whether any resources or structures could be affected by subsidence. Due to the uncertainty related to conditions at the project site, staff recommends that survey monuments be installed and monitoring stations established for assessment of long term changes that may occur as a result of subsidence due to groundwater pumping in the area. Staff also recommends the applicant be required to develop an action plan for mitigation of impacts based on analysis of monitoring station data. Staff recommends the project owner be required to implement **WATER SUPPLY-6** to monitor and mitigate any potential impacts associated with ground subsidence due to project groundwater pumping.

Water Quality

Water quality can be impacted by sustained pumping of the groundwater basin and migration of low quality or contaminated water towards pumping well screens. The Lahontan Regional Water Quality Control Board also protects local groundwater through the Water Quality Control Plan for the Lahontan Region, also known as the Basin Plan. The Plan establishes water quality objectives that apply to groundwater in the PVGB. Specific objectives include: coliform bacteria, chemical constituents, radioactivity, and taste and odor. Total dissolved solids concentrations (TDS) is an example of a water quality objective in the category “chemical constituent.” It is an indicator of the quality of groundwater and is a measure of acceptance for groundwater use as a drinking water source. In California, the recommended Secondary MCL or ‘Consumer Acceptance Contaminant Level’ for TDS is 500 mg/l, and upper and short term ranges can be 1,000

and 1,500 mg/l, respectively. Water with TDS concentrations greater than 3,000 mg/l is generally considered undrinkable. These water quality objectives are identified to protect the following beneficial uses identified for groundwater in the PVGB: Municipal and Domestic Supply, Agricultural Supply, and Fresh Water Replenishment. Staff reviewed available water quality data to evaluate whether the project's proposed pumping could result in water quality degradation. During the applicant's initial site investigation a water quality sample was taken from the Orchard Well which is located on the proposed site (**WATER SUPPLY Figure 4**). The constituents detected in the water sample are reported in **WATER SUPPLY Table 6** below.

WATER SUPPLY Table 6
Water Quality Constituents, Orchard Well

	Constituent	Units	Concentration
1	Alkalinity, Bicarbonate (CaCO ₃)	mg/L	134
2	Alkalinity, Carbonate (CaCO ₃)	mg/L	<20
3	Alkalinity (Total)	mg/L	134
4	Aluminum	mg/L	<0.100
5	Arsenic (Total)	ug/L	<0.030
6	Barium (Total)	ug/L	0.028
7	Beryllium	mg/L	<0.003
8	Bicarbonate	mg/L	134
9	Cadmium	mg/L	<0.003
10	Calcium	mg/L	53
11	Chloride	mg/L	7.4
12	Chromium (Total)	ug/L	<0.005
13	Conductivity	uS/cm	557
14	Copper	mg/L	<0.005
15	Flouride (Total)	mg/L	0.54
16	Hardness (CaCO ₃)	mg/L	246
17	Iron (Total)	ug/L	<0.10
18	Lead	mg/L	<0.015
19	Magnesium	mg/L	27
20	Manganese	mg/L	<0.005
21	Nitrate/Nitrite	mg/L	7.3
22	pH	log(L/mol)	8.0
23	Silica	mg/L	10
24	Silver	mg/L	<0.010
25	Sodium	mg/L	21
26	Sulfate	mg/L	110
27	Total Dissolved Solids (TDS)	mg/L	361
28	Total Organic Carbon (TOC)	mg/L	<1.0
29	Total Suspended Solids (TSS)	mg/L	<1.0
30	Zinc	mg/L	0.069

Staff notes that the site is partially underlain by playa deposits which can be associated with saline shallow groundwater. In some desert groundwater basins of the southwest an increase in salinity concentrations has been observed with an increase in basin fill

sediment depth. Because the proposed project could draw water from a large radial extent, and there is substantial uncertainty in the water quality distribution and drawdown effects on the quality of water produced by existing wells, staff proposes Condition of Certification **WATER SUPPLY-4** to ensure no impacts to the basin water quality objectives and existing wells. This condition requires that the project semi-annually monitor water quality in on-site extraction wells and project related monitoring wells. The monitoring results would be reported to staff and Inyo County.

Drinking Water

The proposed project would be supplied with potable water during operations from a newly constructed onsite groundwater well. Well water would need to be treated to meet the California Safe Drinking Water Act requirements, including those contained in Title 17 and Title 22 of the California Code of Regulations (CCR).

The HHSEGS is expected to employ 120 full-time employees and 50 to 60 shift workers during operations and many more during construction. Therefore the HHSEGS project would qualify as a Public Supply System by serving more than 25 people for more than 60 days. The facility would also qualify as a non-transient non-community water system, serving at least 25 persons for over 6 months per year.

Senate Bill 1307 passed in 1997 and enabled California to implement the provisions of the federal Safe Drinking Water Act. The California Department of Public Health administers the state's authority. The California Department of Public Health (CDPH) has authority to delegate regulatory authority over public water supplies serving 200 or fewer connections to a local health officer authorized by the board of supervisors. The CDPH delegated authority to the Inyo County Environmental Health Department to serve as the Local Primacy Agency (LPA), therefore the applicant would be required to meet the requirements of the Inyo County Environmental Health Department.

Staff recommends Condition of Certification **WATER SUPPLY-7**, which would require the applicant to obtain a permit to operate a non-transient, non-community water system with the Inyo County Environmental Health Department at least sixty (60) days prior to commencement of construction at the site. This condition would ensure that the applicant meets all provisions of Title 22, Section 3 to provide a suitable domestic water supply.

Staff also recommends Condition of Certification **WATER SUPPLY-3**, which would ensure that water supply wells are constructed or modified in accordance with Inyo County standards and registered with the California Department of Water Resources (DWR). The applicant would submit a well construction packet to the Inyo County Environmental Health Department for review and comment and to staff for review and approval. A Well Completion Report would also be submitted to DWR prior to approval.

Existing Wells

There are a number of wells that are currently present on the project site. These wells have been used for past activities at the site including domestic and agricultural use. Some of these wells were used for monitoring and measurement of aquifer parameters during the February and October 2012 aquifer performance tests. One of the wells

identified as the Orchard Well has an unidentified obstruction at the bottom and another known as Well No.3 currently has a submersible pump stuck at the bottom. During various site explorations other abandoned wells were also identified. The condition of some of these wells is not well known and it is unclear whether they may have been a conduit for contamination. Staff is concerned that these abandoned wells could become or are conduits for contamination of groundwater.

The California Well Standards provide minimum standards that well owners must follow to ensure protection of groundwater quality. The standards state that a well is considered "abandoned" when it has not been used for a period of one year unless the owner demonstrates his intention to use the well again for supplying water. The standards require that all "abandoned" wells and exploration or test holes be destroyed. The objective of destruction is to restore as nearly as possible those subsurface conditions which existed before the well was constructed taking into account also changes, if any, which have occurred since the time of construction. To ensure compliance with the California Well Standards staff recommends the applicant be required to comply with the California Wells Standards as specified in **WATER SUPPLY-3**. Compliance with these requirements would ensure that wells that would not be used for project purposes would be abandoned appropriately. It also provides a means for qualifying wells and maintaining them in a safe condition in the event they may be needed for future purposes. Staff acknowledges it may be beneficial to use some existing wells for monitoring purposes. In these cases the well condition would have to be evaluated and rehabilitated if necessary to ensure protection of water quality.

CUMULATIVE IMPACTS AND MITIGATION

Staff analyzed whether the project pumping along with all other reasonably foreseeable pumping in the Southern PVGB could have a significant impact. Staff found five projects that could require a substantial volume of water for annual operation. **WATER SUPPLY Figure 21** lists the reasonable foreseeable projects that may be developed in the southern PVGB.

WATER SUPPLY Figure 22 shows pumping impacts of two potentially contemporaneous groundwater users in the vicinity of the proposed HHSEGS project – the Hidden Hills Ranch and Sandy Valley projects. Staff's cumulative analysis assumed that the HHSEGS project pumps 288 AFY for 2 years and 5 months of construction, followed by 30 years of operational pumping of 140 AFY. In addition, it assumed that the Hidden Hills Ranch pumps 211 AFY and that the Sandy Valley project pumps 170 AFY for 33 years. **WATER SUPPLY Figure 22** shows the maximum drawdown (transmissivity of 660 gpd/ft and a storativity of 0.0014) for the combined pumping from these projects.

WATER SUPPLY Figure 22 also shows that the potential cumulative water level decline at both Stump Spring and the private wells located in the Charleston View community could be greater than 60 feet. These results could be conservative with respect to the mesquite and Stump Spring. The results ignore the reportedly low permeability fault zone which could act as a partial barrier between the HHSEGS wells southwest of the fault and the Hidden Hills Ranch and Sandy Valley project wells

northeast of the fault. The fault zone would substantially limit the spread of drawdown from the Hidden Hills Ranch and Sandy Valley project wells to the area southwest of the fault which would limit the cumulative effects on the Charleston View community. Similarly, the spread of drawdown from the HHSEGS wells would be limited northeast of the fault. Staff proposes Conditions of Certification **WATER SUPPLY-4**, and **-5** to mitigate potential impacts from the HHSEGS project to neighboring wells and ensure that groundwater dependent species and habitats are adequately protected from the project's contribution to cumulative impacts.

A drawdown impact from cumulative pumping on the Amargosa River is speculative. Staff is not able to determine if there is a measurable change at the river because there is inadequate information available to quantify the hydraulic connection between the basin and river. Given the lack of evidence for a hydraulic connection, the relatively large intervening distance (about 20 miles), uncertainty in potential flow barriers, permeability contrasts within the subsurface, and the presence of the fault zone which would isolate pumping effects from the Sandy Valley site, staff concludes that a significant cumulative impact at the Amargosa River due to project pumping is unlikely. However, **WATER SUPPLY-1** which requires an offset of project water use in the PVGB would ensure there is likely no net cumulative overall change in subsurface outflow from the PVGB that might affect the Amargosa River.

COMPLIANCE WITH LORS

The proposed HHSEGS project would comply with all LORS identified by staff if the proposed conditions of certification are implemented. Staff weighs a number of considerations while assessing how well a project's water use complies with LORS and California state policies regarding water use at industrial facilities. A summary of those considered by staff are include below.

SWRCB RESOLUTION 75-58, ENERGY COMMISSION'S 2003 INTEGRATED ENERGY POLICY REPORT, AND THE WARREN-ALQUIST ACT

The California Energy Commission, under legislative mandate specified in the 2003 *Integrated Energy Policy Report (IEPR)*, would approve the use of fresh water for cooling purposes by power plants it licenses only where alternative water supply sources and alternative cooling technologies are shown to be environmentally undesirable or economically unsound. SWRCB Resolution 75-78 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. . The Warren-Alquist Act promotes all feasible means of water conservation. Each of the proposed power plants include a steam turbine using an air-cooled condenser, which achieves maximum water conservation associated with cooling. Therefore, the proposed project complies with the requirements of SWRCB Resolution 75-78, the Energy Commission's 2003 Integrated Energy Policy Report (IEPR), and the Warren-Alquist Act.

PSA COMMENTS

Comment #	DATE	COMMENT TOPIC	RESPONSE
1	July 17, 2012	Inyo County	
1.4		Water Supply conditions of certification should include the same level of monitoring as outlined in the Air Quality, Biological Resources and Cultural Resources portions of the PSA.	Water supply conditions have been included that require an appropriate level of monitoring that would indicate drawdown impacts and require mitigation.
1.5		The proposed project with trigger reporting requirements mandated by SBX&-6.	Staff is aware of this reporting requirement and has written conditions that allow the county to remain in compliance.
1.67		Revise the first paragraph of WATER SUPPLY-6 to read: The project owner shall submit a Groundwater Level Monitoring, Mitigation, and Reporting Plan to the CPM and to the Inyo County Water Department review and approval.	Change accepted and incorporated in document. Specifically to the County for review and to the CPM for approval.
1.68		Revise WATER SUPPLY-6, A.1, add the following: shall identify the owner of each well, and shall include the location, depth, screened interval, pump depth, static water level, pumping water level, and capacity of each well, The plan should include, as feasible, agreements from the owner of each well approving monitoring activities.	Change accepted and incorporated in document.

<p>1.69</p>	<p>1. add: and to the Inyo County Water Department</p> <p>2. add: The plan shall include a model for predicting changes in the groundwater flow system resulting from the Project which has the capability to assess changes in hydraulic head, flow rate, flow direction, and water budget and shall include model runs which predict effects of the planned groundwater pumping by the Project on GDEs and predictions of the level of groundwater pumping that will cause significant impacts on such habitats and resources. The Project Owner shall also use the model to provide an evaluation of the sustainability of the water supply for the life of the project, including the cumulative sustainability when considered with other pumping occurring or projected to occur in the groundwater basin.</p> <p>3. delete: This condition proposes a threshold for significant impacts to groundwater-dependent vegetation caused by water level decline due to Project groundwater pumping. This condition also proposes mitigation that would, if initiated, reduce the impact to a level that is less than significant.</p> <p>4. add: The plan shall also include:</p> <ul style="list-style-type: none"> i. Provisions for initiation of water level monitoring as soon as wells are available and results will be publicly available: ii. A plan for logging and aquifer testing of all new production wells; iii. A plan for verifying the predictive tools described above and for revising or recalibrating the tools as necessary. iv. A plan for revising thresholds as dictated by new data concerning system response to Project operation, v. In cooperation with U.S. BLM and if permission is granted by BLM. the applicant shall fund and construct a monitoring well approximately 0.5 mile west of the Stump Spring ACEC for inclusion in the monitoring well network. vi. An enforceable commitment based on monitoring data and significance thresholds, to implement mitigation measures as necessary. 	<ul style="list-style-type: none"> 1. add: Change accepted and incorporated in document. 2. add: Additional modeling is not necessary to make this condition enforceable. 3. delete: Staff retains this part of the condition, which is necessary to mitigate any drawdown impacts to vegetation. 4. add: <ul style="list-style-type: none"> i. Commission staff will make this data available to the public. ii. Staff has required well logging in accordance with DWR requirements and developed a monitoring and mitigation framework that will allow for aquifer analysis during construction and operation pumping. iii. A procedure for recalibration of the drawdown threshold is now written into this condition. iv. same as iii. v. Staff believes the monitoring well arrays proposed in WATER SUPPLY-4 will be sufficient for evaluating potential impacts in mesquite areas that are closer than Stump Spring and would therefore be an earlier indicator of a potential impact. In addition to this array staff has also proposed a new monitoring well just west of Stump Spring that can be used to evaluate whether there is a barrier such as fault which is affecting drawdown from project pumping. vi. The condition would be enforceable as it is written.
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1.70		Revise WATER SUPPLY-6,C.4 and WATER SUPPLY 8,C.5, add: Groundwater elevations shall be measured throughout the life of the project at least twice per year, and reported to the CPM and to the Inyo County Water Department. The County will report these data to the California Department of Water Resources as part of the California Groundwater Elevation Monitoring Program.	Change accepted and incorporated in document.
1.71		Revise the Verification section of WATER SUPPLY-8 in each instance where a report or information is to be submitted to the CPM to read: ". to the CPM and to the Inyo County Water Department.	Change accepted and incorporated in document.
1.83		Preliminary assessment of the project indicates that the project could exacerbate overdraft conditions, contribute to water level decline for groundwater dependent vegetation, and substantially lower water levels in neighboring domestic wells. Compliance could be met based on the addition of the County's Conditions of Certification.	Comment noted. Many proposed conditions have been accepted, as indicated in the above responses.
1.84		Pump tests performed for the project were subject to irregularities in execution, and were discontinued prematurely, and the results were inconclusive. Despite these issues, preliminary assessment of the project indicates that the project could exacerbate overdraft conditions, contribute to water level decline for groundwater dependent vegetation, and substantially lower water levels in neighboring domestic wells. Compliance could be met based on the addition of the County's Conditions of Certification.	Comment noted. See responses above.

<p>1.11</p>		<p>To fulfill the requirements of the legislation, DWR initiated the California Statewide Groundwater Elevation Monitoring Program (CASGEM). Participation in CASGEM by local entities is voluntary; however, if no eligible local party volunteers to become the designated monitoring entity, DWR may undertake the groundwater elevation monitoring. If DWR assumes responsibility for the groundwater monitoring, nonparticipating eligible monitoring entities may lose eligibility for water grants and loans awarded or administered by the state. Naturally, Inyo County is concerned about the potential for losing eligibility for these grant funds, and wishes to comply with the requirements of CASGEM. No funding was provided in the legislation for local entities to implement this new state program.</p>	<p>The revised conditions would ensure that the project owner shares their groundwater elevation data with the county.</p>
<p>1.12</p>		<p>Approval of HHSEGS will invalidate any argument by Inyo County that the California portion of Pahrump Valley, California Valley, and Middle Amargosa Valley are unaffected by land use activities; therefore, the County will be required to either develop a program for reporting groundwater elevations to DWR, or be ineligible for state water grants and loans. In order to comply with CASGEM requirements, the County could use the groundwater elevation monitoring data proposed in condition of certification Water Supply - 6 and Water Supply - 8 if those data are made available to the County.</p>	<p>The revised conditions would ensure that the project owner shares their groundwater elevation data with the county.</p>

Comment #	DATE	COMMENT TOPIC	RESPONSE
2	July 16, 2012	Bureau of Land Management	
2.5		<p>The applicant has performed an on-site well pump test, which lasted 4.5 days. We fully support the PSA's pump test review (Appendix A), which questions the assumptions, procedures, and conclusions of the applicant's pump test report. We recommend that another pump test be performed, lasting at least one week. This new pump test, combined with curve fitting for determination of the rate of drawdown stabilization at the monitoring wells, would better determine whether there is a direct link between the alluvial aquifer and the underlying carbonate aquifer. This information would help estimate the degree to which pumping may affect water resources to the east and west of the project, as well as the timing of such impacts. To get the best estimation of key subsurface parameters and impacts, it would be important for at least two of the monitoring wells to penetrate the carbonate aquifer. As shown in Figure 4 of Section 4.15 in the PSA, there are locations close to the project area where the carbonate aquifer is at or near ground surface.</p>	<p>Figure 4 is a very small scale cross section. This figure was not intended to show the depth of the carbonate aquifer at the project site but rather a generalized characterization of the PVGB. The applicant has completed a second aquifer test (October 2012) submitted as Data Response 2A-4. None of the monitoring wells penetrated the carbonate aquifer. Staff believes the depth to the carbonate aquifer (> 1,000 feet bgs) at the site is likely much greater than the target depth for project pumping (300 to 350 bgs). It is unknown where the carbonate aquifer would be encountered in the vicinity of the site. Staff believes the monitoring network proposed in WATER SUPPLY-4 is appropriate for monitoring potential impacts given the current knowledge of the groundwater system in the PVGB.</p>

2.6		<p>The lack of any physical logs for any onsite or nearby wells impedes the ability to draw clear conclusions as to aquifer parameters and the impact of pumping on the aquifer. If well logs are available, the applicant should utilize them to validate its conclusions regarding the impact of pumping on groundwater. At least some of the monitoring wells should be screened in the same stratigraphic interval as the pumping well. Actual physical data from well logs rather than assumed values for aquifer parameters is critical for analyzing pump test results, and for using these results to construct a conceptual model of local and regional groundwater flow and the impacts of the HHSEGS project on this flow. If any of the above data reveal that the initial pump test conclusions were incorrect, the water supply and mitigation plans may need to be revised.</p>	<p>The applicant did not clearly define their conceptual model of the aquifer and did not validate their conclusions about impacts with any conceptual model of the area. Staff therefore employed a range in aquifer parameter values to consider uncertainty in projected impacts and considered these results in developing the proposed conditions of certification and appropriate mitigation.</p>
2.7		<p>The BLM supports implementation of condition of certification WATER SUPPLY-1, which would require the applicant to replace all extracted groundwater. This is similar to a mitigation measure being developed by California BLM in discussion with the developer of the Desert Harvest solar project in the Chuckwalla Valley, as well as future developers in that basin. Unlike the Desert Harvest mitigation, however, the PSA recommendation is to require BrightSource to simply replace the extracted water at some point during the 3D-year life of the project. At least some of this replacement should be required to occur early in the life of the project. Reinforcing this need is the existence of large ground cracks approximately 4 miles north of the HHSEGS site, which appear to be subsidence cracks caused by groundwater extraction in the area (see attached Figure 2); these features suggest that the basin is already experiencing an irreparable loss of storativity by diminishing local groundwater aquifers.</p>	<p>WATER SUPPLY-1 was revised to address this comment.</p>

2.8		<p>Specifically, the BLM suggests two additional wells directly up-gradient from Power Block 1 and two additional wells directly up-gradient from Power Block 2 to supplement CEC-identified BLM Mesquite Bosque Wells 1 and 2, respectively. These wells should be placed at regular intervals 0.5 to 1.5 miles from the project boundary. One additional well should be installed east of the Stump Springs ACEC so as to help differentiate any drawdown east of the ACEC, for example drawdown extending from the proposed BrightSource Sandy Valley SEGS project, from drawdown emanating from the HHSEGS site. If any drawdown is measured over time at the Mesquite Bosque Wells, monitoring wells placed in the configuration described above should provide adequate information to determine whether this drawdown is originating from the project site or is due to other factors identified above.</p>	<p>Wells in Nevada up-gradient of the site appear to have much less consistent water level trends. For this reason staff modified WATER SUPPLY-8 (now WATER SUPPLY-4) to rely solely on the onsite wells to project water level declines up-gradient to the site. This is a conservative and defensible approach to project off-site drawdown and identify if thresholds have been reached.</p>
2.9		<p>Condition of certification WATER-SUPPLY-8 recommends only one well to the west of the project, between 2 and 3 miles from the project boundary; this well would be on the far side of an inferred fault (Figure 13 of the PSA), which may delay drawdown at that well. The BLM recommends four additional wells; like the wells recommended above, these would be placed at regular intervals up to two miles west of the project boundary.</p>	<p>The Condition (now WATER SUPPLY-4) now requires one well (Offsite California Monitoring Well between 0.5 and 1.0 miles from the southwest corner of the site, located between a bearing of southwest (225°) and west (270°). An alternative location can be approved by the CPM. Staff does not believe the four additional monitoring wells proposed by BLM are necessary. The analysis provided by staff shows that potential impacts to the Amargosa River are unlikely. Additionally, WATER SUPPLY-1 would require an offset of project water use in the PVGB and ensures there is likely no net overall change in subsurface outflow that might affect down gradient discharge features. Therefore, additional monitoring wells were not considered necessary by staff.</p>

2.10		First, we recommend that drawdown triggers also be determined for other wells closer to the project, the locations of which are discussed above. These trigger depths would be graduated based on the expected drawdown at these wells that would correlate to an 0.5-foot drawdown at the Mesquite Bosque Wells, based on results of the additional pump test and curve fitting procedure discussed above.	Staff modified the condition to address this issue.
2.11		Second, we recommend that pumping be immediately curtailed or ceased if any of these drawdown triggers are crossed, regardless of whether impacts appear in the vegetation. By the time vegetation is noticeably affected, it may be too late for pumping curtailment to save these bosques.	Staff modified the condition to address this issue, such that it dovetails with condition BIO-23 to protect vegetation.
Comment #	DATE	COMMENT TOPIC	RESPONSE
4	July 21, 2012	The Nature Conservancy	
4.1		The Nature Conservancy believes there is justification for considering water use by this facility as essentially permanent; as a result, we recommend analyzing the effects of project pumping over a much longer period.	The AFC states the HHSEGS project would be designed for an operating life of 33 years. In addition, staff also proposes in WATER SUPPLY -1 that the applicant be required to offset project water use for the life of project operation regardless of the 33 year impacts analysis. Staff believes this term of analysis is adequate for CEQA and the stated purpose of the project.
4.2		This analysis of longer-term impacts is critical and justified because adverse effects from groundwater withdrawal can take a very long time to propagate through to distant springs and water dependent resources, even following the cessation of pumping. By the time effects are noticed through monitoring, it is often far too late to restore the health of these resources.	The revised staff analysis considered delayed drawdown by calculating impacts almost 50 years past the planned end of the project and estimate the maximum drawdown impact.

4.3		<p>We believe that the intended design of the network should be extended to areas or resources that may be influenced by project pumping well beyond the project period and for a minimum of 100 years, given that operations at the HHSEGS facilities are almost certain to continue well beyond the first licensing period. It is simply unrealistic to expect that renewal of the plant's operating franchise would be withdrawn three decades hence, even if severe groundwater problems were encountered.</p>	<p>The revised staff analysis considered delayed drawdown by calculating impacts almost 50 years past the planned end of the project and estimate the maximum drawdown impact. See answer to 4.1, above.</p>
4.4		<p>However, we recommend that additional wells be required, that well locations be more clearly specified in the final staff assessment, that all drilling logs and other data on well construction, testing, and performance be made public.</p>	<p>The eleven proposed monitoring wells would adequately characterize and protect against impacts from the project. Staff has further specified the location of the well west of the project to address this comment. Drilling logs would be available along with testing data as part of compliance submittals.</p>
4.5		<p>We also recommend that applicant conduct at least one additional reasonable length pump test to supplement the results of the initial truncated test, using newly drilled production and monitoring wells.</p>	<p>The applicant conducted another pump test. New data provided by the pump test did not change staff's characterization of impacts.</p>
4.6		<p>Conducting at least one well-designed aquifer performance test after installation of one or more planned production wells and several associated monitoring wells-prior to the commencement of construction and permanent installation of the rest of the wells--would provide the applicant and the CEC with valuable data about how to site other wells and whether the initial assumptions about the aquifer configuration and the absence of off-site drawdown were correct.</p>	<p>See answer to Question 1.69.</p>

4.7		Further, The Nature Conservancy recommends that the CEC require a total of three offsite monitoring wells (i.e. adding 2 wells) to the southwest of the HHSEGS site to detect possible effects on the Amargosa River and its protected resources.	See answer to 2.9, above.
4.8		Additionally, because of the intense public interest in groundwater issues, WS-9 should provide that all of the monitoring wells should include continuous data logging and recording devices and that the raw data and all reports be promptly placed on a public CEC website.	Staff would review and approve a monitoring plan in accordance with WATER SUPPLY-4, which would include specifications for appropriate data logging devices in each well. Data and reports submitted in accordance with WATER SUPPLY-4 would be public information and would be made available upon request.
4.9		We recommend that WS-1 be interpreted to require actual, steady, contemporaneous reductions in PVGB pumping equivalent to the pumping by HHSEGS, we also strongly recommend replacement of groundwater use at a ratio of greater than 1:1	WATER SUPPLY-1 was revised to more explicitly require actual contemporaneous reductions in water use. Offsets pursuant to CEQA must be proportionate to the project's impact. Here, if the offset is real and verified, the offset will be proportionate to the impact.
4.10		We also encourage the CEC to provide more clarity around how the PSA compensatory mitigation obligation would work in practice. The PSA appears to allow the applicant to acquire either an annual 167 acre feet/year or a gross quantity of water rights (4,900 acre feet) with no specified time period for the acquisition.	WATER SUPPLY-1 was revised to require mitigation for the life of the project.
4.11		Moreover, the mitigation obligation is framed as "one or more activities," which would apparently not compel the applicant to actually acquire and retire active, senior water rights in the PVG Basin.	The condition requires commission staff approve a water offset plan, but the offset can be achieved by means other than retirement of water rights, such as verified execution of water conservation measures.

4.12		<p>However, we object to the specific trigger conditions proposed in PSA's biological resources (BIO-23 and 24) and water supply (WS-8) sections as Conditions for Certification, because these Conditions will not adequately protect groundwater dependent ecological resources before they are likely to experience significant harm.</p>	<p>Staff revised these conditions to require the applicant to modify or stop pumping until they can prove their pumping doesn't have an adverse impact to the water-dependent vegetation starting near the state line.</p>
4.13		<p>We recommend that the CEC establish clearer and more effective trigger conditions. Given that we lack understanding of the local and regional hydrology and an accompanying detailed groundwater flow model that could be used to predict and avoid adverse impacts, the only reasonable alternative is to set very conservative trigger conditions. We recommend that Applicant cease groundwater pumping when specified, measurable water level declines are detected in offsite groundwater</p>	<p>Staff revised these conditions to require the applicant to modify or stop pumping until they can show their pumping doesn't have an adverse impact on the water-dependent vegetation adjacent to and east of the site boundary.</p>
4.13a		<p>We thus advocate permit conditions requiring, once offsite water levels decline or any decline in vegetation health is detected, that the applicant demonstrate that those effects are not the result of their pumping.</p>	<p>See answer to 4.13, above.</p>
4.14		<p>We recommend that at least three monitoring wells be required between the project site and the Nopah Range, adequate to determine both water levels in, and effects of pumping on, the alluvial aquifer, as well as whether the alluvial aquifer and deeper carbonate aquifer are in communication. We also recommend that CEC specify mitigation requirements, including pumping cessation or reduction in the event that specified water level declines (greater than one foot) are noted in any of the monitoring wells or other adverse effects are detected.</p>	<p>Staff believes the location of one well in this area is adequate for measuring baseline and background conditions for the monitoring program outlined in WATER SUPPLY-4. Mitigation would be required if water level declines are detected in monitoring wells located much closer to the project pumping wells than the proposed well between the project and Nopah Range and are therefore likely more sensitive to project groundwater use. Additionally, WATER SUPPLY-1 would require an offset of project water use in the PVGB and ensures there is likely no net overall change in subsurface outflow that might affect down gradient discharge features.</p>

4.15		<p>The CEC should ensure that the river, its spring tributaries, and ecological resources are adequately protected by conservative conditions on project groundwater use to avoid adverse effects before they occur. This will require a well- designed monitoring network, development and use of a predictive groundwater model, and adaptive trigger conditions.</p>	<p>Condition WATER SUPPLY-1 requires that 100% of project pumping is offset; therefore basin outflow would likely not change.</p>
4.16		<p>In general, there is a scarcity of data related to the hydrology of the southern Pahrump Valley, California Valley, Chicago Valley and the Amargosa River. Also poorly understood are the groundwater interconnections between these aforementioned areas. Data supplied by the applicant has not increased the base of knowledge.</p>	<p>This uncertainty is acknowledged and discussed in the FSA. Staff's analysis notes the uncertainty in the hydraulic connections and fate of subsurface outflow from the PVGB. Condition WATER SUPPLY-1 would require that 100% of project pumping be offset and therefore basin outflow would likely not change.</p>
4.19		<p>Assuming a travel distance of 20 miles, a hydraulic conductivity (K) value of 1 foot per day (ft/d), a porosity of 0.2 and a gradient based on the difference in groundwater elevation between the site and the river, the calculated groundwater travel time was over 3,000 years. Increasing K to 15 ft/d reduced the travel time to 214 years. These calculations do not reflect the potential for the actual groundwater flow path between the HHSEGS site and the Amargosa River (assuming it exists) to significantly reduce those travel times.</p>	<p>This assumed flow path and travel time relies on the river being hydraulically connected to the project pumping well, which cannot be verified. There are also potentially complex interactions between groundwater in the alluvial-aquifer from which the proposed wells would extract groundwater and the deeper regional aquifer. These hydraulic interactions can result in complex flow patterns between aquifers, the river and other discharge locations. Furthermore, the intervening distance between pumping wells and river is substantial (about 20 miles), and there is uncertainty regarding potential subsurface flow barriers and permeability contrasts that would significantly limit hydraulic communication with the river. We therefore removed the travel time analysis.</p>
4.20		<p>More critically, the travel time for a particle of water to reach the Amargosa River from Pahrump Valley has little relationship to hydraulic effects, which can be transmitted nearly instantaneously over long distances within a confined aquifer. The result is that an estimate of travel time from Pahrump Valley is not a conservative assessment of potential effects to the Amargosa River.</p>	<p>See answer to 4.19 above.</p>

Comment #	DATE	COMMENT TOPIC	RESPONSE
2	July 16, 2012	Bureau of Land Management	
5.1		<p>Although the PSA water supply analysis acknowledges that HHSEGS pumping might affect the Amargosa, it discounts that effect based on calculations of the length of time that the pumping effects might take to affect the river— using the same inadequate body of data discussed above. The attached analysis commissioned by the Nature Conservancy by Johnson Wright, Inc., hydrogeological consultants, posits other likely routes by which the HHSEGS pumping might well affect the river much more quickly and directly than the PSA analysis estimates. We believe that it is incumbent on the Applicant and the CEC to rule out these effects and to require mitigation (e.g., pumping cessation) if effects are predicted by water level declines in appropriately sited monitoring wells.</p>	<p>This assumed flow path and travel time relies on the river being hydraulically connected to the project pumping well, which cannot be verified. There are also potentially complex interactions between groundwater in the alluvial-aquifer from which the proposed wells would extract groundwater and the deeper regional aquifer. These hydraulic interactions can result in complex flow patterns between aquifers, the river and other discharge locations. Furthermore, the intervening distance between pumping wells and river is substantial (about 20 miles), and there is uncertainty regarding potential subsurface flow barriers and permeability contrasts that would significantly limit hydraulic communication with the river. We therefore removed the travel time analysis. WATER SUPPLY-1 requires an offset of project water use in the PVGB and ensures there is likely no net overall change in subsurface outflow from the PVGB that might affect down gradient discharge features.</p>

<p>5.2</p>		<p>The PSA proposes that Applicant install a single monitoring well between the project and California Valley, but would propose no mitigation conditions in the event that water level declines are detected. This is clearly inadequate. We suggest that at least three monitoring wells be located west of the project site, completed in the alluvial aquifer in the producing horizon from which the project will be pumping water. Moreover, to establish whether the HHSEGS pumping will affect the carbonate aquifer, at least one well should have a dual completion in the alluvial and carbonate aquifers. (We note that the BLM's recent comments on the PSA support installing monitoring wells penetrating the carbonate aquifer.) If future water level declines in these wells predict effects on the Wild and Scenic Amargosa River, pumping should cease or be curtailed; however, the Applicant should first be given a reasonable opportunity to demonstrate that the water level changes are not due to its operations.</p>	<p>Staff believes the location of one well in this area would be adequate for measuring baseline and background conditions for the monitoring program outlined in WATER SUPPLY-4. Mitigation would be required if water level declines are detected in monitoring wells located much closer to the project pumping wells than the proposed well between the project and California Valley and are therefore likely more sensitive to project groundwater use. Additionally, WATER SUPPLY-1 requires an offset of project water use in the PVGB and ensures there is likely no net overall change in subsurface outflow that might affect down gradient discharge features.</p>
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5.2a		<p>With regard to the groundwater dependent resources, in an attempt to protect groundwater dependent resources, the PSA water supply and biological resources conditions would require mitigation in the form of a temporary pumping cessation; however, before groundwater pumping is modified or discontinued over the long-term, the PSA requires the CEC to meet the burden of satisfying three difficult conditions: a water level decline of .5 foot, that the health of water dependent vegetation had declined by 20%, and that these effects were not due to actions or conditions beyond the control of the Applicant. This is nearly an impossible burden, and enforcement would be extraordinarily expensive, difficult, and protracted even in the face of clear adverse changes. Moreover, by first requiring a demonstrable decline in the health of vegetation, remediation would very likely be too late to avert permanent harm to the target resources. The Conservancy believes that declines in the water level in off-site monitoring wells sited to detect impending effects on key resources alone is a sufficient trigger for mitigation requirements, both for the groundwater dependent resources and the Amargosa River. In addition, vegetation effects should be included as a triggering condition as an independent basis for pumping reduction.</p>	<p>Staff significantly revised the water level monitoring approach and use of the trigger in WATER SUPPLY-4, which would require the applicant to modify or stop pumping until they can show their pumping doesn't have an adverse impact to the water-dependent vegetation east of the project boundary. See also the Biological Resources section and BIO-23 and -24 for further discussion of impact monitoring and mitigation.</p>
5.3		<p>In our view if a clear and easily enforceable groundwater level trigger is reached, the Applicant should have the burden of proof to establish that their operations are not the cause of the decline and, if the Applicant cannot meet this burden within a reasonable period time, groundwater pumping should cease.</p>	<p>Staff significantly revised the water level monitoring approach and use of the trigger in WATER SUPPLY-4, which would require the applicant to modify or stop pumping until they can show their pumping doesn't have an adverse impact to the water-dependent vegetation east of the project boundary. See also the Biological Resources section and BIO-23 and -24 for further discussion of impact monitoring and mitigation.</p>

5.4		<p>Both the PSA and the Applicant propose compensatory mitigation for groundwater pumping by employing some (largely undefined) method to offset project water use on a 1:1 ratio. The Amargosa Conservancy supports such compensatory mitigation, but believes that the nature of the obligation as proposed in the PSA and by the Applicant poses significant issues and requires clarification and improvement. The offset obligation, if framed to require reduction of Pahrump Valley basin water use, should be limited to permanent retirement of active senior water rights with a long and documented history of steady use, located closest to the project site, approved by Nye County and the Nevada State Engineer—and in multiples of the proposed project use. Multiple retirements are necessary for compensation because of the fact that the Pahrump basin is grossly over allocated, so retirement of even senior active rights may well have no positive effect on reducing basin water use, even in the short run. Also, because offsetting rights may likely be available only in the distant northern section of the Pahrump Basin in Nevada, effective mitigation for impacts of project water use on nearby resources also justifies a higher ratio. Accordingly, we suggest at least a 4:1 permanent retirement ratio.</p>	<p>WATER SUPPLY-1 was revised to more explicitly require actual contemporaneous reductions in water use. The goal of the offset requirement is that Pahrump Valley underflow discharge remain the same. CEQA provides for mitigation that is proportionate to the impact of a project. Thus, this project cannot be used to mitigate overdraft conditions caused by other users.</p>
5.7		<p>We believe that the CEC is required to take a much more serious look at the potential, long term effects of all of the existing and allocated water rights in the Pahrump Valley basin and of the potential cumulative impacts of groundwater pumping by the project in combination with groundwater pumping by other reasonably foreseeable projects on the Amargosa River and on other groundwater dependent resources. While the PSA has included a short list of current and future projects, the list is not complete, and does not include other forms of water pumping and use (e.g., agricultural pumping).</p>	<p>Staff has considered the over allocation of water rights in Nevada and understands that if all existing rights were utilized there would likely be significantly greater overdraft impacts in the PVGB than currently exist. Staff or the State of California do not control the administration of water rights in Nevada or project development that may occur in Nevada. Under CEQA, it is not reasonable to require an offset greater than 1:1 where true water use can be replaced and full mitigation is achieved for the proposed project. Staff has updated the list of reasonably foreseeable projects that could pump a significant volume of groundwater and considered this in the analysis.</p>

Comment #	DATE	COMMENT TOPIC	RESPONSE
6	July 23, 2012	Basin and Range Watch	
6.38		The Energy Commission hydrologist said the applicant needed to reach out much farther in their analysis, and we agree. A gradient in a confined system is not a source of recharge. CEC wanted the applicant to have 3 monitoring wells outside the project in a line with the proposed project wells, all at 1,000 feet deep, and we recommend this as well. Two upstream from the project and one downstream. Triggers should be required as new mitigation, such as sending out biologists to monitor how the deep-rooted mesquite at Stump Springs react, and if they appear to be adversely affected. CEC said if they see a half foot drop in water at the project boundary, then the assumption could be made that pumping might be affecting Stump Springs.	Staff agrees with much of this comment, including triggers based on water drawdown and vegetation monitoring. In WATER SUPPLY-4 staff has revised the required depths for monitoring wells to be equivalent to the depths of production wells.
6.39		We agree with the CEC that groundwater pumping by the project would need mitigation. Mitigation Measures Water Supply 1, 6, 7, and 8 to offset impacts to overdraft in the basin and potential impacts to local well owners and nearby springs are needed.	Comment noted. The FSA addresses these issues.
6.40		We also recommend, in contrast with CEC, that there might be potential impacts to the Amargosa River drainage from unstudied connections with the Pahrump Valley aquifer; mitigation measures should be enacted.	See answer to 5.2 above.
6.41		A Water Supply Plan showing how the applicant will replace 163 AFY per year as a condition of certification in Water Supply-1 should be completed before approval and certification of the project so that the public can review this important plan. How do we know there are even enough private wells and water rights to purchase and retire?	A water rights purchase is one way to mitigate the proposed water use in the PVGB, but there are likely other approaches as well. The details of the offset plan would be provided after certification but prior to construction. Construction would not proceed until a viable offset plan is approved.

6.42		Similarly, a Groundwater Level Monitoring, Mitigation, and Reporting Plan (Water Supply-6) should be prepared now, before certification, so that the public -- and especially local residents -- can review the plan. There is a lot of deferred mitigation in this review. If project pumping lowers residents' well levels by 1.5 feet then the applicant should reimburse the well owners. We believe ten feet lowering is too much and damage may already be done to resident's ability to have a reliable water supply.	Staff has identified an adequate number of wells, locations, and depths to implement the monitoring and mitigation required in WATER SUPPLY-4 and -5. Staff requires complete details of the monitoring plan prior to project construction. In the FSA staff used 10 feet of drawdown and estimated there could be a 15 percent increase in pumping costs, which would be significant.
6.43		They want more monitoring wells farther out, towards California where unknown and potential connections with Amargosa Valley could be present. We support this recommendation, as more needs to be studied about the complex hydrology of the region before more drawdown is allowed. A regional groundwater map should be made, and more well testing should be undertaken before approval of this project.	See answer to 5.2, above.
Comment #	DATE	COMMENT TOPIC	RESPONSE
7	July 23, 2012	Pahrump Paiute Tribe	
7.8		Another effect to development is water usage, as illustrated by the lack of springs that once existed in the Pahrump Valley.	Spring flow in the valley seemed to decrease with increased development in Pahrump throughout the 1900s. This is discussed in both the PSA and FSA.
Comment #	DATE	COMMENT TOPIC	RESPONSE
8	July 23, 2012	Richard Arnold, Pahrump Paiute Tribe	
8.6		Any impacts to the hydrology and other important resources associated with the HHSEGS will elevate the risks of us maintaining cultural and ecological balance within and adjacent to the proposed Project Area and most importantly, to our cultural landscape.	The proposed mitigation in both the Water Supply and Soil and Surface Water sections would reduce the impacts to local hydrology to a level that is less than significant.

Comment #	DATE	COMMENT TOPIC	RESPONSE
9	July 21, 2012	Big Pine Tribe of Owens Valley	
9.2		The project will use approximately 140 acre feet of water a year. The Pahrump Valley groundwater basin has been in a state of overdraft for decades. The additional amount of water depletion for this project could have severe impacts on fragile desert vegetation such as the nearby mesquite bosques and other sensitive plant associations. Some last surviving cottonwoods and willows at Stump Springs not mentioned in the report may also be severely threatened with even minimal impacts to groundwater depletion.	The proposed mitigation measures in both the Water Supply and Biological Resources sections would be protective of the local groundwater-dependent vegetation and the local water supply. Proposed conditions would require the applicant to cease or reduce project pumping until they could prove that their pumping is not having an adverse impact. WATER SUPPLY-1 would require that the applicant offset all of their groundwater pumping within the Pahrump Valley.
Comment #	DATE	COMMENT TOPIC	RESPONSE
10	July 21, 2012	Intervenor Cindy MacDonald -- Water Supply, pg. 19-1	
AIR RESOURCES 10.61		If the applicant uses water trucks to control fugitive and windblown dust over the life of the project, what are the additional water annual water requirements and can they be met with the currently proposed water limitations?	The applicant has taken this water usage into account, staff agrees with their water use for mirror washing. Staff estimates 27 acre feet per year per power block for mirror washing. The total expected use of 140 AFY would leave 26 AFY for drinking (< 5 AFY) and dust suppression. So about 20 AFY left for dust suppression.
10.1		Given the critical nature of water resource availability in the Pahrump Valley Ground Basin, why does the CEC Staff believe it is appropriate to develop plans to resolve these issues outside the CEQA equivalency process and public review?	The Energy Commission is not exempt from CEQA. The amount of mitigation is already described. The details of how the applicant will meet the performance standard set in the conditions can be determined post licensing, so long as the basic requirement is satisfied.
10.2		Under what authority is the CEC Staff exempt from reasonably developing the Water Use Off Set Plan mitigation measure during this CEQA equivalency process, which should include analyzing levels of significance, compliance with LORS and effectiveness of mitigation measures to reduce impacts?	See answer to 10.1, above.

10.3		What is the projected zone of impact this Water Use Off Set Plan will be developed for?	The offset would have to occur in the Pahrump Valley groundwater basin. Therefore, the mitigation would address the impact within the Pahrump Valley groundwater basin.
10.4		What are some reasonably available measures or activities the applicant might employ in this Water Use Off Set Plan that would “replace” 4,900 acre-feet or 163 AFY over the life of the project?	The applicant could for instance buy out an existing agricultural operation in Pahrump with a historic record of pumping.
10.5		Does the 4,900 acre-feet or 163 AFY apply per year of operation or will it just be required as a one-time replacement value sometime during the 30-year life of the project?	See answer to 4.10, above.
10.6		Does the 4,900 acre-feet or 163 AFY only apply to the operational portion of the proposed project or does it apply to the construction portion of the project as well?	See answer to 4.10, above..
10.7		Why did Staff stipulate “replacing water” versus “retiring water” rights and what is the difference?	Staff did not use one phase over the other for any particular reason.
10.8		If the applicant is required to increase their right to an additional 4,900 acre-feet or 163 AFY of water without retiring it, would this mean the applicant will be authorized to use approximately 303 AFY if the proposed project is approved?	WATER SUPPLY-1 sets the construction limit to 288 acre-feet per year and operation pumping to 140 acre-feet per year for the life of the project.
10.8.1		What jurisdiction, if any, does the CEC have over both the entire 10,000 acres the applicant will be leasing and its associated water rights?	Staff is not aware of any CEC jurisdiction over the applicant's water rights. The CEC has authority over the project “site” and “related facilities”.
10.9		What is the current approximate water value and/or rights in terms of acre-feet-per-year that is associated with the 6,800 additional acres that is part of the applicant's lease agreement?	In most areas of California, overlying land owners may extract percolating groundwater and put it to beneficial use without approval from the State Board or a court. California does not have a permit process for regulation of groundwater use. In several basins, however, groundwater use is subject to regulation in accordance with court decrees adjudicating the groundwater rights within the basins.

10.10		Can the CEC assume jurisdiction over this additional acreage and its associated water resources as a Condition of the Permit, even if the proposed project is not directly active on this portion of the site?	No.
10.11		While the CEC may be able to impose direct limits on water use for the proposed project itself, can the CEC also impose limits on water use regarding the other 6,800 acres that will not be directly a part of the HHSEGS construction and operations?	No.
10.12		If the CEC has no jurisdiction over the other 6,800 acres, will the applicant and/or landowner be capable of developing this acreage and its associated water rights in any manner they see fit without restrictions or limitations if the proposed project is approved?	The applicant would be required to comply with the requirements of the permitting agency responsible for whatever land use is approved at the site. This would require CEQA analysis, including satisfaction of provisions in CEQA requiring assessment of a reliable water source. Inyo County would normally be the permitting agency.
10.13		What are the reasonably foreseeable impacts of the applicant's control of this additional acreage if no restrictions or limitations are incorporated as a Condition of the Permit? Topics may include additional development adjacent to the project site such as temporary worker housing, permanent residential housing, commercial development and/or industrial development, growth-inducing impacts, increased water demand, etc.	The CEC process is a review of the Hidden Hills project only. However, any development on the "site" or of a "related facility" would require an amendment from the CEC.
10.14		Should the current landowner, which is merely leasing the project site to the applicant, choose to induce growth and capitalize on the proposed project's approval on the additional lands he owns surrounding the proposed project site, what control, if any, does the CEC have with respect to limiting or restricting that landowners development of the area and the associated water requirements necessary for that growth?	See answers to 10.8.1 and 10.13, above.

10.15		What impacts will this additional project have on water withdrawal in the project vicinity?	Any additional development that results in significant additional pumping in the vicinity could contribute to water level lowering.
10.16		While the AFC files, subsequent related documents and the Preliminary Staff Assessment occasionally reference Nevada LORS that may be applicable to the proposed project (such as traffic, hazardous materials, waste management, etc.) why has no discussion included Nevada LORS and jurisdictional analysis of the Pahrump Valley Groundwater Basin as well?	The FSA addresses LORS applicable to the project, including California laws and regulations. The impacts to Nevada are addressed in the staff analysis, but a specific analysis of compliance with Nevada laws is not required because the project is in California.
10.17		If the CEC Staff were to incorporate applicable Nevada LORS related to the authorization of water allocations from the Pahrump Valley Groundwater Basin, would the proposed project still be compliant with LORS?	See answer to 10.16, above.
10.18		What dialogue, if any, has the CEC or Inyo County engaged in with the Nevada State Engineer regarding coordinating the shared water resources of the Pahrump Valley Groundwater Basin, which has historically and predominately been used for the public interest of the people of Nevada?	Energy Commission staff has contacted the Nevada State Engineer's office to learn more about their permitting process and understand how it affects project analysis. Staff has also spent significant time researching the water right's and permit process, history, and status of water rights on the Nevada State Engineer's website.
10.19		Is it the applicant's or CEC's intention to circumvent impacts to Nevada or Nevada Water Right Laws in order serve California's interest at the expense of the people of Nevada?	No, the intent is that all impacts to the water basin would be mitigated for, whether the impact is in California or Nevada.
10.20		Why does the CEC Staff believe that subjecting local well owner to significant burdens results in reducing the proposed projects impacts to "less than significant"?	The purpose of the mitigation requirements is that the applicant must pay for impacts to local wells. Well owners do not have to participate in the program. Those that do not participate however cannot be reimbursed.

10.21		If a local well owner does not agree to or comply with the Conditions of Certification, are the projects impacts still reduced to "less than significant"?	Yes. Participation in the program that tracks impacts to local well owners is voluntary and requires well owner approval. Owners that do not participate cannot be compensated.
10.22		If the proposed mitigation measures are based predominately on a 10 ft. drawdown trigger level but the CPM can eliminate the monitoring program, how will the terms and agreements designed to protect the local well owners from project impacts be honored or upheld?	The word "eliminated" was removed from condition WATER SUPPLY-6 in response to this comment.
10.23		If the applicant has sole control over the monitoring network, which will be used as the singular source of data to determine trends, impacts and degrees of significance, what happens in the event that local well owners dispute what the applicant is reporting or how the CEC chooses to interpret those reports?	Local well owners are free to discuss the alleged impacts with CEC staff and be involved in the review of data. Staff does not intend to work around the local well owners.
10.24		In the event a local well owners water supply and/or well is impacted but the CEC/applicant disputes that impact, there are only two reasonably foreseeable options the well owner will have to remedy the impacts; a) they can spend their time and money legally challenging the CEC/applicant's data and decisions, b) they can spend their time and money fixing the problems so as to regain their water supply. How is either of these options not considered a significant burden on local well owners?	CEC staff is willing to relieve local well owners of this burden. However, much like the environmental review process for the staff analysis, local well owners are free to discuss the alleged impacts with CEC staff and be involved in the review of data. Staff does not intend to work around the local well owners.
10.25		Given the fact that there is currently no development or any other projects capable of producing significant impacts such as the proposed project can, why would Staff stipulate a two-prong requirement for mitigation that includes "water level changes are different from background trends" AND "are caused by project pumping"?	There are currently pumpers in this portion of the PVGB. Staff estimates 17 AFY is currently being used and water levels in this portion of the PVGB are already in decline. The current decline is used to estimate the background trend and is different than the decline and trend that may be caused by the project pumping. Staff is requiring that the applicant mitigate only for impacts resulting from their pumping.

10.26		What is the definition of “significantly affected by Project pumping”? Who makes this determination, the applicant, the CEC or the well owner?	Staff. In absence of specific public guidance to help shape the significance threshold, staff might choose a common significance threshold such as 10% increase in cost.
10.27		Who determines the “impact of drawdown” induced solely by the proposed project?	CEC staff will make that determination.
10.28		Who will be monitoring “any other source” that occurs in the proposed projects vicinity in order to determine proportional impacts and mitigation measures?	It is in the applicant’s interest to discover and report other new pumpers in the area if it looks like they could significantly contribute to drawdown.
10.29		Does the CEC have the authority to require “any other source” of development that may occur over the life of the project to subject themselves to the same terms and conditions the applicant and local stakeholders must agree to so that those sources may be included in the proportional equation of mitigation?	No.
10.30		In the event the CEC eliminates the monitoring program over the life of the proposed project, what methodology, data collection, proof, etc., will local well owners be required to produce that will satisfy the CEC and/or applicant’s requirements for determining merits of impacts?	The CEC will not eliminate the monitoring program. The word "eliminated" was removed from condition WATER SUPPLY-6 in response to this comment. The CEC may always be contacted to help resolve impacts resulting from project operation through the complaint process.
10.31		In the event the CEC eliminates the monitoring program over the life of the proposed project, what methodology, data collection, proof, etc., will local well owners be required to produce that will satisfy the CEC and/or applicant’s requirements for determining merits of impacts induced solely by the proposed project?	See answer to 10.30, above.

10.32		<p>Outside the CEC, which agency in the State of California has the jurisdiction and responsibility to protect the public interest of local well owners and community stakeholders in the project vicinity should those well owners not agree to the terms and conditions set forth by the CEC to accommodate the proposed project?</p>	<p>Staff is not aware of any other state agencies with such authority. In general, groundwater use by overlying landowners is not regulated in California, and pumpers routinely impact one another by lowering each other's water levels by some amount. If chronic water-level declines (overdraft) become unbearable, the principal legal/regulatory remedy is to initiate a court-administered adjudication of groundwater rights. Any basin user can initiate the process, but the process is typically long and expensive.</p>
10.33		<p>In the event the CEC eliminates the monitoring program over the life of the proposed project and a dispute arises regarding the terms, agreements, conditions, stipulations, contract, data, methodology, etc., where will local well owners go to file their grievances and/or receive compensation?</p>	<p>See answer to 10.30, above.</p>
10.34		<p>Why does the local vegetation get an lifetime monitoring mandate but monitoring data and programs that supposedly help local well owners can be revised and/or eliminated after only five years?</p>	<p>See answer to 10.30, above.</p>

Comment #	DATE	COMMENT TOPIC	RESPONSE
11	July 23, 2012	Intervenor Center for Biological Diversity	
11.40		The PSA indicates that up to 140 AFY of water will be used yearly on the HHSEGS site during normal operations (PSA at 4.15-2), although construction water use could be as high as 288 AFY for up to three years (PSA at 4.15-8). Although no water will leave the site, additional information on the effects of groundwater pumping on nearby seeps and springs in the adjacent mountains is lacking. In fact the seven-day ground water pump test that the CEC required was never completed. We have repeatedly requested that the seven-day ground water pump test be completed and once again ask the CEC to enforce their own requirement. No data is presented that addresses the hydrological connection between these essential wildlife sustaining locations, the Amargosa drainage and the proposed project impacts.	Neither staff nor the CEC required any pump test as a follow up to the first test. The conditions proposed to protect the springs are conservative. They would require that the project cease pumping when drawdown of 0.5 is projected at the site boundary. There is insufficient information to conclude or quantify a hydrologic connection between project wells and the Amargosa River. Condition WATER SUPPLY-1 requires that at least 100% of project pumping be offset and therefore PVGB outflow would likely not change. Please see staff's analysis of potential Amargosa River impacts in this FSA.
11.4		Additionally, because of the substantial evaporation rate at the project site, please provide data on how much pumped ground water will actually be returned to the groundwater basin.	The current assumption is that none of the water pumped by the proposed HHSEGS project would return to the aquifer.
Comment #	DATE	COMMENT TOPIC	RESPONSE
13	July 23, 2012	Applicant, BrightSource Energy, Inc. -- Water Supply, pg. 293	
13.14		The applicant will retire water rights. The applicant will protect local groundwater users from impacts.	Conditions in the FSA provide a back-up plan in case water rights with a sufficient pump record cannot be retired. The back-up plan allows for the retirement of inactive rights in conjunction with additional monitoring wells west of the project with drawdown triggers.

13.15		<p>1. Staff needs to acknowledge the benefit of the applicant's proposal to retire water. 2. California water law is ambiguous. 3. The alternatives analysis should be constructed differently. 4. The PSA is focused on Nevada. 5. Staff's analysis is too simple. 6. A 0.5-foot decline in water levels is indistinguishable from background decline.</p>	<p>1. In this Final Staff Analysis staff has acknowledged the applicants proposal to offset project water use through retirement of water rights. One outcome of the offset is to also ensure Pahrump Valley underflow discharge remains the same. 2. Comment noted. 3. Comment sent to ENERGY COMMISSION Alternatives staff. 4. Water Supply impacts resulting from the project are evaluated. 5. Staff's analysis is sufficient given available quantitative information on the PVGB and surrounding areas and considers uncertainty in hydrologic conditions. 6. The approach is based on statistically significant trends in historical water levels in PVGB wells.</p>
13.16		Please use our PowerPoint presentation in your analysis.	PowerPoint presentation was considered.
13.17		Please use our PowerPoint presentation in your analysis.	PowerPoint presentation was considered.
13.18		Page 4.15 1, Summary of Conclusion, 3rd paragraph, Item 1: The basin is not in overdraft but is over permitted per the Nevada State Water Engineer. The Nevada State Water Engineer has no authority over water rights in California.	Water levels within the proposed project vicinity show a statistically significant decline indicating groundwater discharge is greater than recharge and the basin is in a state of overdraft. The declines are observed in both Nevada and California portions of the basin.
13.19		Page 4.15 1, Summary of Conclusions, 3rd paragraph, Item 2: We believe the following conclusion is not supported by the data for reasons explained in General Comment 2 above: "If not mitigated, the proposed project pumping could contribute to a water level decline in areas that support groundwater dependent vegetation, including the Stump Springs Area of Critical Environmental Concern."	Comment noted.

13.20		Page 4.15 1, Summary of Conclusions, 3rd paragraph, Item 3: We believe the following conclusion is not supported by the data for reasons explained in General Comment 2 above: "If not mitigated, the proposed project could substantially lower the water level in neighboring domestic wells."	Comment noted.
13.21		Page 4.15 1, Introduction, 1st paragraph, 1st sentence: Please change "Bright Source Energy" to "the Applicant."	Brightsource Energy is the owner of the project and it should be noted here. The wording was modified to reflect this concern.
13.22		Page 4.15 2, Introduction, 1st full paragraph, last sentence: Please change "HHSO 2011a" to "HHSEGS 2011a."	Done.
13.23		Page 4.15 5, heading: Please change "Hydrogeologic Setting" to "Hydrogeologic Setting."	Done.
13.24		Page 4.15 8, 1st paragraph (partial paragraph), 3rd sentence in paragraph: Please reword the sentence as follows: "Recent water quality analyses from wells on the project site show the groundwater is relatively low in Total Dissolved Solids (between 250 and 361 ppm, based on 2011 and 2012 data) and has a bicarbonate character."	Done.
13.25		Page 4.15 9, Method for Determining Significance, Water Resources, b: Please see comment under Alternatives. The significant impact should be measured against what the current beneficial use impact or potential impacts are. Need to consider what the current entitled draw from the project site would be if full development of residential lots were to occur.	The baseline is current conditions.
13.26		Page 4.15 9, Method for Determining Significance, Water Resources, c: Please define the term "affected" when stating that species or habitats would be affected. This criterion is better suited for the biological resources section.	"Affected" refers to impacts due to lowered water levels.

13.27		Page 4.15 9, Method for Determining Significance, Water Resources, c: The PSA should identify with specificity the legal authorities for these purported significance criteria. Citations to those legal authorities should be included in the FSA.	Comment noted.
13.28		Page 4.15 10, 3rd full paragraph: Please reword the sentence as follows: The long term declining trend estimated by these data is comparable to that estimated for the rest of this portion of the basin and is about 0.37 foot per year, or 4.44 inches per year.	Comment noted. Change not necessary. Terms in feet are most useful for the subject analysis.
13.29		Page 4.15 10, 3rd paragraph: Please provide WATER SUPPLY Figure 15 at a scale similar to that of the other figures. The scaling on this figure makes the slope on the Orchard Well figure look steeper than some of the other figures.	Done.
13.30		Page 4.15 10, 7th full paragraph, 1st sentence: The years 2005 through 2011 represent the period of heaviest drought in the area so are not representative of a trend. In addition, they only cover a span of 6 years, which is not sufficient data to make a determination of trends.	There are 32 to 46 records. Though it is a relatively short record, it is the most complete record within the project vicinity. This record shows a statistically significant trend over the period of record.
13.31		Page 4.15 10, 7th full paragraph, 3rd sentence: The magnitudes of water level changes indicated by Sen's Test for slope indicate that the median water level change in the wells reviewed was about (-)0.273 feet per year (ft/yr), or approximately 3.28 inches per year.	Done (units of in/yr not reported).
13.32		Page 4.15 11, 2nd paragraph, 7th sentence: The PSA states: "The northern portion of the PVGB has an extensive record of pumping that shows an approximate loss in water levels of one foot per year."	Yes. The average change in water levels over the period of record shows a decline in the water table equal to about one foot per year.

13.33		Page 4.15 11, 2nd paragraph, last three sentences: We suggest that the division between the subbasins is at the faults to the east of the site, placing only the Dry Lake Bed Well, Old Orchard Well, and Quail Well in the southern subbasin. This results in an arithmetic mean of (-) 0.18, significantly lower than the mean for all eight wells (-)1.185. This suggests that the boundary of the subbasin is more properly drawn along the faults.	Staff would also include the Stateline well, which would make the arithmetic mean trend about (-)0.23 ft/yr.
13.34		The CEC estimate of storativity is too low. If staff used a value of 0.1 instead of 0.005, the applicant's proposed use of 140 ac-ft/year looks smaller.	Employing a greater storativity value would simulate a greater loss in storage and a lower magnitude of water level decline. However, the use of a higher value for storativity is not supported by the data.
13.35		If CEC used a higher value for storativity, the water level decline induced by the project would be less.	See answer to 13.34, above.
13.36		It is possible the basin has been in overdraft for thousands of years as is evident from the dry lake bed. Thus, this trend will continue with or without development of the plant.	Protecting water supplies is therefore critical.
13.37		Page 4.15 12. 2nd full paragraph: Mitigation requirements (WATER SUPPLY 1) should provide credit for the reduction in water use from allowed current residential use and for the provision of storm water recharge via implementation of best management practices (BMPs).	Existing conditions involve little residential pumping, and the residential build out the comment refers to is at best speculative. Recharge from storm water retention is unlikely given the high clay content in the shallow subsurface. Recharge in the desert rarely occurs at the valley floor because evaporation and evapotranspiration rates are too high and percolation rates are too low. Furthermore the proposed site condition described in the AFC would create a general increase in site runoff due to compaction and reworking of the surface.
13.38		Page 4.15 12, 2nd full paragraph: The PSA states: "This condition requires the project owner to provide a water use offset within the PVGB that is equal to project pumping." Is this defined as a ratio of 1:1 and any overdraft permitted rights? Meaning active or non active?	The water use mitigation must represent active water rights with a recent pumping history.

13.38		Page 4.15 13, Increased Cost of Pumping, Equation 2: The actual equation for the Cooper Jacob modified non equilibrium method is $s=2.30Q/(4\pi T)\log(2.25Tt/r^2S)$. A more robust form of this equation is the Theis equation $s=114.6QW(u)/T$ and $u=1.87r^2S/Tt$ with Q in gpm, T in gpd per foot, r in feet and t in days.	All drawdowns calculated for the FSA used the Theis solution rather than its approximate form.
13.40		Page 4.15 13, Increased Cost of Pumping, Equation 2 Assumptions: These are simplifying assumptions used to make the analytical solutions solvable. They are not meant as an expression of real aquifer conditions. They are limitations of the method that clarify how the solution will vary from real world conditions.	Comment noted.
13.41		Page 4.15 15, Thresholds to Determine Significant Impact, 1st sentence: These calculations are based on assumed theoretical aquifer conditions that we believe do not reflect site conditions. Our modeling indicates that drawdown will not propagate to the domestic wells based on the regional gradient.	Simulated drawdown is the impact.
13.42		Page 4.15 15, Thresholds to Determine Significant Impact, 2nd sentence: Please reword this sentence as follows: One threshold therefore could be limiting drawdown to 10 feet below existing conditions or mitigating adverse effects of drawdown greater than 10 feet below existing conditions.	Done.
13.43		Page 4.15 15, Aquifer Parameters, 2nd paragraph, 1st sentence: Curve matching is a long established industry standard. It is the basis for aquifer analysis dating back over 70 years and is not considered subjective. Please revise the PSA to reflect this fact.	The word 'subjective' was removed.
13.44		Staff and applicant show different curve matches for pump test results.	The FSA considers both of the applicant's aquifer test analyses.

13.45		Page 4.15 16, 2nd full paragraph, 1st sentence: The PSA states: "Using staff's estimates of transmissivity and Equation 3 above it is possible water level declines in neighboring wells could be on the order of 10 15 feet after 30 years of project pumping." Is the 10 to 15 inclusive of background declines currently predicted in the PSA by Staff's estimates?	The 10 to 15 feet is the isolated drawdown due solely to the pumping.
13.46		Page 4.15 16, 2nd full paragraph: Actual drawdown for those assumptions is 7.84 feet after 30 years pumping at 101 gpm. This ignores recharge and regional flow. Actual drawdown will be less.	7.84 feet is the simulated drawdown due to the pumping, which by definition is the impact.
13.47		Page 4.15 16, last paragraph, 2nd sentence: The PSA is requiring Applicant to take responsibility for increased pumping costs and maintenance that may be experienced by residents of Charleston View. How is the effect of over pumping from neighbors' wells or from other projects within the basin to be accounted for? The HHSEGS will bear the burden of others' pumping under this scenario. In addition, the condition of certification may incentivize neighboring owners to over pump their wells, by eliminating financial deterrents, thereby hastening overdraft conditions.	The groundwater monitoring plan shall monitor select private wells and proposed project supply and monitoring wells. Data collection shall document background- and pre-construction conditions and trends. The plan would be designed to monitor project related trends that can be quantitatively compared against background and pre-construction conditions.
13.48		Page 4.15 16, last paragraph, 3rd sentence: Conditions of Certification WATER SUPPLY 6 and WATER SUPPLY 7 require monitoring and mitigation of potential impacts to neighboring domestic wells. This should only pertain to impacts above the baseline.	Agreed, language added.
13.49		Page 4.15 17, Groundwater Dependent Vegetation and Stump Springs, 1st paragraph, last sentence: What is the basis for BLM's claim that Stump Springs still produces water at the site intermittently?	Sentence deleted. Staff has provided updated information in the FSA.

<p>13.50</p>		<p>Page 4.15 17, 4th paragraph, 2nd sentence: Both of these assumptions are exceedingly conservative and essentially incorrect. Based upon our aquifer analysis and that of others in the basin, the aquifer is unconfined or leaky artesian; and, the clear existence of a regional groundwater gradient as indicated in Figure 5 of the PSA is a priori indication of the existence of recharge.</p>	<p>The reported water level response in some of the wells could possibly indicate local leaky aquifer conditions. However, the available hydrogeologic information is insufficient to confidently identify the adjoining aquifer that supplied the recharge, the water level changes in the leaky aquifer as a result of the deeper pumping (if different from the water-bearing materials monitored by the shallower monitoring wells), the thickness and extent of the intervening aquitard, and the depth and thickness of the pumped aquifer. Staff therefore was conservative in its approach and employed the Theis equation for a confined aquifer. The groundwater gradient is not relevant to the impact, which is the isolated drawdown due to the pumping.</p>
<p>13.51</p>		<p>Page, 4.15 17, 5th paragraph, 1st sentence: These calculations are based on assumed theoretical aquifer conditions that we believe do not reflect site conditions. Our modeling indicates that drawdown will not propagate to Stump Springs based on the regional gradient and leakance without regard to the likely presence of a permeability barrier in the aquifer created by one or more faults.</p>	<p>Staff was conservative in its approach and employed the Theis equation for a confined aquifer. The groundwater gradient is not relevant to the impact, which is the isolated drawdown due to the pumping. In the FSA, staff included an analysis that assumes the fault zone is an impermeable barrier in its evaluation of potential impacts on water levels west of the fault. Water levels measured under the monitoring program during project operation will confirm whether the fault prevents drawdown from reaching Stump Springs and other habitat areas on the east side of the fault.</p>
<p>13.52</p>		<p>Page 4.15 18, 1st paragraph after Table 5, 2nd sentence: This analysis would only be valid for a fully confined aquifer of infinite extent with no gradient. In reality the site wells are approximately 250 feet lower than Stump Springs and the aquifer is likely bounded by faults that will impede the propagation of drawdown to the springs.</p>	<p>The absence of a hydraulic connection between the site and Stump Springs has yet to be demonstrated. The FSA considers potential impacts with and without an impermeable fault barrier.</p>

13.53		<p>Page 4.15 18, 1st paragraph after Table 5, 3rd sentence: The PSA states that the approach was supported by the Applicant in the AFC. However, such support was given by Applicant prior to performance of the Aquifer Pump Test. Since that time, the belief that in the possibility that the aquifer is confined is no longer held by the Applicant.</p>	<p>Comment noted.</p>
13.54		<p>Page 4.15 18, 1st paragraph after Table 5, 5th sentence: To correctly apply superposition, one must consider the actual flow field and the change in flow that occurs in response to pumping. The cone of depression, superimposed on the sloping potentiometric surface, changes the shape of the surface and causes some of the regional groundwater flux to be diverted to the pumping well. As the cone grows deeper and wider, more water is diverted to the well. At some point, enough water is diverted to the well to replace the water being pumped and the cone of depression no longer expands and a new stable potentiometric surface is established. This does not occur in a theoretical infinite aquifer with no gradient, and such aquifers do not exist. Our modeling shows the cone of depression will stabilize shortly after pumping begins, even with the assumption of no leakance, after which time water levels will no longer decline. This is entirely consistent with the results of the pumping test on site and consistent with normal aquifer responses.</p>	<p>The impact is defined as the volume of water removed (consumed) from the over drafted groundwater basin, and the drawdown of groundwater level due solely to the pumping well. The water consumed is equal to the water extracted. The drawdown attributed solely to the pumping well is isolated at finite locations in the aquifer using superposition. This approach is conservative, as in other aspects of Staff's analysis, to assure the maximum potential impact is considered.</p>
13.55		<p>Page 4.15 18, 1st paragraph after Table 5, 6th sentence: This model was designed to predict worst case conditions before any site data was available. Although the model was intended to incorporate the regional gradient the Winflow modeling package does not factor the gradient into its drawdown calculations. While Winflow does allow a gradient to be specified, it does not include the gradient in the solution but only applies it after the fact to draw the contour lines.</p>	<p>Winflow can be employed to calculate the isolated drawdown due solely to the pumping well, which is defined as the impact.</p>

13.56		Page 4.15 19, 1st paragraph, 2nd sentence: Please provide support for the statement that “any” decline in water levels could result in adverse impacts to groundwater dependent vegetation and define “adverse impacts.”	Please refer to the BIOLOGICAL RESOURCES FSA section for discussion of groundwater impacts to vegetation.
13.57		Page 4.15 20, 1st paragraph (partial), last two sentences: This calculation refers to groundwater flow velocity, which is essentially how long would it take for a drop of water to move to the river. This is different than the propagation of drawdown, which is based on confined storage and transmissivity of the aquifer.	Analysis was removed.
13.58		Page 4.15 20, 2nd paragraph, 3rd sentence: The monitoring program described in WATER SUPPLY 8 will measure water level declines from any source, not just the project. Multiple factors could contribute to the decline.	The groundwater monitoring plan shall monitor and document background- and pre-construction conditions and trends. Using the methods specified in WATER SUPPLY-4 monitoring of project related trends can then be quantitatively compared against background and pre-construction conditions caused by multiple factors.
13.59		Page 4.15 22, Drinking Water, 2nd paragraph, 1st sentence: The HHSEGS is expected to employ 120 full time employees and 50 to 60 shift workers during operations and many more during construction.	Correction made.

13.60		<p>Staff recommends Condition of Certification WATER SUPPLY 10, if groundwater will be used for potable purposes, which that would require the applicant to submit information to the Inyo County Environmental Health Department at least sixty (60) days prior to commencement of construction at the site, that would typically accompany an application obtain for obtain a permit to operate a non transient, non community water system with the Inyo County Environmental Health Department at least sixty (60) days prior to commencement of construction at the site. if groundwater will be used for potable purposes. This condition would ensure that the applicant meets all provisions of Title 22, Section 3 to provide a suitable domestic water supply.</p>	<p>Compliance is required in accordance with state and federal law.</p>
13.61		<p>Page 4.15 23, 1st full paragraph: Please reword this paragraph as follows: Staff also recommends Condition of Certification WATER SUPPLY 3, which would ensure that the domestic wells are constructed or modified in accordance with County standards and registered with the State of California through DWR. The applicant shall submit a well construction packet to the Inyo County Environmental Health Department for review and comment and to the CPM for review and approval. Aa Well Completion Report shall also be submitted to DWR prior to approval.</p>	<p>Change made as requested.</p>
13.62		<p>Page 4.15 23, Cumulative Impacts and Mitigation, 2nd paragraph: These calculations are based on assumed theoretical aquifer conditions that we believe do not reflect site conditions. Aquifer properties have not been determined at the Sandy Valley site.</p>	<p>Due to uncertainty in aquifer conditions staff employed a conservative approach and utilized a range in reported aquifer conditions.</p>
13.63		<p>Page 4.15 24, Basin Balance, 1st paragraph, 1st sentence: The loss in storage attributable to the project would be equal to the pumping at the site, a maximum of 140 AFY, immediately after construction and would decrease to zero once the cone of depression stabilized.</p>	<p>Existing groundwater consumption exceeds recharge; hence the basin is in over draft. Any new consumption therefore increases the depletion of groundwater storage in the basin. Neither staff nor the applicant has identified a source of water that would increase recharge to the basin in response to project pumping.</p>

13.64		Page 4.15 24, Basin Balance, 1st paragraph, 2nd sentence: The loss in storage attributable to the projects would be no greater than the sum of pumping at the sites, a maximum of 317 AFY, immediately after construction if they all started pumping on the same day, and would decrease to zero once the cones of depression stabilized.	Staff removed this section of the analysis.
13.65		Page 4.15 24, Basin Balance, 3rd paragraph, last sentence: Please reword the sentence as follows: Their combined use of up to 317 AFY would represent about 3% of the basin's safe yield.	Staff removed this section of the analysis.
13.66		Page 4.15 25, State Water Resources Control Board Resolutions, 1st paragraph: This 1975 Resolution is just that, a resolution. Its legal weight is questionable. It also focuses on new appropriations of surface water. It is inapplicable here on the facts.	Staff removed this.
13.67		Page 4.15 26, Order from the Genesis Solar Project Committee, 1st paragraph: This Genesis reference is NOT a decision of the Commission. It was an interim order of the Committee. It is NOT reflected in the Final Decision. This is not precedent because it is not a decision of the Commission. It is also directly contradicts California Water Law, the constitutional sections cited previously, about making reasonable and beneficial use of water. The California Constitution does not require "worst, feasible available water that applicant could use for particular purposes on a project."	Staff removed this.
13.68		Page 4.15 31, Conclusions, Conclusion 2: We believe this conclusion is based on an inaccurate understanding of the pumping impacts. See previous comments.	This Conclusion was revised.
13.69		Page 4.15 31, Conclusions, Conclusion 3: We believe this conclusion is based on an inaccurate understanding of the pumping impacts. See previous comments.	This Conclusion was revised.
13.70		Page 4.15 51, Appendix A	Staff removed this section of the analysis.

13.71		Page 4.15 52, Appendix A	Staff removed this section of the analysis.
13.72		Page 4.15 52, Appendix A	Staff removed this section of the analysis.
13.73		Page 4.15 52, Appendix A	Staff removed this section of the analysis.
13.74		Page 4.15 53, Appendix A	Staff removed this section of the analysis.
13.75		Page 4.15 53, Appendix A	Staff removed this section of the analysis.
13.76		Comments on WATER SUPPLY condition 1	Staff accepted some of the proposed edits.
13.77		Comments on WATER SUPPLY condition 2	Staff would not accept a rolling average for water use. As written the condition is more enforceable.
13.78		Comments on WATER SUPPLY condition 2: Page 4.15 34, WATER SUPPLY 2, Verification, 2nd paragraph "Water usage" is not defined. Does filling onsite storage tanks count as daily water usage? Or only water taken out of the water system count as "usage"? Please define this term.	Water usage is considered removal from the ground.
13.79		Comments on WATER SUPPLY condition 3	Staff cannot comment on the County's internal approval procedure.
13.80		Comments on WATER SUPPLY condition 4	Some edits accepted.
13.81		Comments on WATER SUPPLY condition 5: Page 4.15 36, WATER SUPPLY 5: this condition should be deleted. WC 4999 et al. apply to groundwater extraction in Los Angeles, Riverside, San Bernardino, and Ventura counties only. It does not apply to Inyo County.	Condition was removed.
13.82		Comments on WATER SUPPLY condition 6	Some edits accepted. Staff also accepts the use of the USGS method for tracking water levels. Staff does not agree that a bulk of the condition should move to the Verification section of the condition.

13.83		Comments on WATER SUPPLY condition 7	Staff does not agree that a bulk of the condition should move to the Verification section of the condition.
13.84		Comments on WATER SUPPLY condition 8	Monitoring must begin prior to construction to establish background and baseline conditions. All monitoring wells must also be installed to the same depth as the pumping wells.
13.85		<p>Comments on WATER SUPPLY condition 9: Page 4.15 47. WATER SUPPLY 9. The Applicant's data, as described in these PSA Comments and in its filings in this proceeding, demonstrates that the project will have no significant adverse effects on water supplies. If anything, the Applicant's water usage will be less than the 170 residential units contemplated in the No Project Alternative. Accordingly, given (a) the project's lack of water supply related impacts and (b) the lack of any water discharges associated with project operations, there will be no significant effects on water quality. The Applicant's proposed conditions Water Supply 6 and Water Supply 8 constitute a rigorous monitoring program that will demonstrate the lack of significant impacts in either water supply or water quality. Because no significant impacts on water quality have been identified, the FSA should not seek to impose mitigation. Water Supply 9 should be deleted.</p>	<p>Staff does not plan to remove WATER SUPPLY-9 (now incorporated in WATER SUPPLY-4). The immediate vicinity has a history of nitrate contamination which degraded local drinking water supplies. The project should be required to monitor and report on water quality conditions throughout the life of the project.</p>
13.86		Comments on WATER SUPPLY condition 10	<p>It is staff's understanding that this requirement stems from the federal Safe Drinking Water Act and that the county must be responsible for approving it. The Energy Commission does not have in-lieu permitting authority.</p>

ADDITIONAL RESPONSES TO AGENCY AND PUBLIC COMMENTS

Agency comments received during the Preliminary Staff Assessment process are included below in an abbreviated format. Please visit the commission website to review complete comment letters at

<http://www.energy.ca.gov/sitingcases/hiddenhills/documents/index.html>.

Letter from Amargosa Conservancy, December 28, 2011 (TN-63256)

Comment: *"...we believe that pumping, over time, may adversely affect sensitive water-dependent ecological resources in the lower Amargosa, including several listed and special status species."*

Response: Staff believes that it is speculative that pumping from this project would result in a measureable impact to water-dependent ecological resources in the lower Amargosa River. However, staff is requiring that the applicant offset project pumping with mitigation equal to the project's consumption of groundwater to address PVGB overdraft impacts. Assuming that the Amargosa River eventually receives water that was once beneath the Pahrump Valley, this mitigation would address out-of-basin concerns.

Comment: *"Also, we note that the applicant has stated that its property lease does not end at 30 years, but has claimed the lease terms as "proprietary" and business confidential, and has thus refused to release its conditions. Under that circumstance, the Energy Commission must assume (in accordance with the common business understanding that an enormous investment in infrastructure will likely result in permanent generation facilities on this site) that groundwater pumping will continue, indefinitely."*

Response: Staff agrees that there is the possibility that such an enormous investment could result in groundwater pumping beyond the life of the project. Staff is suggesting that the applicant offset water rights for the entire life of the project. Staff is requiring mitigation that constitutes a true offset for project pumping.

Comment: *"As an initial observation, the groundwater modeling presented by the Applicant in AFC Appendix 5.150 is unacceptably simplistic."*

Response: Staff disagrees with the phrasing "unacceptably simplistic." Staff instead believes that since the Calvada Springs area is poorly defined, the use of superposition may be most appropriate. As discussed in this analysis, the principle of superposition is employed to isolate the direct influence of pumping regardless of water table conditions and other groundwater sources and sinks. This may be the best way to demonstrate the impact of this project's pumping on sensitive receptors.

Comment: *"It is critically important to note that the USGS Death Valley Regional Flow System regional groundwater model (the only accepted regional representation of groundwater flows--although coarse-scaled) posits that groundwater flows from*

Pahrump Valley into the Amargosa River. The Applicant has not used that model in its analyses on project impacts.”

Response: Regardless of whether or not the applicant has considered this possible flow condition in their analysis, staff has considered this potential hydraulic connection. Staff concluded the USGS model is not an appropriate tool to analyze this project. Given the scale of the model and the limited data available in the project area that can be used for model calibration, predicted changes would not be more reliable than other methods and thus have little added value for impact analysis.

Comment: *“Although the new geochemical work (anticipated to be released in early 2012) suggests that flow from Pahrump Valley into Chicago Valley and thence into the Amargosa could be less important in comparison to the overall flow system in the Amargosa Basin, those results should be properly placed in a wider context and confirmed by sampling from new wells that need to be drilled in the area between the project site and the Amargosa River.”*

Response: Staff agrees that the chemistry of the water that would be pumped by the project should be analyzed to help understand the source and fate of water in the region. Staff is recommending a groundwater monitoring and reporting condition that addresses this concern. Staff has recommended the adoption of Condition of Certification **WATER SUPPLY-4**, which would require the applicant to do groundwater quality sampling and analyses as part of the project’s monitoring program.

Comment: *“...the Energy Commission must assume a strong influence of groundwater flow within the basin fill aquifer and the lower carbonate aquifer on springs in the Shoshone -Tecopa area, and that projected drawdown caused by HHSEGS pumping will propagate into and adversely affect the Amargosa Wild and Scenic River.”*

Response: The mitigation suggested by staff to offset project pumping maintains the basin water budget and therefore also out-of-basin flow to the river, if any, that exists.

Letter from Inyo County Water Department, January 18, 2012 (TN-63478)

Comment: *“Retirement of water rights is ineffective as mitigation if the retirement does not result in an actual reduction in pumping.”*

Response: Staff concurs and has written Condition of Certification **WATER SUPPLY-1** such that it would require the applicant to address this in the proposed mitigation.

Comment: *“...and generally conclude that the principal source of recharge to the basin is from the Spring Mountains to the northeast, groundwater flows to the southwest, and some groundwater exits the basin to the southwest. Faults run parallel to the state line, and may partially buffer the Project site from effects of pumping in the Pahrump area and recharge from the Spring Mountains. These faults are areas of natural groundwater discharge.”*

Response: Staff agrees that connectedness between the northern and southern PVGB is unclear. Staff also agrees that faults running parallel to the state line may buffer the proposed site from the effect of pumping in northern PVGB. This concept also agrees with staff's analysis which shows a lower average water level decline in southern PVGB (0.25 foot per year) compared to the average decline observed in northern PVGB (one foot per year).

Comment: *"Prior reports suggest that groundwater from the Pahrump Valley basin flows through the Nopah Range and discharges in the Tecopa/Shoshone/Amargosa River area, but the flow-paths, rates of flow, and sources of water for regional discharge zones are not well known."*

Response: Staff notes that the flow-paths and regional discharge zones for the PVGB is not well understood. This comment is similar to one shared by the Amargosa Conservancy (TN-63256).

Comment: *"The circumstances discussed above suggest a number potential adverse effects from the Project:*

1. Pumping for the Project may adversely affect well owners near the Project. Active wells have been identified south of the Project site."

Response: Staff agrees and is suggesting mitigation measures for local wells in Condition of Certification **WATER SUPPLY-4** and **5**.

Comment: *"2. Pumping for the Project may adversely affect phreatophytic vegetation northeast of Project. Zones of phreatophytic vegetation have been mapped northeast of the site."*

Response: Staff agrees that pumping may adversely affect phreatophytic vegetation to the northeast of the project and has recommended Condition of Certification **WATER SUPPLY-4** to mitigate for this effect.

Comment: *"3. Pumping for the Project may affect groundwater users down-gradient from Pahrump Valley, in the Tecopa/China Ranch/Amargosa River area. These potentially affected users may not have all been identified, but include China Ranch and Tecopa."*

Response: This comment has been addressed in responses regarding impacts to the Amargosa River above.

Comment: *"4. Pumping for the Project may adversely affect groundwater-dependent and groundwater influenced habitat down-gradient of the Project. Of particular concern are the Amargosa River and China Ranch."*

Response: Same response as that above.

Comment: *"5. Pumping for the Project may contribute to overdraft of the Pahrump Valley groundwater basin."*

Response: Addressed in previous responses. Staff concurs and has recommended mitigation for potential impacts.

Comment: *“In view of the foregoing, the County of Inyo has proposed the following to Hidden Hills Solar:*

A. *Prior to the commencement of construction, Hidden Hills Solar shall cooperate with the County to complete and provide to the CEC and other interested agencies an inventory of private wells potentially affected by the Project that identifies the owner of each well and includes the location, depth, screened interval, pump depth, static water level, pumping water level, and capacity of each well. For each such well, Hidden Hills Solar shall assess any projected impact of the Project on the well and shall develop and submit a plan for monitoring and mitigating any adverse effects on the well, including thresholds where mitigation activities would be undertaken. The plan should include, as feasible, agreements from the owner of each well approving monitoring activities. Monitoring should include both groundwater elevation and water quality. Mitigations should include deepening or replacing wells that become inoperable due to Project pumping, monetary compensation for additional pump lift incurred by Project pumping, and mitigation for impacts to water quality.”*

Response: Staff agrees and has recommended Condition of Certification **WATER SUPPLY-4 and -5** to mitigate these potential impacts.

Comment: *“C”. Prior to the commencement of construction, Hidden Hills Solar shall develop and provide to the County and the CEC and other interested agencies a model for predicting changes in the groundwater flow system resulting from the Project which has the capability to assess changes in hydraulic head, flow rate, flow direction, and water budget. Hidden Hills Solar shall also provide to the County, the CEC and other interested agencies model runs which predict effects of the planned groundwater pumping by the Project on the habitats and resources described above and predictions of the level of groundwater pumping that will cause significant impacts on such habitats and resources. Hidden Hills Solar shall also use the model to provide an evaluation of the sustainability of the water supply for the life of the project, including the cumulative sustainability when considered with other pumping occurring or projected to occur in the groundwater basin (including the California and Nevada portions of the basin).”*

Response: Response to the appropriateness of an extensive groundwater model is discussed in responses to the Amargosa Conservancy above. There is currently very limited data available for the southern portion of the PVGB. The ability to develop a calibrated model that could be used for analysis of well interference, cumulative overdraft, groundwater dependent vegetation, and regional impacts could be difficult and time consuming. Much more research into groundwater basin conditions and long term monitoring data would be needed. Staff believes the monitoring program proposed in Condition of Certification **WATER SUPPLY-4** would adequately measure potential project impacts which could then be mitigated in accordance with **WATER SUPPLY-1 and -5**, and **Bio-23**.

Letter from Nye County Water District, January 31, 2012 (TN 63651)

Comment: *“Some areas within the Pahrump Basin have experienced drops in water level and the basin has been designated by the Nevada State Engineer as a basin in need of administration (Designated Basin). As a designated basin there are no additional appropriations of water rights and any use would require purchase of existing water rights. Water Districts are accorded special status to assist and advise the State Engineer in the administration of designated basins.”*

Response: Staff acknowledges that PVGB has experienced significant water level declines. The information provided about water rights availability was very helpful for developing a satisfactory mitigation measure to offset the project’s water uses. In this analysis staff recommends the purchase of an existing water right(s) to offset the proposed use. Furthermore, staff has expressed the need for any purchased water right to constitute an exercised right, or one that has contributed to the current state of declining water levels in the basin.

PROPOSED FINDINGS OF FACT

Based on the evidence, staff proposes the following findings:

1. The proposed HHSEGS site would pump groundwater from the PVGB.
2. Domestic well owners are located adjacent to or within 3 miles of the project site.
3. The proposed project is bordered by sensitive groundwater-dependent vegetation, which is habitat for endemic species.
4. The proposed project is located within five miles of the Stump Spring Area of Critical Environmental Concern (ACEC).
5. The Stump Spring ACEC is designated for protection by the United States Bureau of Land Management (BLM) because of its cultural and biological resources.
6. There is limited data available for site specific analysis of potential effects due to project use of groundwater from the PVGB.
7. Monitoring project groundwater pumping would provide data that could be used to evaluate effects on the existing groundwater users and groundwater dependent vegetation.
8. The PVGB is a basin that has for many years been in “overdraft”, such that recharge of the basin has been exceeded, and continues to be exceeded, by groundwater pumping.
9. The historic overdraft of the PVGB continues today, and Nevada has made it a “designated” basin to control groundwater pumping on the Nevada side of the border by requiring permits for non-domestic groundwater pumping.
10. Without mitigation, the impact of the project would be cumulatively significant.
11. There is a high level of uncertainty regarding potential impacts from project groundwater pumping, particularly with regard to the potential impact on local springs and wells.
12. The Stump Spring ACEC, with temporal springs and vegetation, may be dependent on local groundwater levels, and could be significantly affected by project groundwater pumping.
13. Local domestic wells, particularly those most proximate to the project site, could be significantly affected by project groundwater pumping.

14. Although it is possible that project groundwater pumping could eventually have a deleterious effect on the Amargosa River, no existing information or model can establish or describe such effect or its extent.
15. Impacts to the PVGB can be mitigated to a level that is less than significant by restricting groundwater use in the Nevada part of the basin by some commensurate level.
16. Restricting groundwater use in the PVGB should reduce impacts, if any, to the Amargosa River.
17. Local well monitoring with defined thresholds and compensation can mitigate impacts to local wells to a level that is less than significant
18. Monitoring wells, coupled with thresholds that require changing water supply sources or reduced pumping, can mitigate impacts to Stump Spring ACEC to a level that is less than significant.

CONCLUSIONS

Based on the assessment of the proposed Hidden Hills Solar Electric Generating System (HHSEGS), California Energy Commission (Energy Commission) staff concludes that:

1. If not mitigated, the proposed project would exacerbate overdraft conditions in the Pahrump Valley groundwater basin. **WATER SUPPLY-1** would require the proposed project to mitigate for its groundwater use by offsetting it through a measure that would constitute a real water savings for the basin. To be effective, such offset must be associated with a documented pumping and water use history, and could not be replaced by alternative water rights.
2. Staff recommends condition of certification **WATER SUPPLY-2** which expressly limits the applicant's water use. Staff also proposes **WATER SUPPLY-3**, which requires the applicant to construct and report well-related information in accordance with appropriate LORS and install metering devices to ensure accurate reporting of water use.
3. If not mitigated, the proposed project pumping could exacerbate water level declines. Accordingly, staff proposes a monitoring plan in the conditions of certification. **WATER SUPPLY-4** monitors groundwater conditions for potential impacts on existing neighboring wells, groundwater dependent vegetation, the Stump Spring Area of Critical Environmental Concern (ACEC), and groundwater quality. The monitoring is designed to prevent potential impacts to groundwater dependent vegetation, among the other noted concerns, and therefore also compliments conditions recommended in the Biological Resources section. Staff proposes a monitoring program in condition of certification **WATER SUPPLY-5** to mitigate potential drawdown impacts in existing wells. **WATER SUPPLY-6** recommends a plan to monitor land subsidence as a result of declining water levels and aquifer dewatering that potentially may occur as a result of pumping.
4. Given the lack of evidence for a hydraulic connection, the relatively large intervening distance (about 20 miles), and uncertainty in potential flow barriers and permeability contrasts within the subsurface it would be speculative to conclude that project, pumping would adversely affect the Amargosa River. There is no available data that identifies groundwater flow paths or confirms a hydraulic connection between PVGB and the Amargosa River, so the water consumed by project pumping may or may not be a source of inflow to the Amargosa River. Although staff concludes that a significant impact due to project pumping is unlikely, **WATER SUPPLY-1** which requires an offset of project water use in the PVGB would ensure there is likely no net overall change in subsurface outflow from the PVGB that might affect the Amargosa River.
5. Staff recommends condition of certification **WATER SUPPLY-7**, which would require the applicant to obtain a permit to operate a non-transient, non-community water system with the Inyo County Environmental Health Department at least sixty (60) days prior to commencement of construction at the site. This condition would ensure

that the applicant meets all provisions of Title 22, Section 3 to provide a suitable domestic water supply.

With implementation of the conditions of certification listed below, the proposed HHSEGS project would comply with all applicable LORS, and would not result in any unmitigated significant impacts related to **WATER SUPPLY** resources.

PROPOSED CONDITIONS OF CERTIFICATION

WATER USE OFFSET PLAN

WATER SUPPLY-1 The Project owner shall submit a Water Supply Plan that will identify how the project would mitigate project overdraft impacts to Pahrump Valley Groundwater Basin (PVGB). These activities shall result in replacement of 288 acre feet per year for construction and 140 acre-feet per year for groundwater pumped from the PVGB during project operation. Replacement shall occur or be in implementation; by the time the project begins to pump groundwater for construction. The activities proposed for mitigation may include, but are not limited to, retirement of active and senior water rights, forbearance of water use, and water conservation. The proposed method would be outlined in the Water Supply Plan to be submitted to the CPM for review and approval.

The Water Supply Plan shall include the following at a minimum:

1. Identification of the activity and water source that would replace 288 acre feet per year for construction and 140 acre-feet per year for groundwater pumped from the PVGB during project operation;
2. Demonstration of the project owner's legal entitlement to the water or ability to conduct the activity;
3. Assessment of whether any artificial recharge of groundwater can be achieved while using storm water controls in accordance with **SOILS-5** and **SOILS-6** or other methods..If recharge can be achieved then the volume recharged can be used to offset project water use in accordance with this condition.
4. Include a discussion of any needed governmental approval of the identified activities, including a discussion of the discussion of the conditions of approval;
5. Discuss whether any governmental approval of the identified activities would be needed, and, if so, whether that approval would require compliance with CEQA or NEPA;
6. Demonstration of how water pumped from the PVGB would be replaced for each of the activities;
7. An estimated schedule for completion of the activities;
8. Performance measures that would be used to evaluate the amount of water replaced by the activities;
9. Monitoring and Reporting Plan outlining the steps necessary and proposed frequency of reporting to show the activities are achieving the intended benefits and replacing PVGB extractions.

The project owner shall implement the activities reviewed and approved in the Water Supply Plan in accordance with the agreed upon schedule in the Water Supply Plan. If agreement on identification or implementation of mitigation

activities cannot be achieved the project owner shall not begin construction or operation until assurance that the agreed upon activities can be identified and implemented.

Verification: The project owner shall submit a Water Supply Plan to the CPM for review 120 days prior to start of construction. Construction or operation pumping will not begin until the Water Supply Plan has been approved by the CPM and implemented by the project owner.

CONSTRUCTION AND OPERATIONS WATER USE

WATER SUPPLY-2 The proposed project's use of groundwater for all construction activities shall not exceed an average rate of 288 acre-feet per year of construction. The proposed project's use of groundwater for all operations and domestic use activities shall not exceed 140 acre-feet per year.

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 month the total volume(s) of water supplied to the project from this water source. The metering devices shall be of an adequate design for the intended use and shall be operational for the life of the project. Metering devices shall be calibrated and maintained in accordance with the manufacturers recommended procedures and schedule.

Verification: 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 water usage in gallons. The report shall also include photographs and documentation showing the type of meter and installed condition.

The project owner shall prepare an annual summary report, which will include daily usage, monthly range and monthly average of daily water usage in gallons per day, and total water used on a monthly and annual basis in acre-feet by source. For years subsequent to the initial year of operation, the annual summary report will also include the yearly range and yearly average water use by source. For calculating the total water use, the term "year" will correspond to the date established for the annual compliance report submittal. The report shall also include reports on meter calibration and maintenance, and document it is in working order.

PROJECT GROUNDWATER WELLS

WATER SUPPLY-3 PRE-WELL INSTALLATION The project owner proposes to construct and operate six groundwater production wells onsite that will produce water from the Pahrump Valley basin. The project owner shall ensure that each well is completed in accordance with all applicable state and local water well construction permits and requirements, including Inyo County code Chapter 14.28 Water Wells. Prior to initiation of well construction activities, the project owner shall submit for review and comment a well construction packet to the Inyo County Environmental Services and fees

normally required for county well permits, with copies to the CPM. The Project shall not construct a well or extract and use groundwater without CPM approval to construct and operate the well.

POST-WELL INSTALLATION. The project owner shall provide documentation to the county with copies to the CPM that the well has been properly completed. In accordance with California's Water Code section 13754, the driller of the well shall submit to the DWR a Well Completion Report for each well installed. The project owner shall ensure the Well Completion reports are submitted. The project owner shall ensure compliance with all county water well standards and requirements for the life of the wells and shall provide the CPM with two (2) copies each of all monitoring or other reports required for compliance with the Inyo County Environmental Health Services water well standards and operation requirements, as well as any changes made to the operation of the well.

DESTRUCTION OF WELLS. On property controlled by the project owner the project owner shall protect groundwater resources by abandoning all groundwater wells that will not be used for project purposes. These groundwater wells shall be abandoned in accordance with all applicable state and local water well abandonment requirements, including the California Department of Water Resources Bulletins 74-81 & 74-90. Prior to the start of well construction activities, the project owner shall submit for review and comment a well abandonment packet to Inyo County, in accordance with the Inyo County Code Title 14, Chapter 14.28, containing the documentation, plans, and fees normally required for the county's well abandonment permit, with copies to the CPM for review and approval.

Verification: The project owner shall do all of the following:

1. No later than sixty (60) days prior to the construction of the onsite groundwater production wells, the project owner shall submit to the CPM a copy of the water well construction packet submitted to the Inyo County Environmental Health Services for review and comment.
2. No later than thirty (30) days prior to the construction of the onsite groundwater production wells, the project owner shall submit a copy of written concurrence received from the Inyo County Environmental Health Department that the proposed well construction activities comply with all county well requirements and meet the requirements established by the county's water well permit program for review and comment
3. No later than sixty (60) days after installation of each well at the project site, the project owner shall ensure that the well driller submits a Well Completion Report to the DWR with a copy provided to the CPM. The project owner shall submit to the CPM, together with the Well Completion Report, a copy of well drilling logs, water quality analyses, and any inspection reports.

4. During well construction and for the operational life of the well, the project owner shall submit two (2) copies each to the CPM of any proposed well construction or operation permit changes and shall submit copies within ten (10) days of submittal to or receipt from the Inyo County Environmental Health Services for review and comment and to the CPM for review and approval.
5. No later than fifteen (15) days after completion of the onsite groundwater production wells, the project owner shall submit documentation to the CPM, and the Lahontan RWQCB that well drilling activities were conducted in compliance with Title 23, California Code of Regulations, Chapter 15, Discharges of Hazardous Wastes to Land, (23 CCR, sections 2510 et seq.) requirements and that any onsite drilling sumps used for project drilling activities were removed in compliance with 23 CCR section 2511(c).
6. No later than 180 days after the start of project construction the project owner shall provide a plan showing the results of a site survey to identify abandoned wells and a schedule for completion of abandonment of wells for CPM review and approval. Abandonment shall be conducted in accordance with the approved plan.

GROUNDWATER MONITORING AND REPORTING FOR IMPACTS AND MITIGATION FOR GROUNDWATER-DEPENDENT VEGETATION, NEIGHBORING WELLS, AND WATER QUALITY

WATER SUPPLY—4 The project owner shall submit a Groundwater Monitoring, Mitigation, and Reporting Plan (GMMRP) to the Inyo County Water Department for review and to the CPM for review and approval in advance of construction activities and prior to the operation of onsite groundwater supply wells. The plan shall monitor select private wells and proposed project supply and monitoring wells. It shall explain the timing and methodology for monitoring site and off-site groundwater levels and quality. The monitoring period shall include pre-construction, construction, and project operation. The report shall document background conditions and pre-construction conditions and trends and plans to monitor project related trends that can be quantitatively compared against background and pre-construction conditions near project pumping wells and near potentially impacted resources (groundwater dependent ecosystems and domestic wells).

The GMMRP shall include a scaled map showing the site and vicinity, existing well locations, and proposed monitoring well locations (both existing wells and new monitoring wells proposed for construction). The map shall also include relevant natural and man-made features (existing and proposed as part of this project).

The monitoring network is intended to protect groundwater dependent vegetation, other groundwater users and groundwater quality that may be within the influence of project pumping during the project life. The projected area of groundwater drawdown shall be refined on an annual basis during project construction and every year during project operations using the data acquired in fulfillment of this condition. The GMMRP also shall provide: (1)

available well construction information and borehole lithology for each existing well proposed for use as a monitoring well; (2) description of proposed design, drilling and installation methods for new monitoring and water supply wells; and, (3) schedule for completion of the work for all existing wells included in the monitoring network. The GMMRP shall include a well survey that documents the drilling methods employed to construct existing wells, the individual well construction as-builds, borehole lithology recorded from the drill cuttings, well development, geophysical survey, and well survey results—to the extent the information is available—and describe how the well is designed to provide groundwater level and quality samples that would be appropriate for measurement of water levels and quality. The well survey shall measure the location and elevation of the top of the well casing and reference point for all water level measurements, and shall include the coordinate system and datum for the survey measurements for all existing and proposed wells.

A. Prior to Project Construction

1. A well reconnaissance shall be conducted to investigate and document the condition of existing water supply wells located within 3 miles of the project site boundary, provided that access is granted by the well owners. The reconnaissance shall include sending notices by registered mail to all property owners within a 3 mile radius of the project area, shall identify the owner of each well, and shall include the location, depth, screened interval, pump depth, static water level, pumping water level, and capacity of each well, to the extent such information is reasonably available or can be measured. The plan should include agreements from the owner of each well that approves participation in the monitoring activities.
2. The project owners shall install up to 11 monitoring wells, subject to the ability to gain access and the right to use certain off-site well locations. All newly constructed monitoring wells shall be constructed consistent with appropriate Federal, State and Inyo County specifications.
3. The monitoring plan and network of monitoring wells shall make use of existing and new monitoring wells installed by the project owner. All monitoring wells shall be installed to a depth that matches the depth of the project pumping wells. The monitoring network shall include the following wells at a minimum:
 - Three wells (Power Block 1 Onsite Monitoring Wells) directly up-gradient (gradient hereafter refers to groundwater potentiometric surface identified in **Water Supply Figure 4**) from the Power Block 1 production well, in a linear array, within the property boundary. Wells shall be installed within one-half mile of the Power Block 1 production well at different distances from the production wells.

- One well (Power Block 1 Offsite Monitoring Well) directly up-gradient from the Power Block 1 production well, between 1.0 and 1.5 miles from the project property boundary at the western edge of the mesquite bosque on BLM land (herein known as the BLM Mesquite Bosque Well 1) .
 - Three wells (Power Block 2 Onsite Monitoring Wells) directly up-gradient from Power Block 2, in a linear array, within the property boundary. Wells shall be installed within one-half mile of the Power Block 1 production well at different distances from the production wells.
 - One well (Power Block 2 Offsite Monitoring Well) directly up-gradient from Power Block 2, between 1.0 and 1.5 miles from the project property boundary (BLM Mesquite Bosque Well 2).
 - One well (Southern Monitoring Well) at the southern end of the site within the project boundaries.
 - One well (Northern Monitoring Well) at the northern end of the site within the project boundaries.
 - One well (Offsite California Monitoring Well between 0.5 and 1.0 miles from the southwest corner of the site, located between a bearing of southwest (225°) and west (270°). An alternative location can be approved by the CPM.
4. As authorized access allows, measure groundwater levels in the off-site background wells and on-site pumping and monitoring wells to provide preconstruction groundwater level trends. Construct water level maps of the PVGB for the area within 3 miles of the site boundary using the preconstruction groundwater data. Update trend plots and statistical analyses as data becomes available. The CPM may also modify the frequency of measurement required in Section B. and C., below, depending on the trends demonstrated by the monitoring results.
 5. Commence water quality monitoring to establish pre-construction groundwater quality conditions in the monitored wells.
 6. Prior to use of any groundwater for construction, all baseline groundwater level and quality monitoring data shall be reported to the CPM. The report shall include the following:
 - a) An assessment of pre-project groundwater levels and a summary of available weather information (monthly average temperature and rainfall records from the nearest weather station).
 - b) An assessment of pre-project groundwater quality with groundwater samples analyzed for TDS, chloride, nitrates, major cations and anions, coliform bacteria, radioactivity, taste and odor, oxygen-18 and deuterium isotopes. The report to the CPM shall assess the

utility of these constituents for future monitoring. Any recommendations to add or remove constituents shall be supported with the data and other relevant factual evidence. The CPM shall finalize the required list of constituents to be analyzed based on these recommendations and review of two years of monitoring results. The CPM may also modify the frequency of sampling required in Section B. and C., below depending on the trends demonstrated by the monitoring results.

- c) The data shall be tabulated, summarized, and submitted to the CPM. The data summary shall include the range (minimum and maximum values), average, and median for each constituent analyzed. If a sufficient number of data points are available, the data shall also be analyzed using the Mann-Kendall test for trend at 90 percent confidence to assess whether pre-project water quality trends, if any, are statistically significant.

B. During Construction:

1. Continuously collect water levels (every hour at minimum) using a pressure transducer from wells within the monitoring network and report water levels on a monthly basis throughout the construction period and at the end of the construction period. If non-vented pressure transducers are being utilized for water levels, a separate pressure transducer shall be used to collect data at the same frequency collected from well pressure transducers. Perform statistical trend analysis on the water level data. Assess apparent trend and delineate project-induced drawdown using the distance-drawdown method and the method described in USGS Scientific Investigations Report 2006-5024, or by using an alternative trend analysis approved by the CPM. Measured water levels shall be analyzed using the USGS trend analysis methods to remove extraneous factors such as local decline, pumping from other locations, and barometric effects. Statistically significant pre-construction and background trends, if any, shall be removed from the observed water levels trends. The remaining drawdown will be presumed to represent the project-related-drawdown, and the project-related-drawdown will be plotted on a distance-drawdown semi-log plot. Statistical analysis and projected drawdown estimates shall be calculated at intervals frequent enough to detect a decline in water levels that will extend to the project boundary and determine if and when the trigger specified in D.1 may be reached.
2. During project construction, the project owner shall monthly monitor the quality of groundwater and changes in groundwater quality in the monitoring network and submit data semiannually to the CPM. The summary report shall document water quality monitoring methods, the water quality data, water quality plots, and a comparison between pre-

and post-construction water quality trends as itemized below. The report shall also include a summary of actual water use conditions.

- a) Groundwater samples from all wells in the monitoring well network shall be analyzed and reported semiannually for the constituent list approved by the CPM as part of A.6.b.
- b) The compliance data shall be analyzed for both trends and for contrast with the pre-project data. For analysis purposes, pre-project water quality shall be defined by samples collected prior to project construction as specified above, and compliance data shall be defined by samples collected after the construction start date.
 - i. Trends shall be analyzed using the Mann-Kendall test for trend at the 90 percent confidence. Trends in the compliance data shall be compared and contrasted to pre-project trends, if any.
 - ii. The difference between pre-project and compliance mean or median concentrations shall be compared using an Analysis of Variance (ANOVA) or other appropriate statistical method approved by the RWQCB for evaluation of water quality impacts. A parametric ANOVA (for example, an F-test) can be conducted on the two data sets if the residuals between observed and expected values are normally distributed and have equal variance, or the data can be transformed to an approximately normal distribution. If the data cannot be represented by a normal distribution, then a nonparametric ANOVA shall be conducted (for example, the Kruskal-Wallis test). If a statistically significant difference is identified at 90 percent confidence between the two data sets, the monitoring data are inconsistent with random differences between the pre-project and baseline data indicating a significant water quality impact from project pumping may be occurring.
 - iii. Contour maps of cumulative change in water level since the start of the project shall be prepared.

C. During Operation:

1. Continuously collect water levels (every hour at minimum) using a pressure transducer from wells within the monitoring network and report water levels on a monthly basis for the first year of operation and quarterly thereafter. If non-vented pressure transducers are being utilized for water levels, a separate pressure transducer shall be used to collect data at the same frequency collected from well pressure transducers. Operational parameters (i.e., pumping rate and time of pumping) of the water supply wells shall be monitored and reported. Additionally, quarterly groundwater use in the southern PVGB shall be estimated based on available land and water use information.

2. On an annual basis, perform statistical trend analysis of water level data and compare to predicted water level declines due to project pumping. Assess apparent trend and delineate project-induced drawdown using the distance-drawdown method and the method described in USGS Scientific Investigations Report 2006-5024, or by using an alternative trend analysis approved by the CPM. Observed changes in water level in the monitoring wells shall be analyzed using the USGS trend analysis methods to remove extraneous factors such as local decline, pumping from other locations, and barometric effects. Statistically significant pre-construction and background trends, if any, shall be removed from the observed water levels trends. The remaining drawdown will be presumed to represent the project-related-drawdown, and the project-related-drawdown, which shall be plotted on a distance-drawdown semi-log plot.

3. During the first year of project operation, the project owner shall monthly monitor the quality of groundwater and changes in groundwater quality in the monitoring network and submit data semiannually to the CPM. After the first year of project operation, the project owner shall quarterly monitor the quality of groundwater and changes in groundwater quality in the monitoring network and submit data semiannually to the CPM. The summary report shall document water quality monitoring methods, the water quality data, water quality plots, and a comparison between pre- and post-construction water quality trends as itemized below. The report shall also include a summary of actual water use conditions.
 - a) Groundwater samples from all wells in the monitoring well network shall be analyzed and reported semiannually for the constituent list approved by the CPM as part of A.6.b.

 - b) The compliance data shall be analyzed for both trends and for contrast with the pre-project data. For analysis purposes, pre-project water quality shall be defined by samples collected prior to project construction as specified above, and compliance data shall be defined by samples collected after the construction start date.
 - i. Trends shall be analyzed using the Mann-Kendall test for trend at the 90 percent confidence. Trends in the compliance data shall be compared and contrasted to pre-project trends, if any.

 - ii. The difference between pre-project and compliance mean or median concentrations shall be compared using an Analysis of Variance (ANOVA) or other appropriate statistical method approved by the RWQCB for evaluation of water quality impacts. A parametric ANOVA (for example, an F-test) can be conducted on the two data sets if the residuals between observed and expected values are normally distributed and

have equal variance, or the data can be transformed to an approximately normal distribution. If the data cannot be represented by a normal distribution, then a nonparametric ANOVA shall be conducted (for example, the Kruskal-Wallis test). If a statistically significant difference is identified at 90 percent confidence between the two data sets, the monitoring data are inconsistent with random differences between the pre-project and baseline data indicating a significant water quality impact from project pumping may be occurring.

- iii. Contour maps of cumulative change in water level since the start of the project shall be prepared.

D. Mitigation During Construction and Operation

1. If water levels in either of the Power Block 1 or Power Block 2 Onsite Monitoring Wells identify a projected 0.5 foot or greater water level decline at the property boundary due to project pumping during construction or operation, the project owner shall comply with BIO-23 and reduce, modify, or stop project pumping until the project owner can show:
 - the pumping can be reduced or modified to maintain groundwater levels above the 0.5 ft. drawdown threshold at the project boundary; or
 - the drawdown trigger was exceeded due to factors other than the project pumping and the project did not contribute to the drawdown; or
 - through vegetation monitoring and soil coring described in **BIO-23** and predictive water level trend analysis in C.2. of this condition, that a greater groundwater drawdown will not result in significant adverse impacts to the groundwater dependent vegetation.
2. If the CPM concludes water levels in neighboring wells have been lowered beyond pre-project water levels, then the project owner shall provide mitigation to the impacted well owner(s). Mitigation shall be provided to the impacted well owners that experience 10 feet or more of project-related drawdown (under static, non-pumping conditions). The type and extent of mitigation shall be determined by the amount of water level decline induced by the project, 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 access to the project owner to document well location and construction, including pump intake depth,

and that the well was constructed and usable before project pumping was initiated. The mitigation of impacts shall be determined as follows:

- a) If project pumping has lowered water levels by 10 feet or more 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 on an annual or one-time lump sum basis. In the absence of specific electrical use data supplied by the well owner, the project owner shall use **WATER SUPPLY-5** to calculate increased energy costs.
- b) If groundwater monitoring data indicate project pumping has lowered water levels below the top of the well screen or slots (if known), and the well yield is shown to have decreased and is no longer capable of meeting 110-percent of the well owner's maximum daily demand, dry-season demand, or annual demand – assuming the pre-project well yield documented by the initial well reconnaissance met or exceeded these yield levels – compensation shall be provided for the diagnosis and maintenance to treat and remove encrustation from the well screen or slots. 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 the well yield reductions be recurring, the project owner shall provide payment or reimbursement for periodic maintenance throughout the life of the project. If with treatment the well yield is incapable of meeting 110-percent of the well owner's maximum daily demand, dry season demand, or annual demand the well owner should be compensated by reimbursement or well replacement.
- c) If project pumping has lowered water levels to significantly impact well yield so that it can no longer meet its intended purpose, causes the well to go dry, or cause casing collapse, payment or reimbursement of an amount equal to the cost of deepening or replacing the well shall be provided to accommodate 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 110-percent of the well owner's maximum daily demand, dry-season demand, or annual demand – assuming the pre-project well yield documented by the initial well reconnaissance met or exceeded these yield levels.

- d) The project owner shall notify any private well owners of the impacted wells within one month of the CPM approval of the compensation analysis for increased energy costs.
 - 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 owner shall reimburse the impacted well owner for the costs associated with lowering pumps.
 - 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 new wells constructed. The project owner shall reimburse the impacted well owner for all costs associated with deepening existing wells or constructing new wells shall be borne by the project owner.
3. If the Project's pumping is proven to not be contributing to the water level decline in mesquite habitat projected at the site boundary, the trigger for action can be revised in increments of 0.5 foot. In this case, D.1. would be revised to 1.0 foot, 1.5 feet, etc. The revision of the trigger set in D.1. is dependent on the project owner's demonstration that project pumping is not responsible for the decline in the vigor of mesquite habitat adjacent to the property and around the Stump Spring ACEC. This revision to the condition also requires CPM approval.
 4. Groundwater quality data shall be used to ensure the project owner complies with the requirements of WATER SUPPLY-7. If the water quality data show that project pumping is causing a decline in water quality that could lead to exceedance of the allowable Water Quality Objectives for beneficial uses of the PVGB the project owner shall prepare an engineering report consistent with the RWQCB requirements for protection of beneficial uses (See also SOILS-9, Septic System). It is the Commission's intent that these requirements be enforceable by both the Commission and the Lahontan RWQCB. Accordingly, the Commission and the RWQCB shall confer with each other and coordinate, as needed, in enforcement of the requirements for any measures that may be required to protect beneficial uses.
 5. 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 lump-sum payments are made, payment is made by March 31 following the first year of operation only. 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.

6. During the life of the project, the project owner shall provide to the CPM all monitoring reports, complaints, studies and other relevant data within 10 days of being received by the project owner.

Verification The project owner shall do all of the following:

1. At least six weeks prior to the start of construction activities, a Groundwater Monitoring, Mitigation, and Reporting Plan (GMMRP) shall be submitted to Inyo County Water Department, the Bureau of Land Management Nevada and California state leads for Soil, Water, Air and Riparian Programs, and the BLM Southern Nevada District and Barstow District Hydrologist and Botanist for review and comment and the CPM for review and approval.
2. At least 30 days prior to operation of the site groundwater supply wells for construction, the project owner shall submit to the CPM a comprehensive report presenting all the baseline groundwater level and quality data required by section A of **WATER SUPPLY-4** above. The report shall include the following:
 - a. An assessment of pre-project groundwater quality with groundwater samples analyzed for TDS, chloride, nitrates, major cations and anions, and oxygen-18 and deuterium isotopes. These analyses, and particularly the stable isotope data, can be useful for identifying partially evaporated water sources and assessing their contributions to the quality of water produced by wells.
 - b. The data shall be tabulated, summarized, and submitted to the CPM. The data summary shall include the estimated range (minimum and maximum values), average, and median for each constituent analyzed.
3. During project construction, the project owner shall submit to the CPM reports presenting all the data and information required in item B above. The reports shall be provided 30 days following the end of the monitoring period. The project owner shall also submit to the CPM all calculations and assumptions made in development of the report data and interpretations.
4. No later than March 31 of each year of construction or 60 days prior to 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.
5. During project operation, the project owner shall submit to the CPM, applicable monthly, quarterly, semiannual, and annual reports presenting all the data and information required in section C above. Reports shall be submitted to the CPM 30 days following the end of the monitoring period. The fourth quarter report shall serve as the annual report and shall be provided on January 31 in the following year. 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.

After the first five year operational and monitoring period, the project owner shall submit a five year monitoring report to the CPM that includes all monitoring data collected and a summary of the findings. The CPM shall determine if the water level measurements and sampling frequencies should be revised.

GROUNDWATER PUMPING COST CALCULATION

WATER SUPPLY-5 Where it is determined that the project owner shall reimburse a private well owner for increased energy costs identified as a result of analysis performed in Condition of Certification **WATER SUPPLY-4**, the project owner shall calculate the compensation owed to any owner of an impacted well as described below.

Increased cost for energy = change in lift/total system head x total energy consumption x costs/unit of energy

Where:

change in lift (ft) = calculated change in water level in the well resulting from project

total system head (ft) = elevation head + discharge pressure head

elevation head (ft) = difference in elevation between wellhead discharge pressure gauge and water level in well during pumping.

discharge pressure head (ft) = pressure at wellhead discharge gauge (psi) X 2.31

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.

- A. 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 and within a 5-mile radius of the project site.
- B. The project owner shall notify all owners of the impacted wells within one month of the CPM approval of the compensation analysis for increase energy costs.
- C. Compensation shall be provided on either 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 163 acre-feet per year. Compensation associated with increased pumping lift for the life of the project shall be estimated as a lump sum payment as follows:

- A. 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;
- B. An annual inflation factor for energy cost of 3 percent; and
- C. A net present value determination assuming a term of 30 years and a discount rate of 9 percent;

Verification: The project owner shall do all of the following:

1. No later than 30 days after CPM approval of the well drawdown analysis, the project owner shall submit to the CPM for review and approval all documentation and calculations describing necessary compensation for energy costs associated with additional lift requirements.
2. 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. Compensation payments shall be made by March 31 of each year of project operation or, if lump-sum payment is selected, payment shall be made by March 31 of the first year of operation only. 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.

GROUND SUBSIDENCE MONITORING AND ACTION PLAN

WATER SUPPLY-6 One monument monitoring station per production well or a minimum of three stations shall be constructed to measure potential inelastic subsidence that may alter surface characteristics of the PVGB and affect structures near the proposed production wells. The project owner shall:

- A. Prepare and submit a Subsidence Monitoring Plan (SMP), including all calculations and assumptions. The plan shall include the following elements:

1. Construction diagrams of the proposed monument monitoring stations including size and description, planned depth, measuring points, and protection measures;
 2. Map depicting locations (minimum of three) of the planned monument monitoring stations;
 3. Monitoring program that includes monitoring frequency, thresholds of significance, reporting format.
- B. Prepare annual reports commencing three (3) months following commencement of groundwater production during construction and operations.
1. The reports shall include presentation and interpretation of the data collected including comparison to the thresholds developed in Item C.
- C. Prepare a Mitigation Action Plan that details the following:
1. Thresholds of significance for implementation of proposed action plan based on monitoring station data;
 - a. Subsidence shall not be allowed to damage existing structures either on or off the site or alter the appearance or use of the structure;
 - b. Any subsidence that may occur shall not be allowed to alter natural drainage patterns or permit the formation of playas or lakes;
 - c. If any subsidence violates (a) or (b) the project owner shall investigate the need to immediately modify or cease pumping for project operations until the cause is interpreted and subsidence caused by project pumping abates and the structures and/or drainage patterns are stabilized and corrected.
 2. The project owner shall prepare an Action Plan that details proposed actions by the applicant in the event thresholds are achieved during the monitoring program

The project owner shall submit the Ground Subsidence Monitoring and Action Plan that is prepared by an Engineering Geologist registered in the State of California thirty (30) days prior to the start of extraction of groundwater for construction or operation.

Verification: The project owner shall do all of the following:

1. At least thirty (30) days prior to project construction, the project owner shall submit to the CPM, a comprehensive report presenting all the data and information required in item A above.

2. During project construction and operations, the project owner shall submit to the CPM quarterly reports presenting all the data and information required in item B above.
3. The project owner shall submit to the CPM all calculations and assumptions made in development of the report data and interpretations.
4. After the first five (5) years of the monitoring period, the project owner shall submit a 5-year monitoring report to the CPM that submits all monitoring data collected and provides a summary of the findings. The CPM shall determine if the Ground Subsidence Monitoring and Action Plan frequencies should be revised..

NON-TRANSIENT, NON-COMMUNITY WATER SYSTEM

WATER SUPPLY-7 The project is subject to the requirements of California Code of Regulations, Title 22, Article 3, Sections 64400.80 through 64445 (22 CCR § 64400.80 – 64445) for a non-transient, non-community water system (serving 25 people or more for more than six months). The project owner shall submit water system plans to Inyo County Environmental Health Services for review and approval. In addition, the system will require periodic monitoring consistent with **WATER SUPPLY-4**, for various bacteriological, inorganic and organic constituents.

Verification: The project owner shall obtain a permit to operate a non-transient, non-community water system with the Inyo County Environmental Health Services at least sixty (60) days prior to commencement of construction at the site. In addition, the project owner shall submit to the CPM a monitoring and reporting plan for production wells operated as part of the domestic water supply system prior to plant operations. The plan shall include reporting requirements including monthly, quarterly, and annual submissions.

The project owner shall designate a California Certified Water Treatment Plant Operator as well as the technical, managerial, and financial requirements as prescribed by State law. The project owner shall supply the CPM updates on an annual basis regarding monitoring requirements, any submittals to the Inyo County Environmental Health Services, and proof of annual renewal of the operating permit.

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WATER SUPPLY - FIGURE 1

Hidden Hills Solar Electric Generating System (HHSEGS)

The Great Basin is a large-scale, topographically closed surface water basin. The area is also aligned with the Basin and Range geologic province, which is characterized by extension, and an alternating mountain/valley-fill landscape.

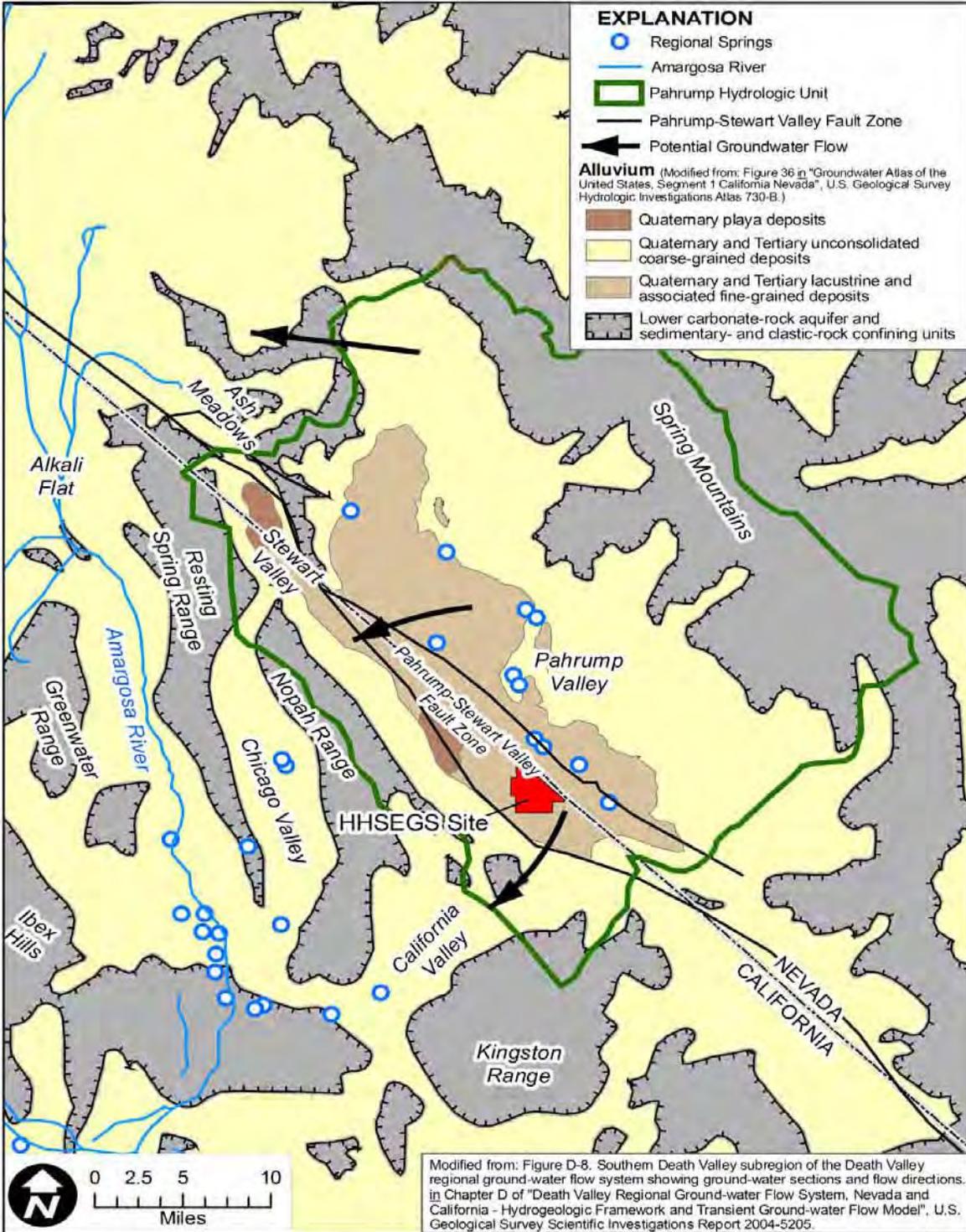


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: USGS, 2011

WATER SUPPLY - FIGURE 2

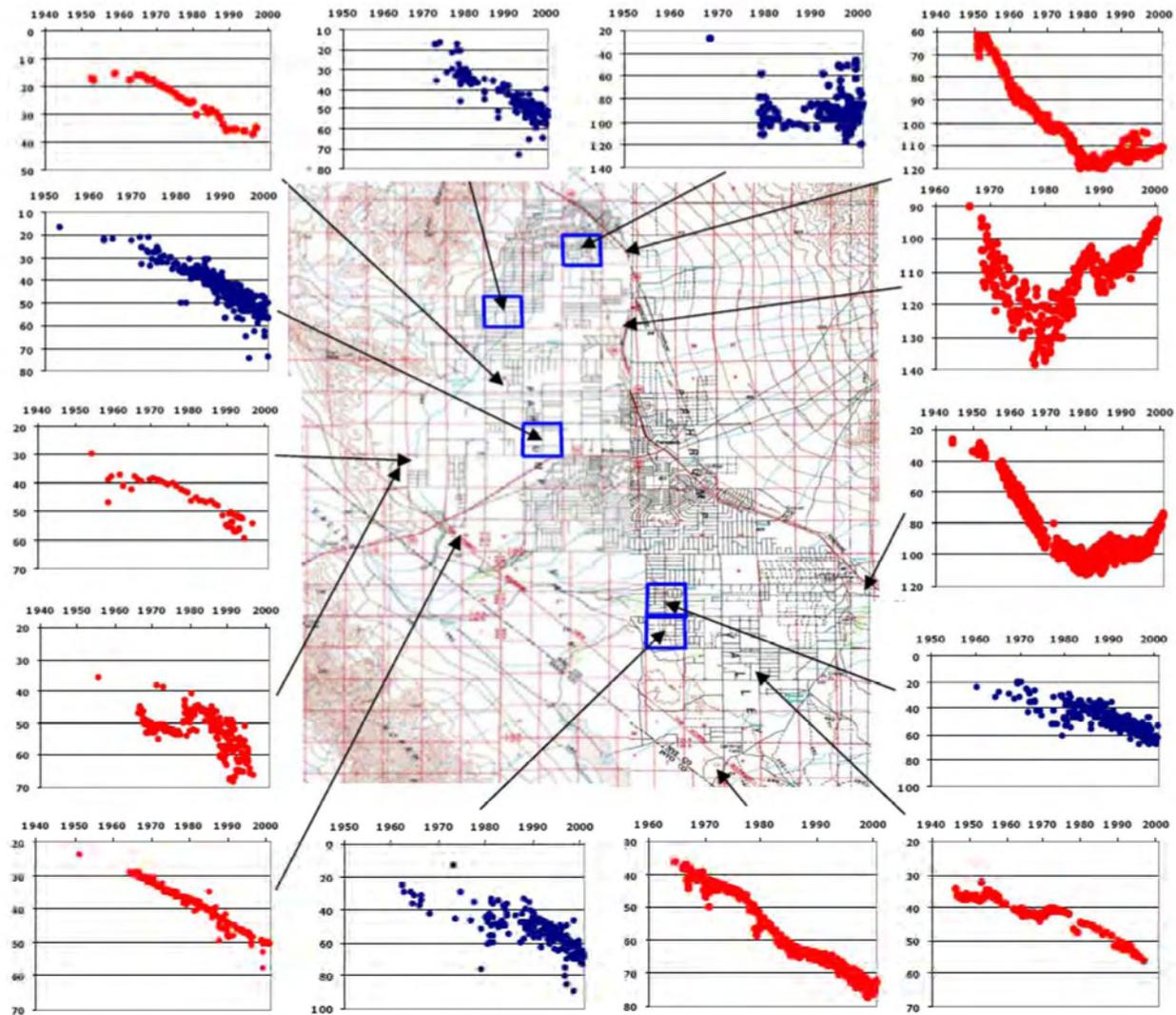
Hidden Hills Solar Electric Generating System (HHSEGS)

The Pahrump Valley and vicinity.



WATER SUPPLY - FIGURE 3 Hidden Hills Solar Electric Generating System (HHSEGS)

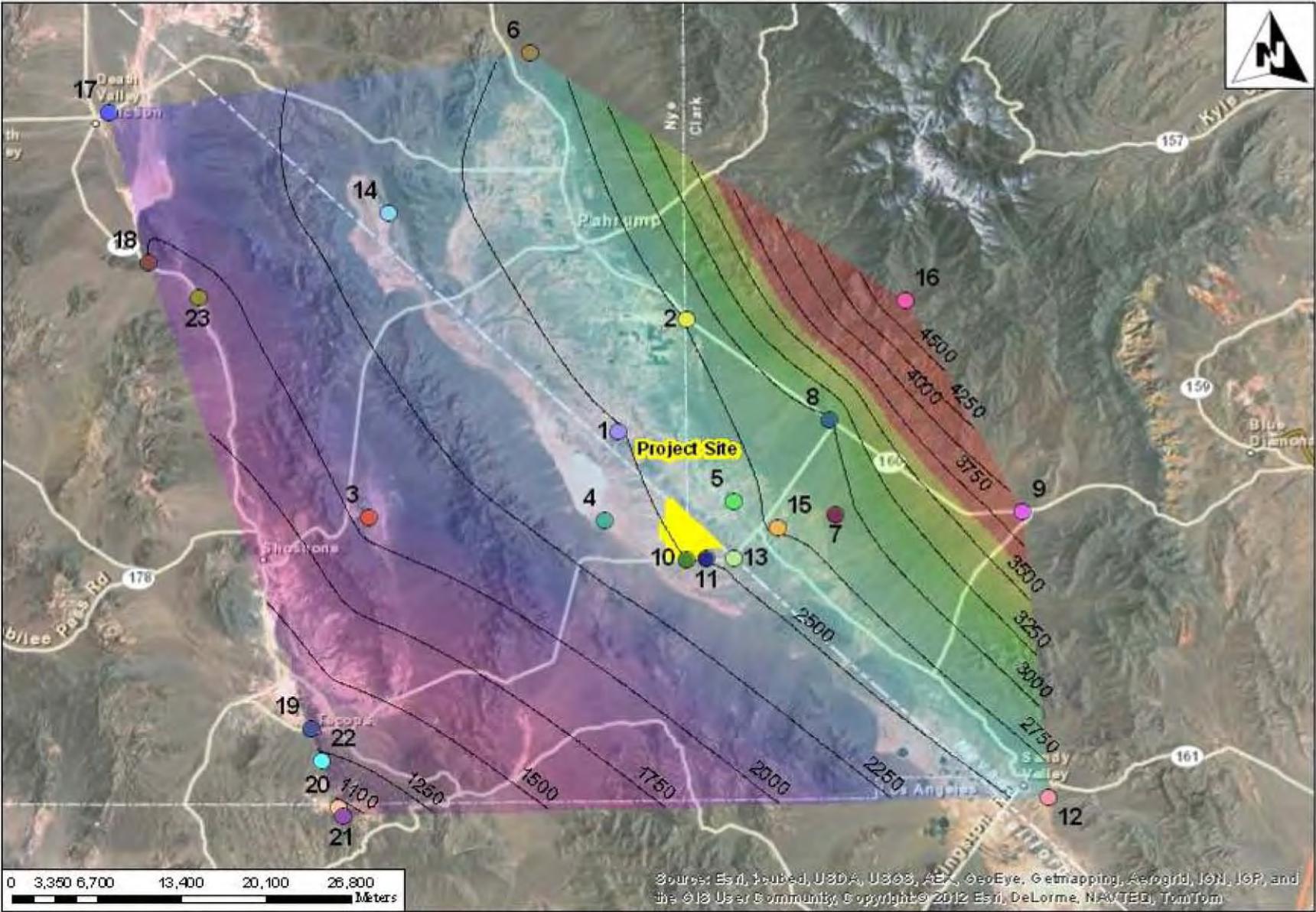
Water levels in northern Pahrump Valley between 1940 and 2000. Vertical axes represent feet below land surface.



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: Buqo, 2004

WATER SUPPLY - FIGURE 4

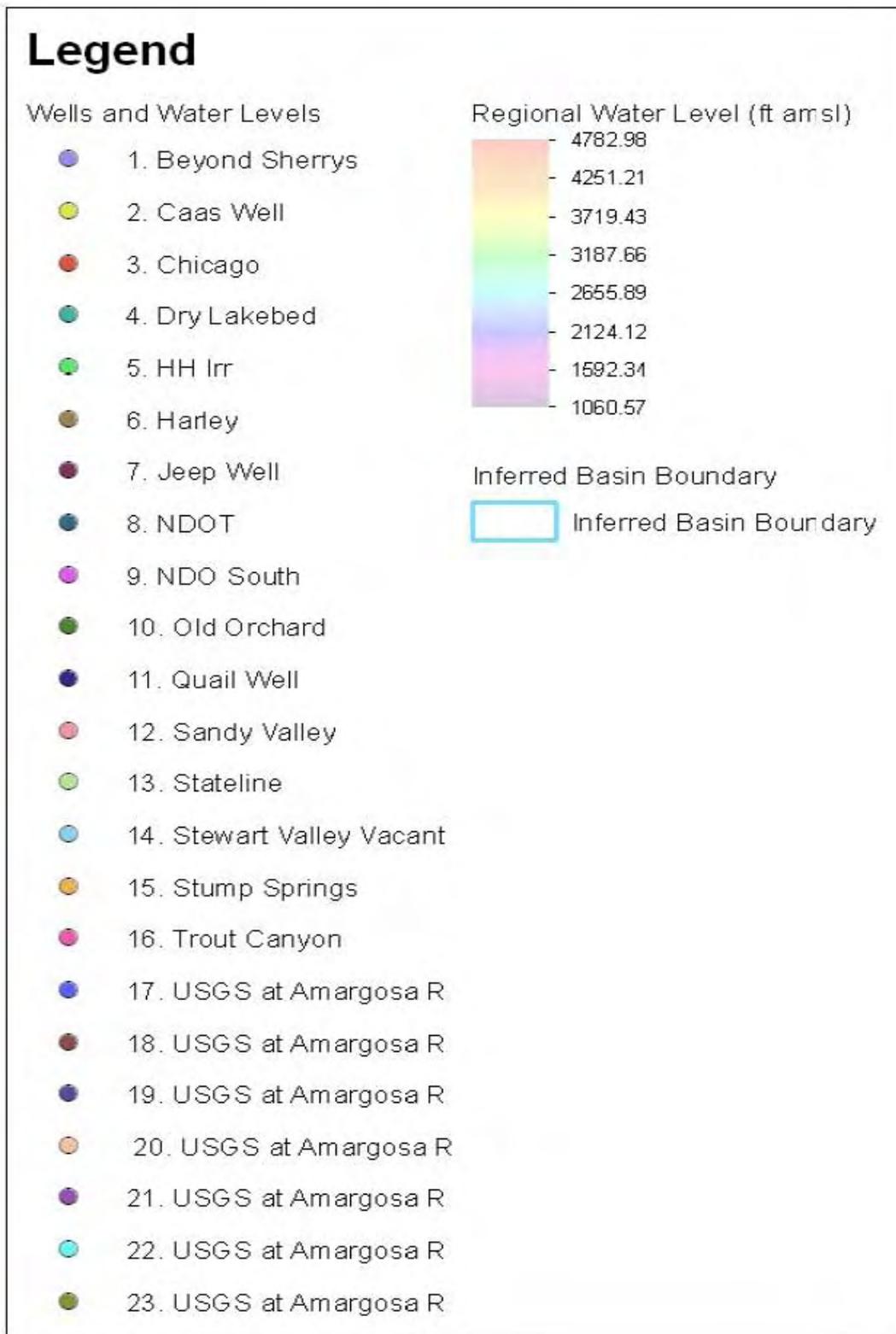
Hidden Hills Solar Electric Generating System (HHSEGS) - Inferred potentiometric surface for Pahrump Valley, based on 2011 water level data, extrapolated a little north, to the Amargosa River in the west, and Sandy Valley to the south (see **WATER SUPPLY: Figure 5** for Legend).



WATER SUPPLY

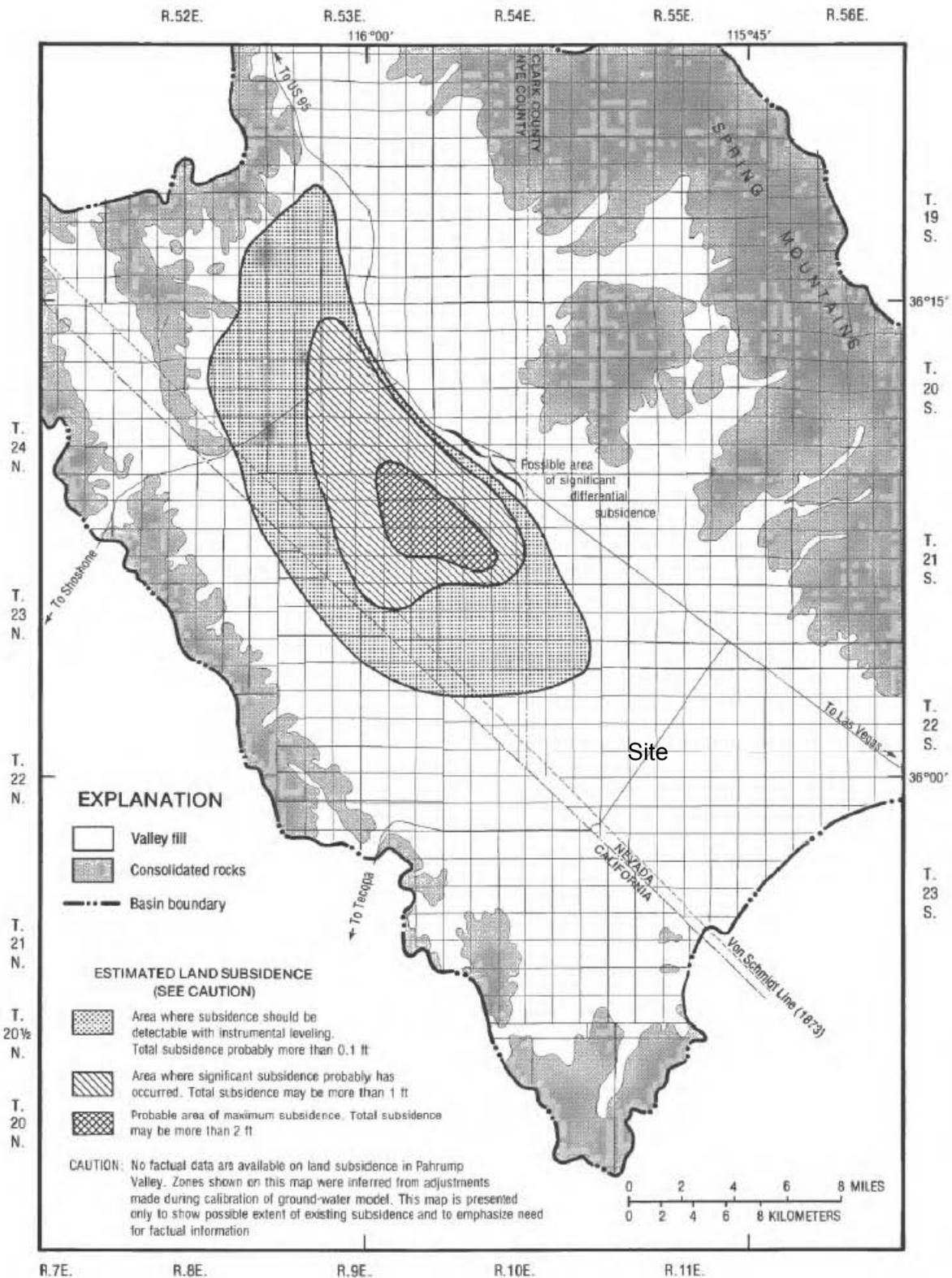
WATER SUPPLY - FIGURE 5

Hidden Hills Solar Electric Generating System (HHSEGS)– Legend for **WATER SUPPLY: Figure 4.**



WATER SUPPLY - FIGURE 6

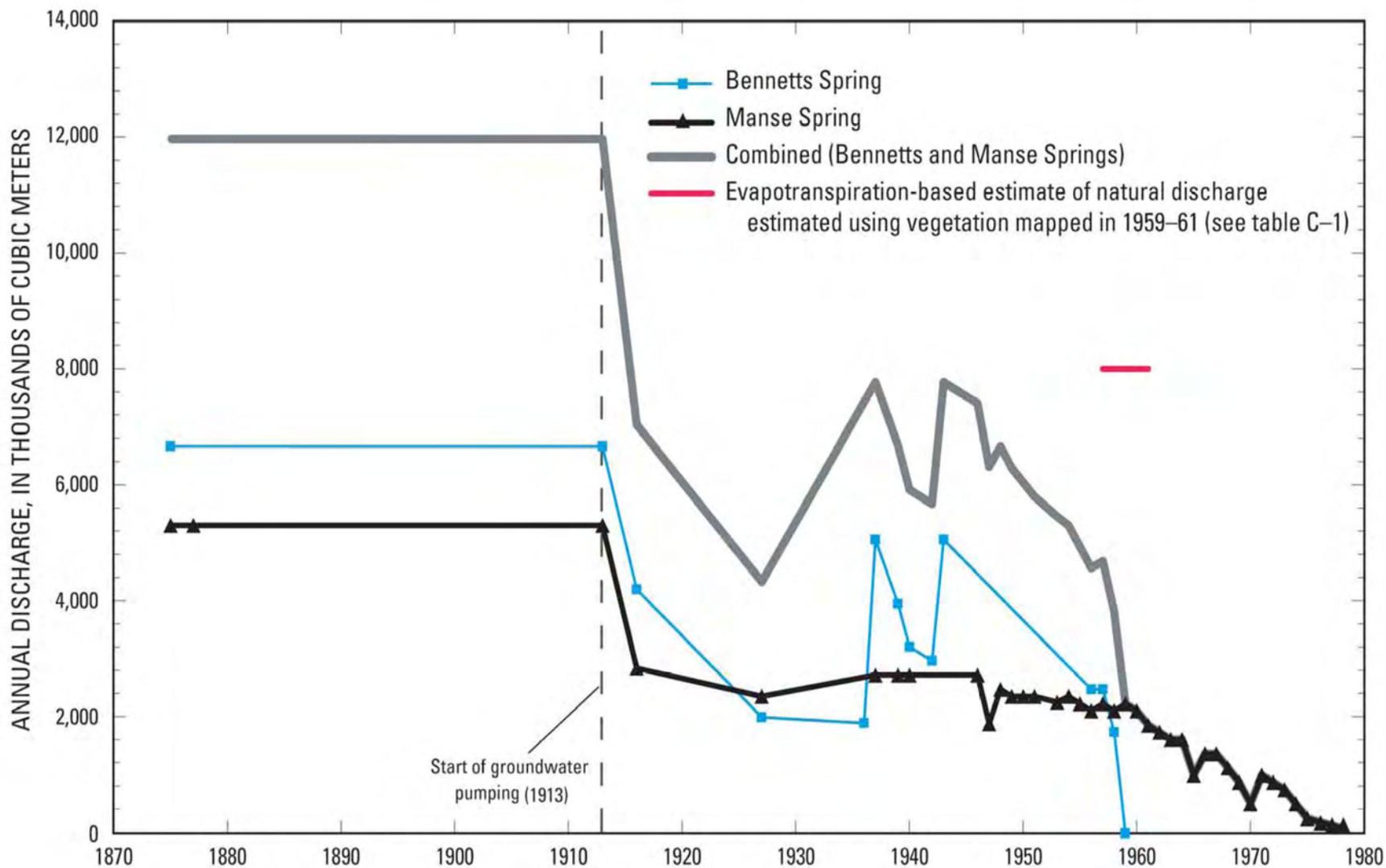
Hidden Hills Solar Electric Generating System (HHSEGS) – Estimated land subsidence in Pahrump Valley.



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: Harrill, 1986

WATER SUPPLY - FIGURE 7

Hidden Hills Solar Electric Generating System (HHSEGS) - Annual discharge estimates for Bennetts and Manse Spring, for years 1870 through 1980.



WATER SUPPLY

WATER SUPPLY - FIGURE 8

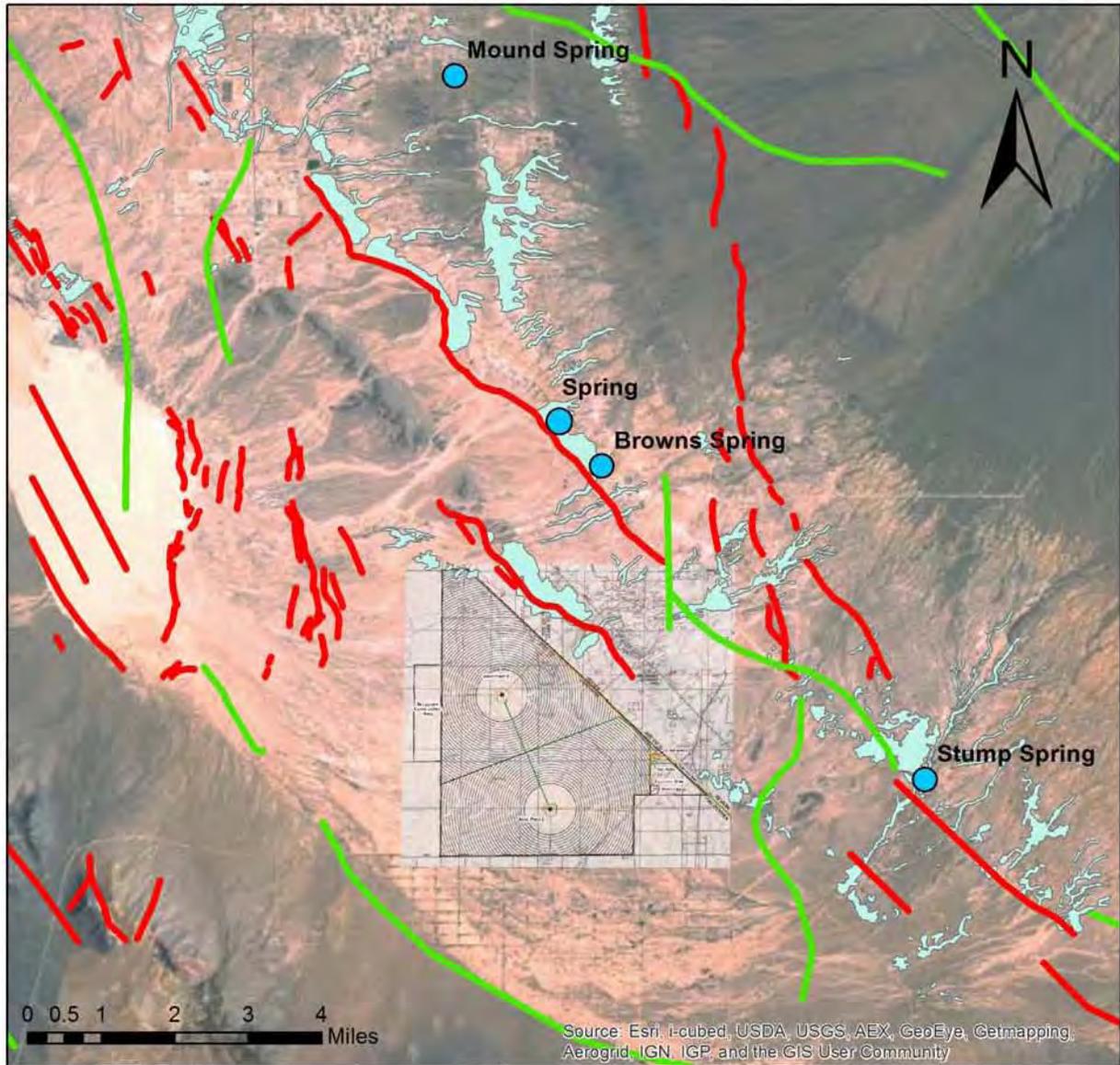
Hidden Hills Solar Electric Generating System (HHSEGS) – Mesquite stands in the vicinity of the project (Malmburg, 1967).



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: Malmburg, 1967

WATER SUPPLY - FIGURE 9

Hidden Hills Solar Electric Generating System (HHSEGS) – Mesquite-acacia habit mapped by BLM staff in the 1990s.



Legend

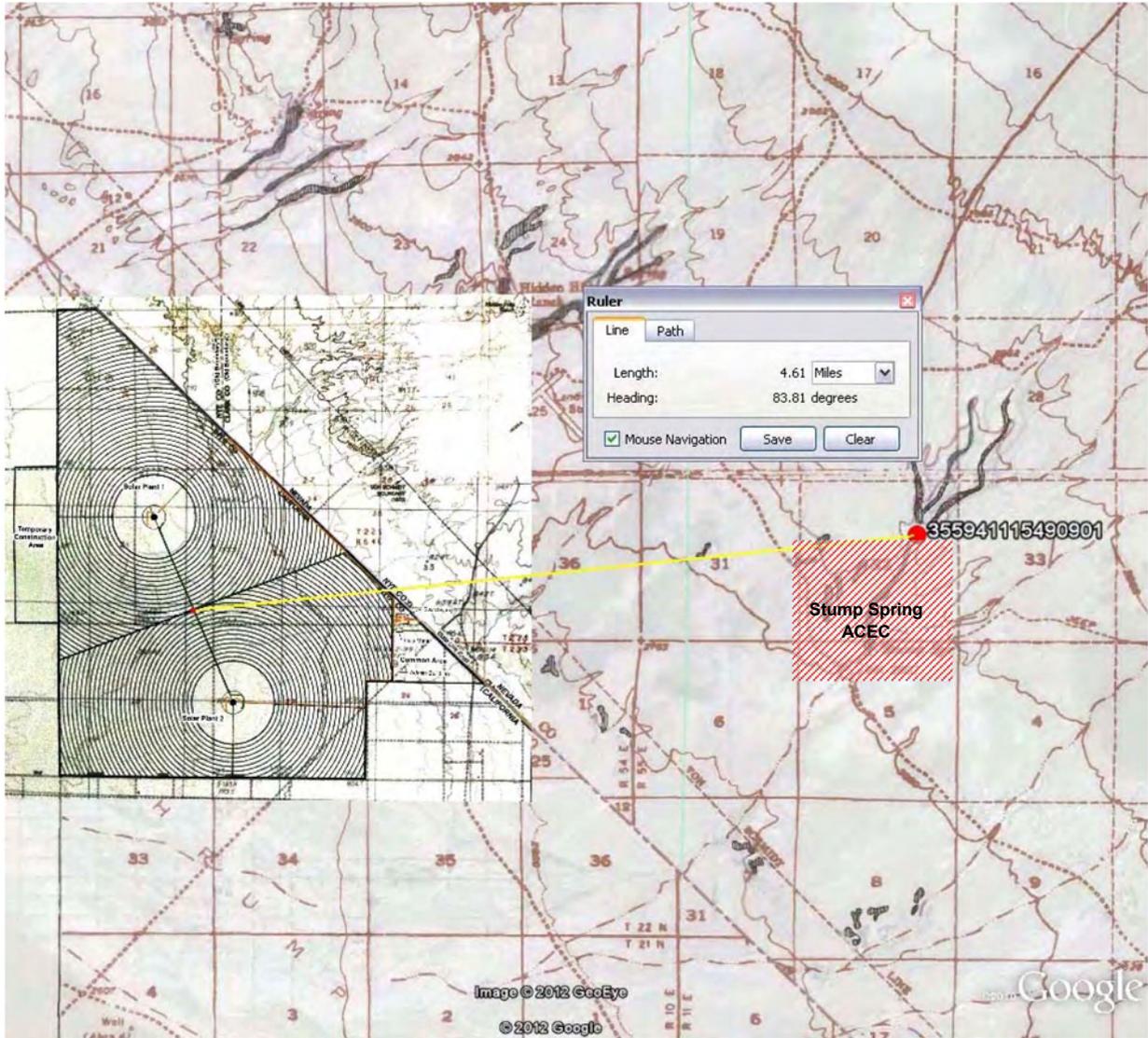
- Geophysically Inferred Faults
- Mapped Faults
- Mesquite Acacia Habitat
- Springs

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: BLM, Workman et al., 2002.

WATER SUPPLY - FIGURE 10

Hidden Hills Solar Electric Generating System (HHSEGS)

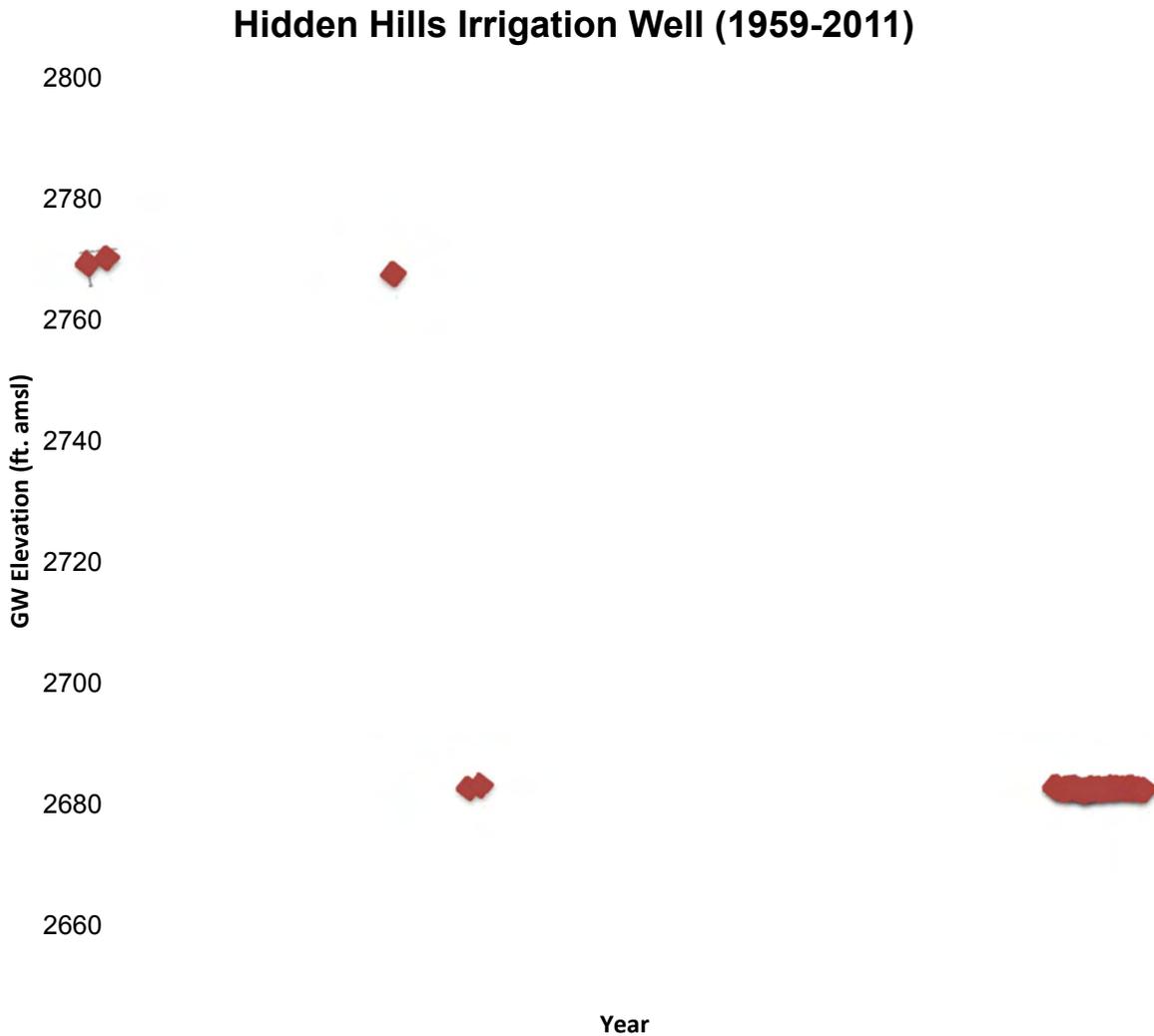
The Stump Springs Area of Critical Environmental Concern is about 4 miles from the center of the project. The Stump Springs monitoring well is about 4.6 miles from the center of the project.



WATER SUPPLY - FIGURE 11

Hidden Hills Solar Electric Generating System (HHSEGS)

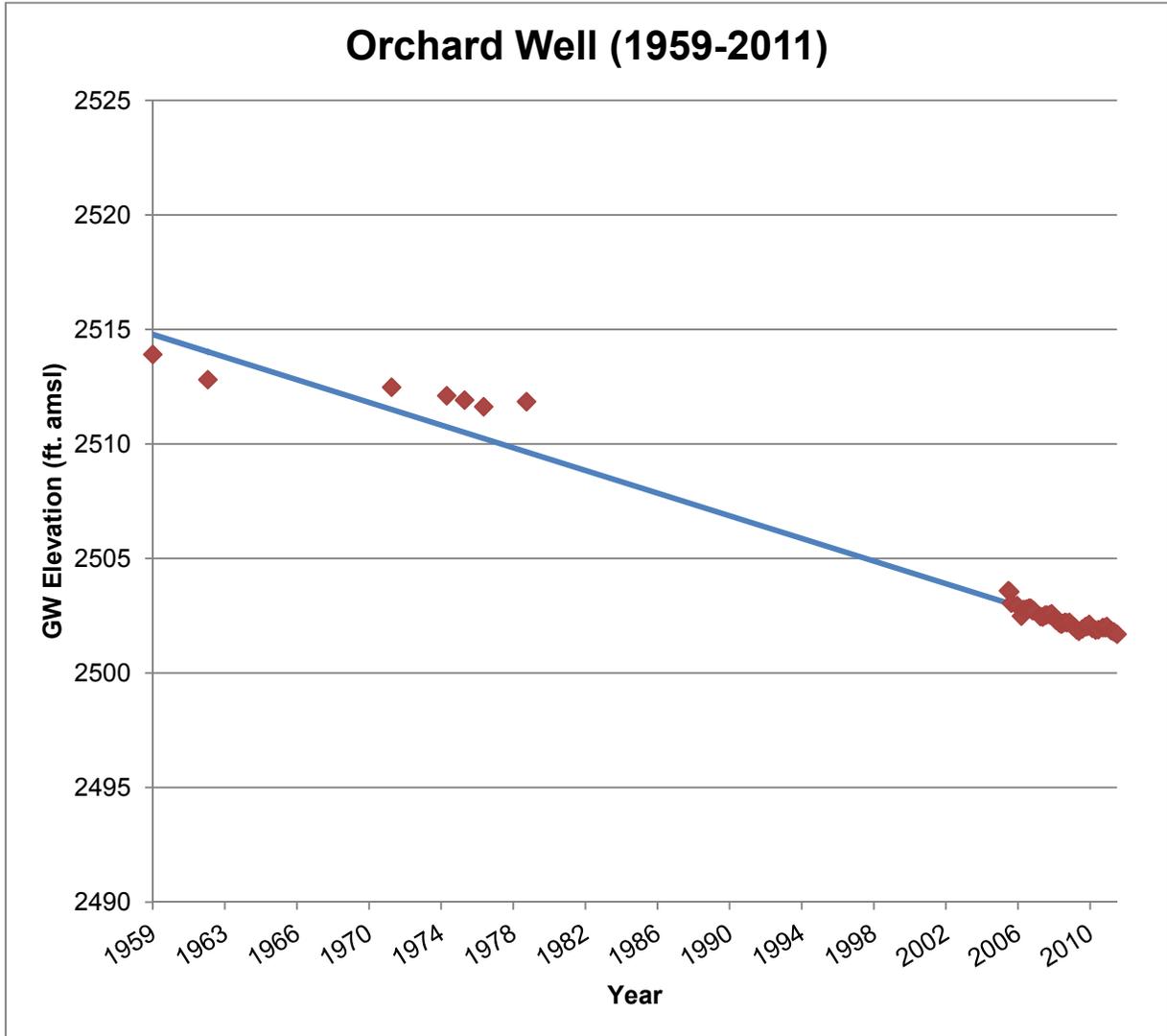
Water levels at the Hidden Hills Irrigation well between 1959 and 2011. The blue line represents the Sen's slope estimator. The slope of trendline indicates that the decline in the well is equal to 0.25 feet per year.



WATER SUPPLY - FIGURE 12

Hidden Hills Solar Electric Generating System (HHSEGS)

Water levels at the Old Orchard well between 1959 and 2011. The blue line represents the Sen's slope estimator. The slope of trendline indicates that the decline in the well is equal to 0.37 feet per year (4.44 inches per year).

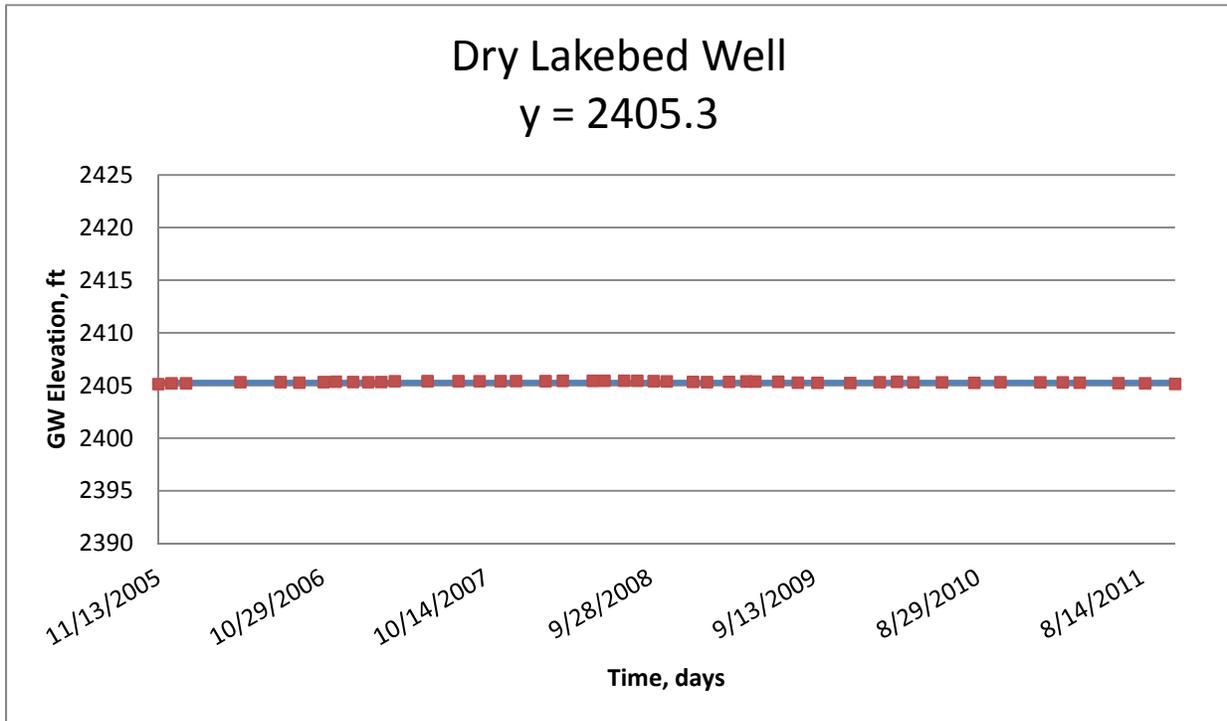
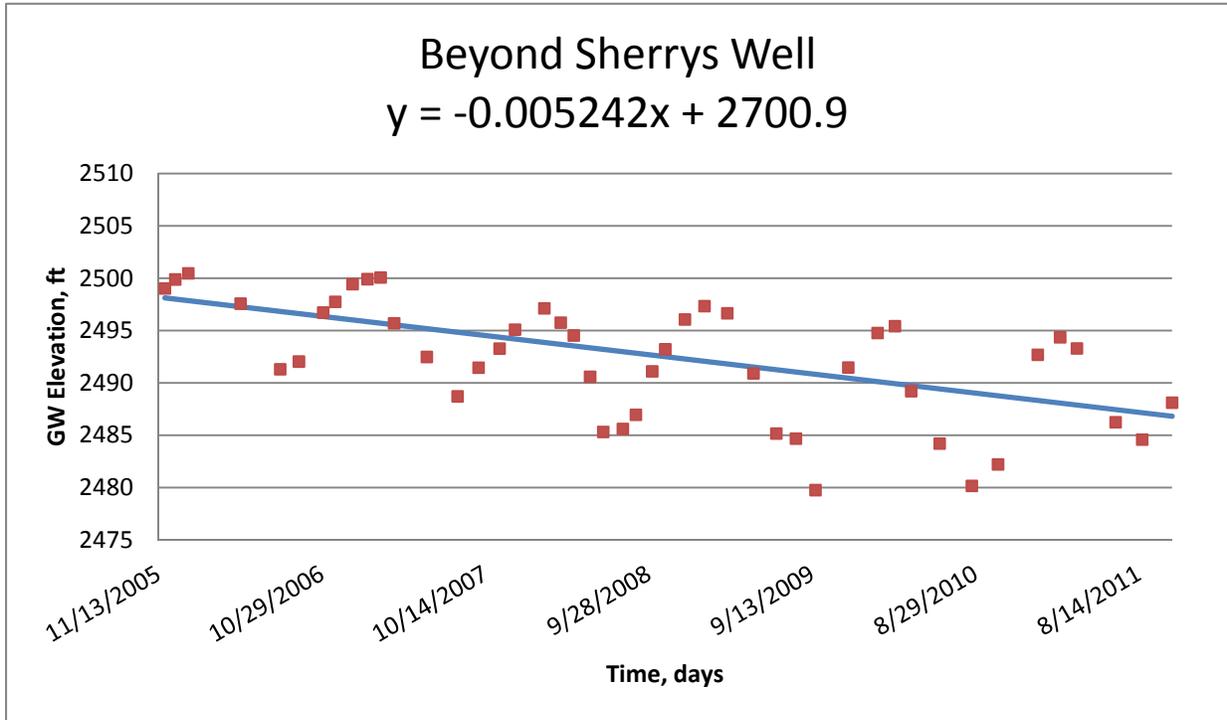


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: USGS, 2012

WATER SUPPLY - FIGURE 13

Hidden Hills Solar Electric Generating System (HHSEGS)

Water level trends in feet per day, between November 2005 and November 2011, for the Beyond Sherrys (-1.91 ft/yr) and Dry Lakebed (0.00 ft/yr) wells.

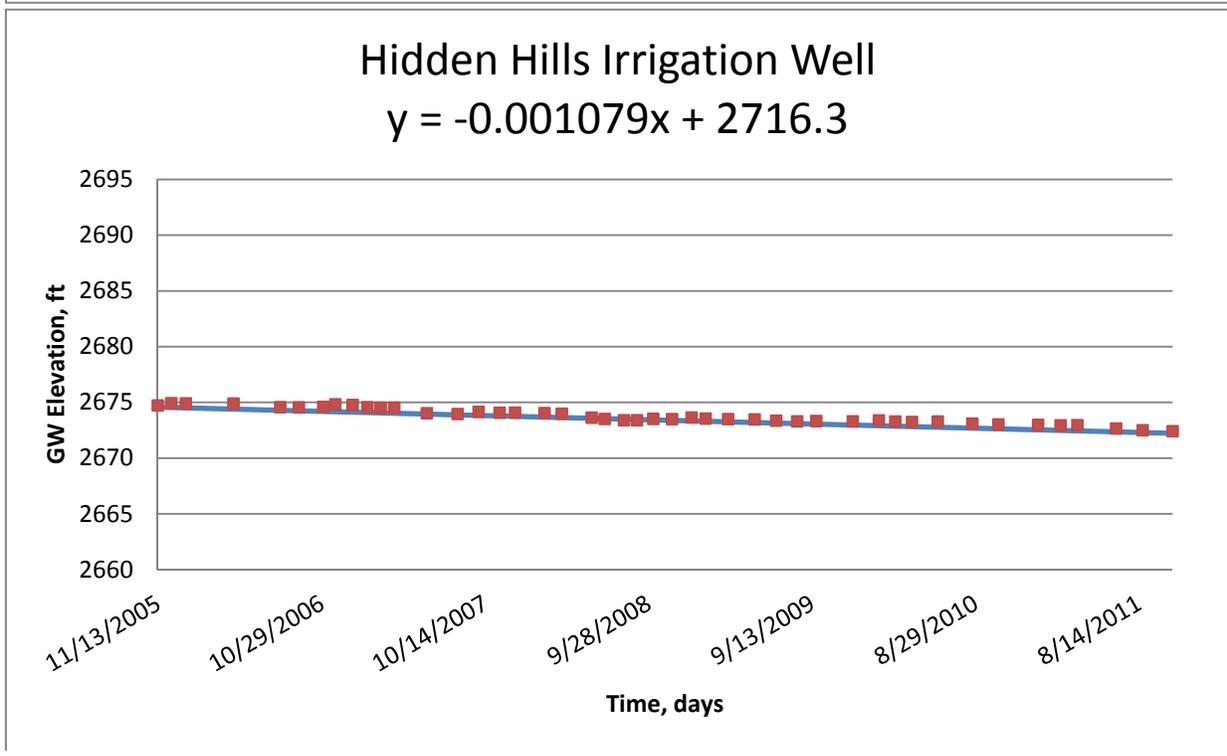
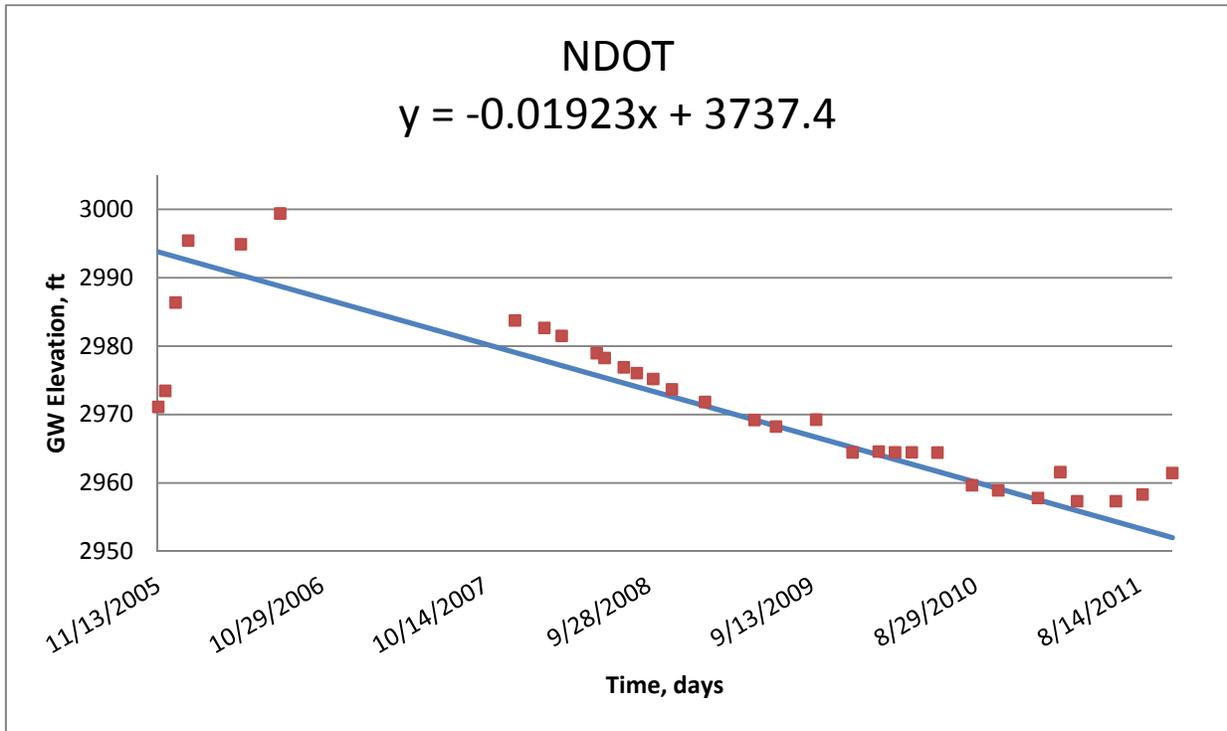


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: NWRPO

WATER SUPPLY - FIGURE 14

Hidden Hills Solar Electric Generating System (HHSEGS)

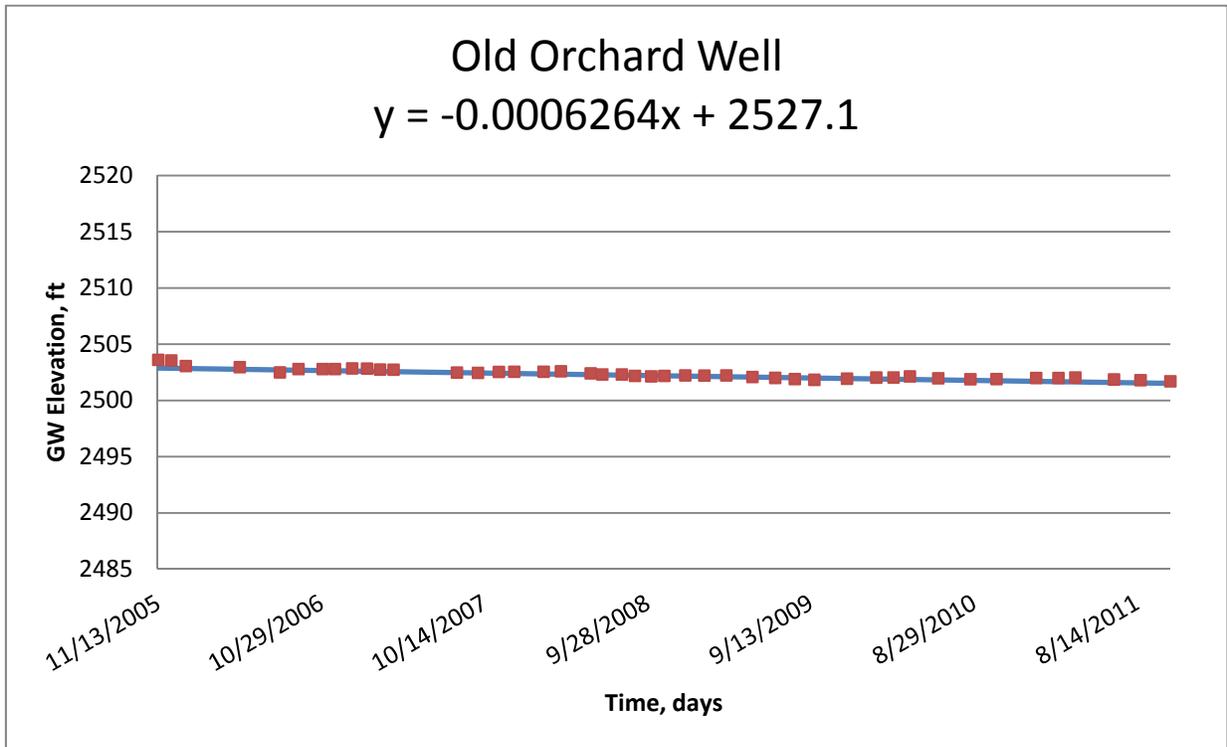
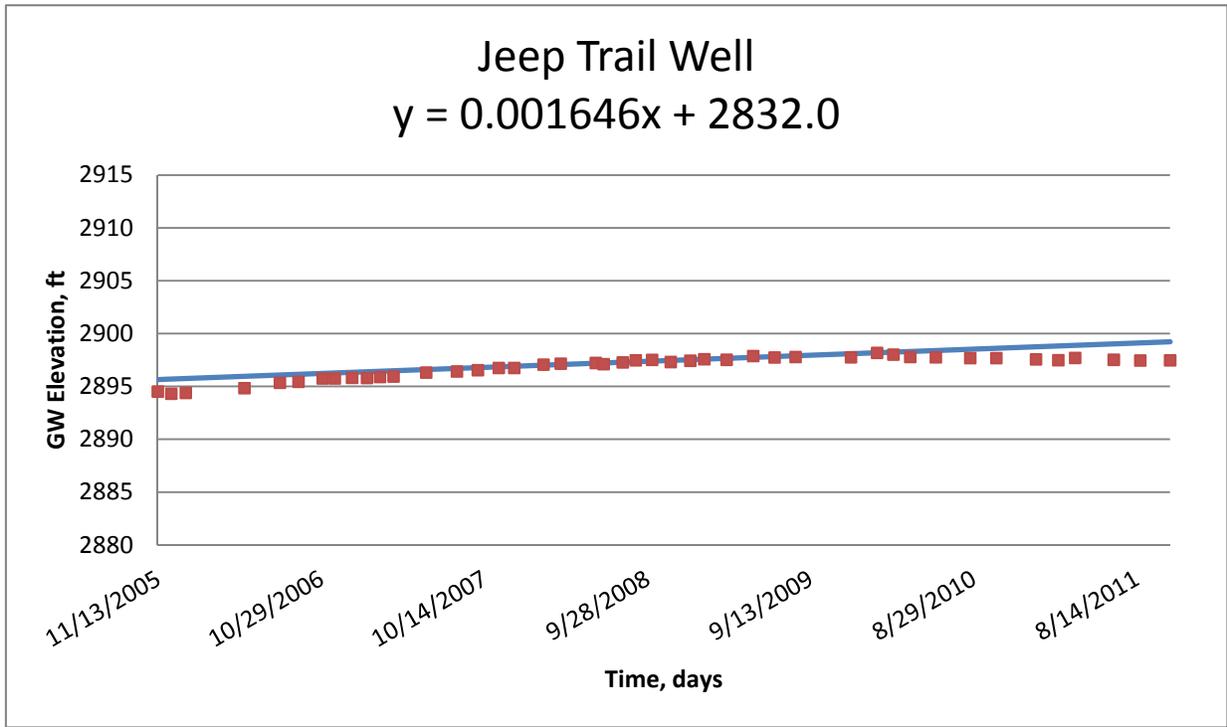
Water level trends in feet per day, between November 2005 and November 2011, for the NDOT (-7.00 ft/yr) and Hidden Hills (-0.39 ft/yr) irrigation wells.



WATER SUPPLY - FIGURE 15

Hidden Hills Solar Electric Generating System (HHSEGS)

Water level trends in feet per day, between November 2005 and November 2011, for the Jeep Trail (0.60 ft/yr) and Old Orchard wells (-0.23 ft/yr).

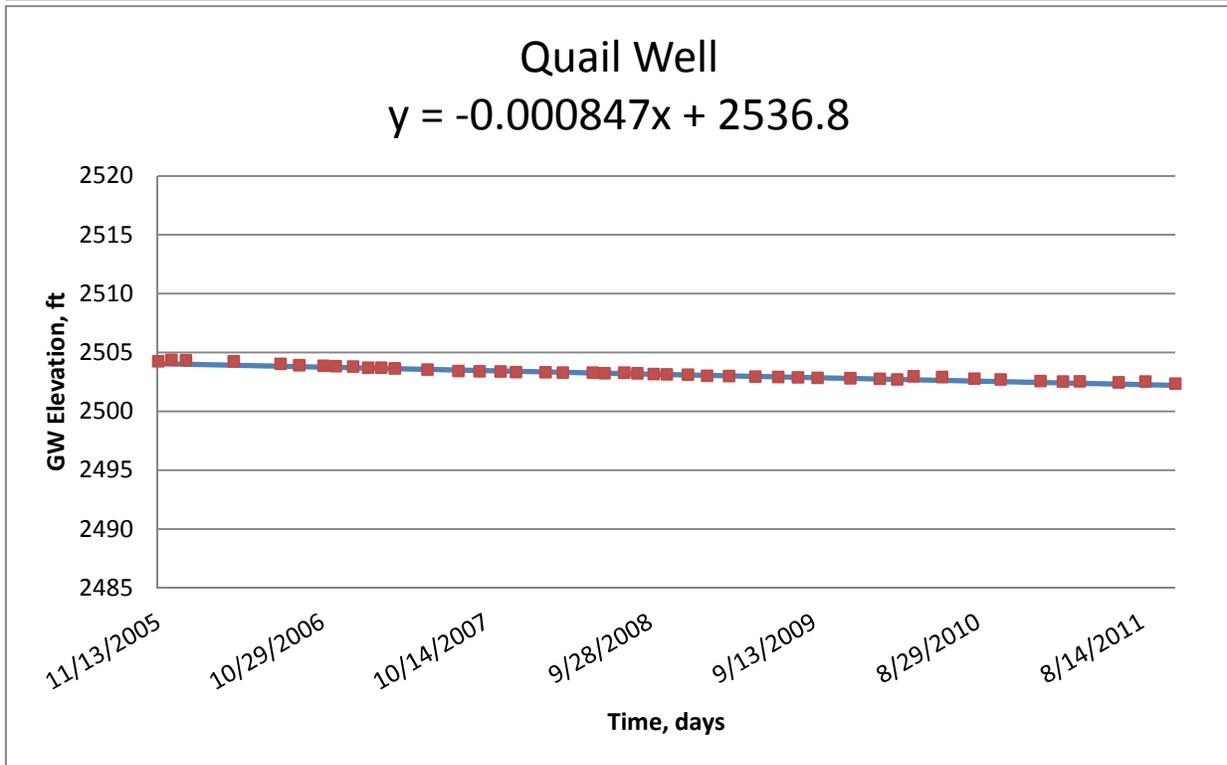
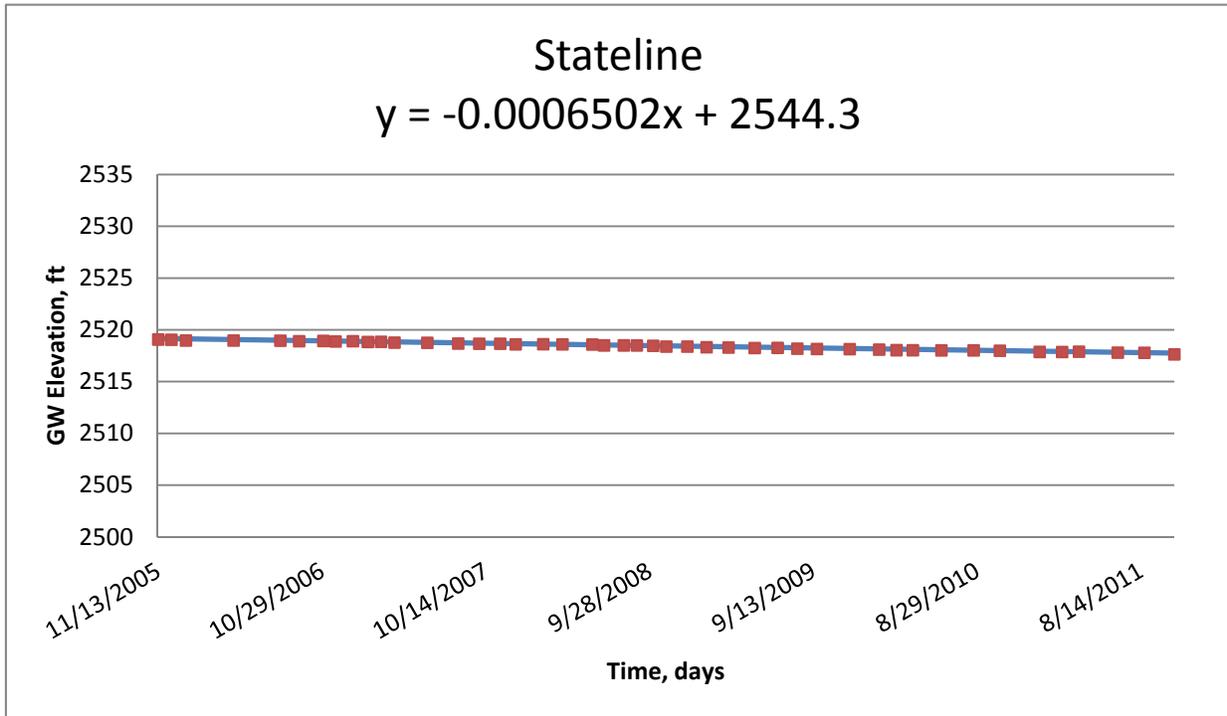


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: NWRPO

WATER SUPPLY - FIGURE 16

Hidden Hills Solar Electric Generating System (HHSEGS)

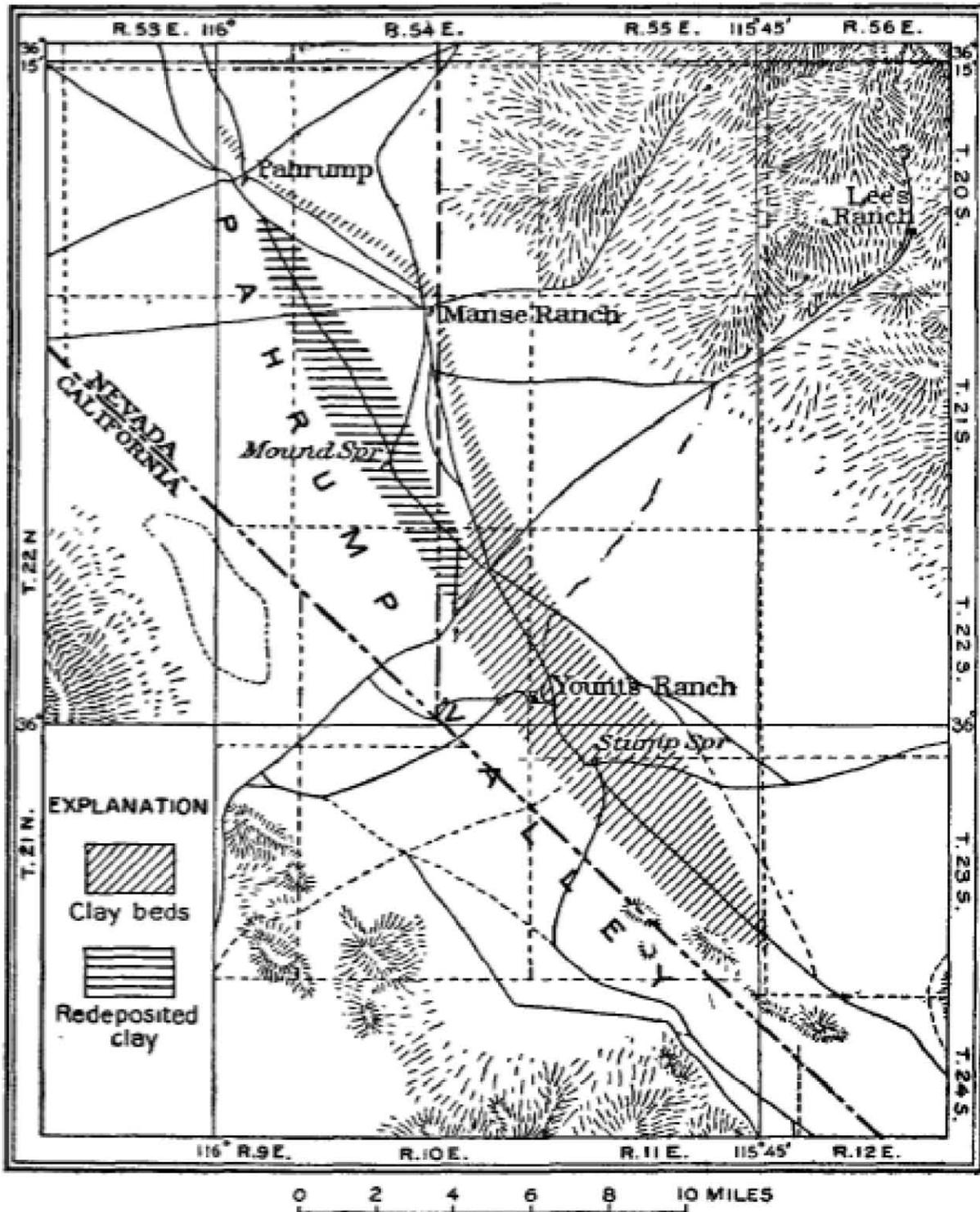
Water level trends in feet per day, between November 2005 and November 2011, for the Stateline (-0.24 ft/yr) and Quail (-0.31 ft/yr) wells.



WATER SUPPLY - FIGURE 17

Hidden Hills Solar Electric Generating System (HHSEGS)

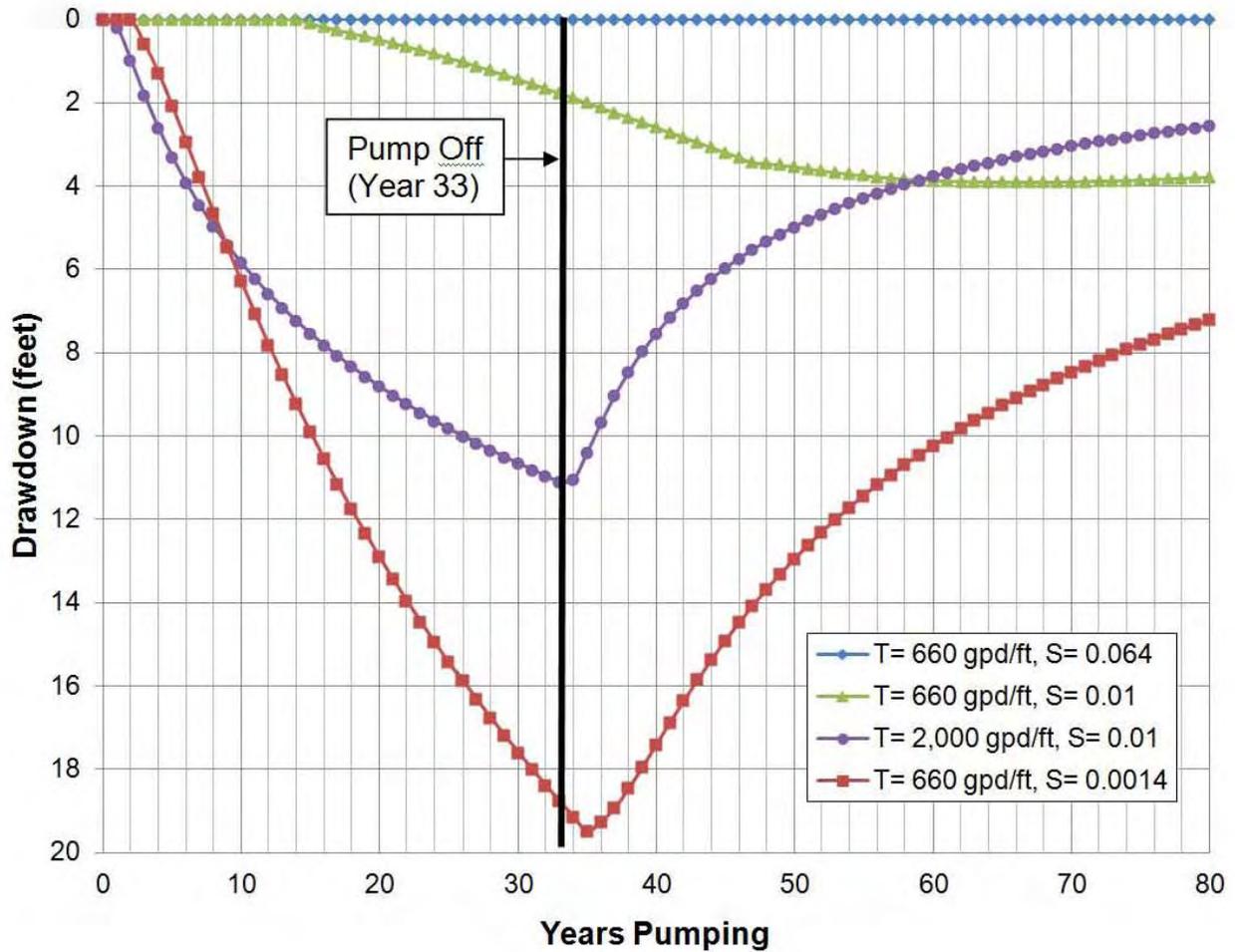
A significant exposure of clay bedding is observed around the Stump Springs region. The clay bedding is said to reach its maximum thickness of 50 feet near Stump Springs.



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: Grover, 1919

WATER SUPPLY - FIGURE 18
Hidden Hills Solar Electric Generating System (HHSEGS)

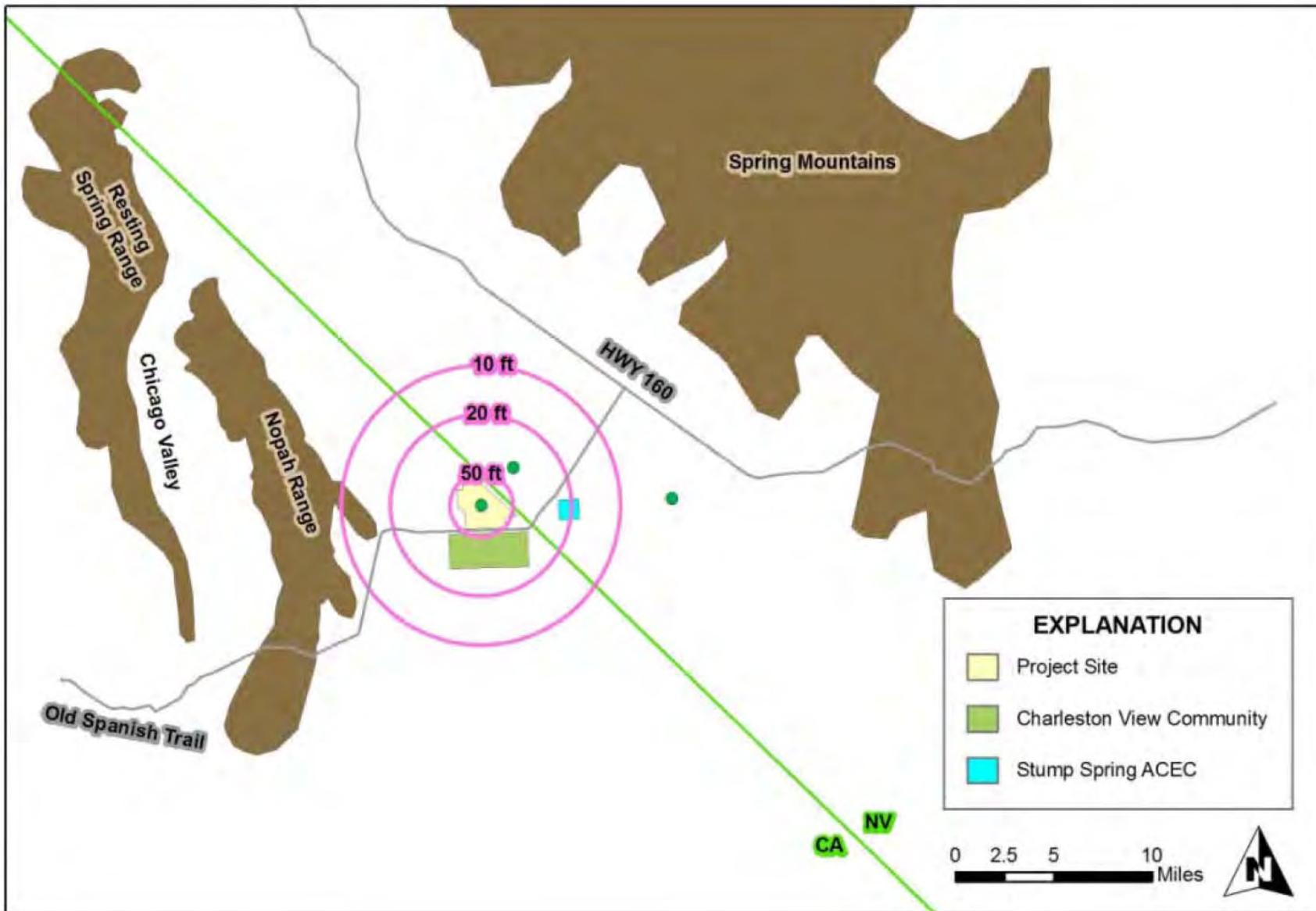
This graph shows potential impacts at Stump Spring (well) after 33 years of pumping at the rate of 87 gpm.



WATER SUPPLY – FIGURE 19

Hidden Hills Solar Electric Generating System (HHSEGS)

Estimated drawdown at groundwater dependent vegetation, worst-case scenario. Transmissivity: 660 gpd/ft, Storativity: 0.0014.

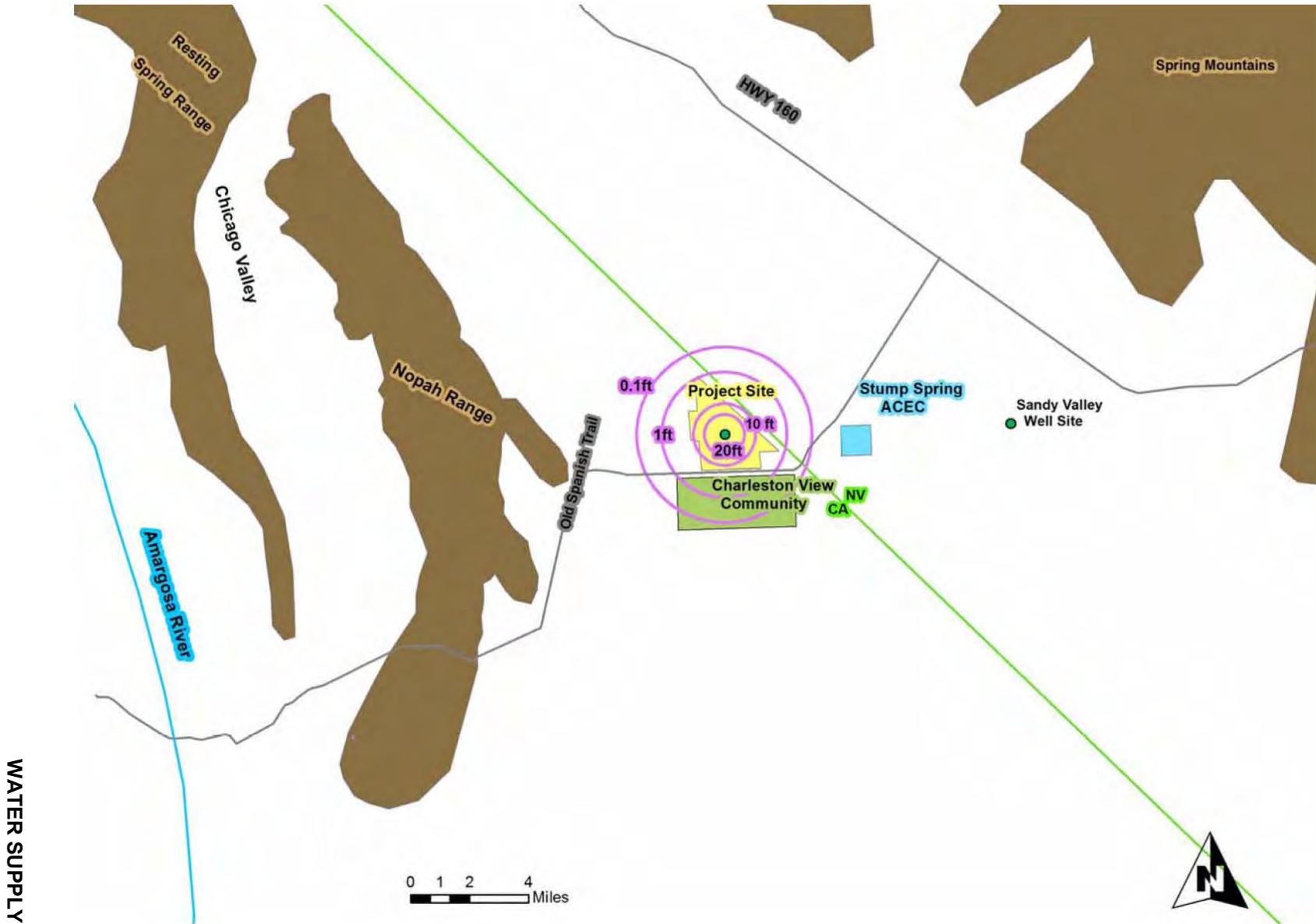


WATER SUPPLY

WATER SUPPLY - FIGURE 20

Hidden Hills Solar Electric Generating System (HHSEGS)

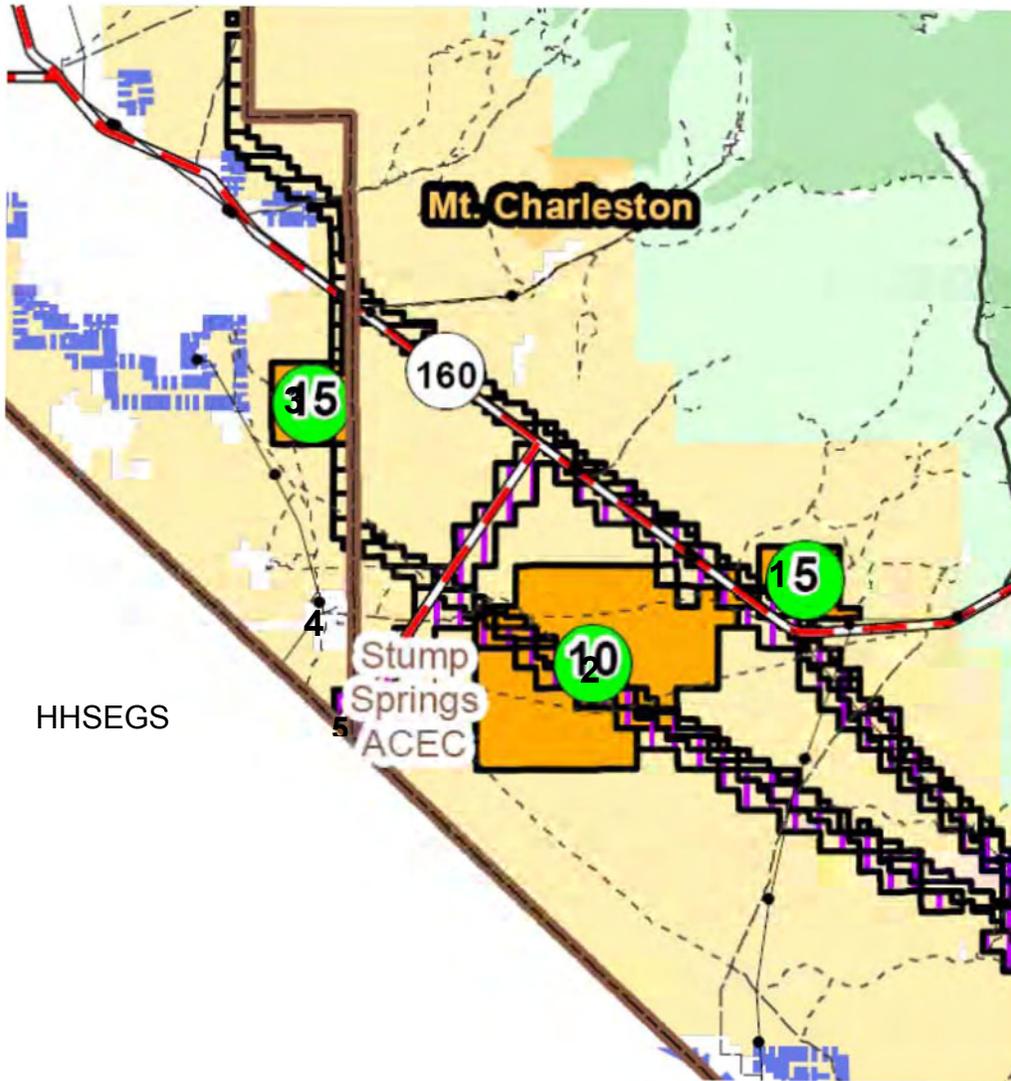
Estimated drawdown at groundwater dependent vegetation, best-case scenario. Transmissivity: 660 gpd/ft, Storativity: 0.064.



WATER SUPPLY

WATER SUPPLY - FIGURE 21

Hidden Hills Solar Electric Generating System (HHSEGS) –
Projects considered for cumulative impacts analysis



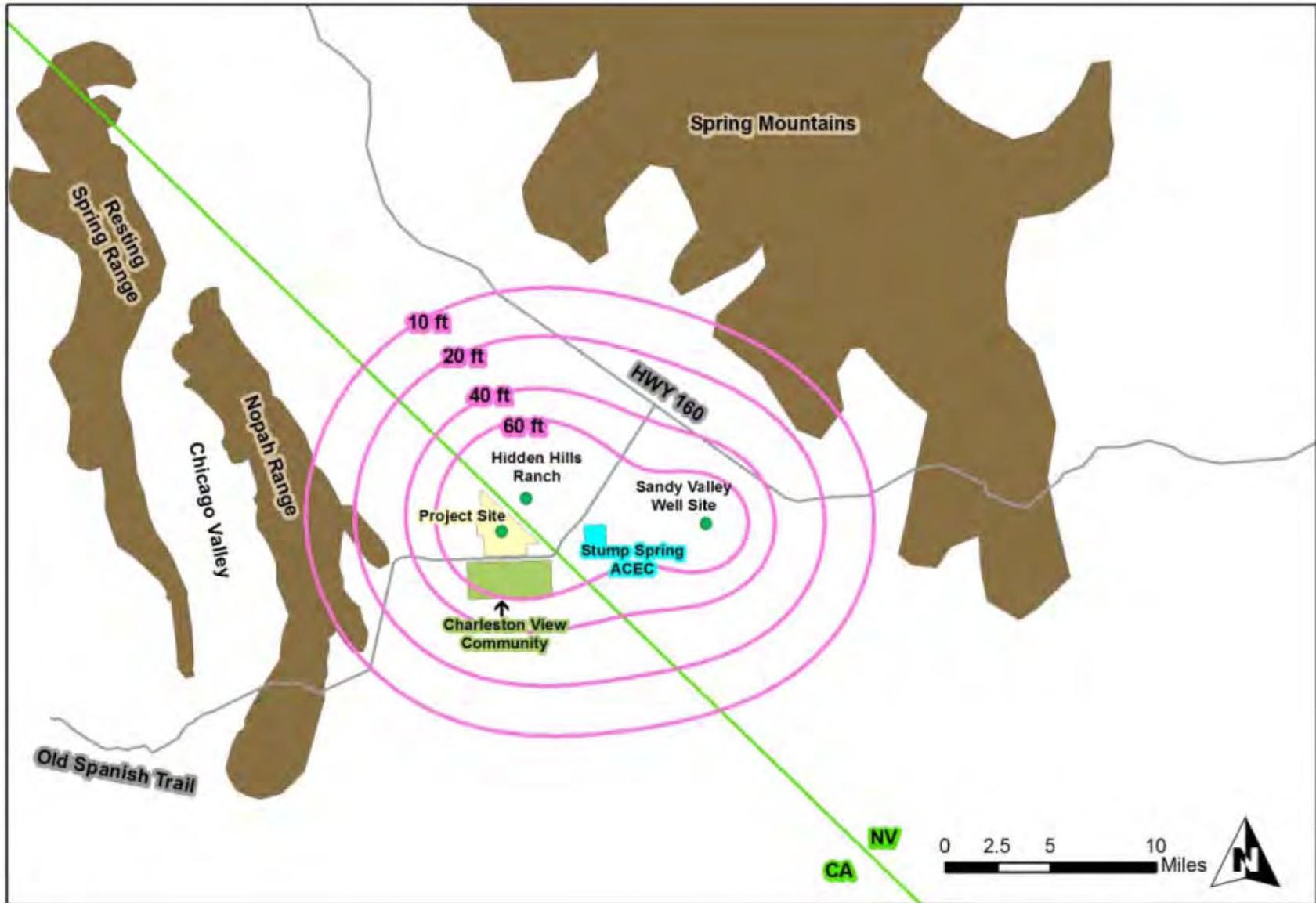
	Applicant	Project Name	County	Water Use (ac-ft/year)	Status
1	Pacific Solar Investments, Inc.	PSI Amargosa PV	Nye	0 (offsite)	DEIS-Plan Amendment
2	Bright Source Energy Solar Partners	Sandy Valley	Clark	170	application-POD
3	Element Power	PV Project	Clark	5-7	application-POD
4	Mary Lee Wiley Trust	Irrigation	Nye	211	NA
5	St. Therese Mission	Municipal	Inyo	18	NA

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

WATER SUPPLY - FIGURE 22

Hidden Hills Solar Electric Generating System (HHSEGS)

Proposed cumulative impacts of HHSEGS project. Transmissivity: 660 gpd/ft, Storativity: 0.0014.



WATER SUPPLY

WORKER SAFETY AND FIRE PROTECTION

Testimony of Geoff Lesh, PE, and Rick Tyler

SUMMARY OF CONCLUSIONS

Staff has reviewed the Hidden Hills Solar Energy Generation Project (HHSEGS or proposed project) 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 HHSEGS 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 **-5** 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 Southern Inyo Fire Protection District (SIFPD) and all relevant information as well as past experience at other solar power plants in California. SIFPD resources (both personnel and equipment) are limited commensurate with the low population density of the area it serves. The SIFPD has indicated, before the recent project changes that effectively doubled the construction workforce and associated traffic, that emergency services would be significantly impacted (SIFPD 2012a) because of the magnitude of the proposed project and the large (relative to local population) workforce. The potential for unmitigated impacts resulting from new demands for SIFPD services as a result of construction and operation of HHSEGS is increased by the fire district not being financially supported by county revenues, and thus would not benefit from any taxes paid to the county.

Due to the minimal resources of the local SIFPD, staff agrees with the SIFPD that the likely emergency response requirements of HHSEGS would likely create a significant public impact.

Staff's conversations with both Fire Chief Larry Levy of SIFPD and Fire Chief Scott F. Lewis of Pahrump Valley Rescue Service (PVRS) have confirmed that there is a longstanding practice of providing mutual aid between their respective fire and EMS agencies. However, currently there is not a formal, signed mutual aid agreement between the two agencies. With ongoing growth in demand for response services in the areas caused by, among other things, solar energy plants, this informal practice could well be tested going forward, and cannot be relied upon in this siting case to enable the local fire department to maintain its level of service under increasing demands.

Assurance of the ability of the SIFPD to continue to provide its current level of response requires expansion of SIFPD's resources in equipment, location, and personnel to handle potential draw-down situations in which there would not be enough resources to provide adequate service response to near-simultaneous emergency incidents.

Mitigation of this risk to the public through the payments to, or agreements with, the SIFPD by the applicant to address services augmentation is feasible, but has not yet been agreed to between the applicant and SIFPD. Staff understands that there are ongoing discussions between the applicant and SIFPD, but that thus far, with regards to potential impacts from construction and operation of HHSEGS, no agreements have been made. Therefore, staff is proposing mitigation to reduce these impacts to less than significant by requiring an initial payment to the SIFPD for capital and personnel support and an agreement with the SIFPD (see proposed Conditions of Certification **WORKER SAFETY-6** and **-7**).

Most of the transmission line and natural gas pipeline linears would be located in Nevada on United States Bureau of Land Management (BLM) land. Therefore, the environmental and permit review of impact from the Nevada portion of the linears would be conducted by BLM.

INTRODUCTION

The proposed action evaluated within this Final Staff Assessment (FSA) is for the construction and operation of the Hidden Hills Solar Electric Generating System (HHSEGS), a proposed solar-thermal electricity generation facility located on private lands, leased in southeastern Inyo County, California. Most of the transmission line and natural gas pipeline linears are located in Nevada on BLM land.

Worker safety and fire protection are regulated through laws, ordinances, regulations, and standards (LORS), at the federal, state, and local levels. Industrial workers at the facility operate equipment and handle hazardous materials daily and may face hazards that can result in accidents and serious injury. Protection measures are employed to eliminate or reduce these hazards or to minimize the risk through special training, protective equipment, and procedural controls.

The purpose of this FSA is to assess the worker safety and fire protection measures proposed by the HHSEGS and to determine whether the applicant has proposed adequate measures to:

- comply with applicable safety LORS;
- protect the workers during construction and operation of the facility;
- protect against fire; and
- provide adequate emergency response procedures.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

**Worker Safety and Fire Protection Table 1
Laws, Ordinances, Regulations, and Standards (LORS)**

Applicable Law	Description
Federal	
Title 29, U.S. Code (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 (C,F,R,), 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 (or locally enforced)	
None	

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 are followed, workers will be adequately protected. Thus, the standard for staff’s review and determination of significant impacts on workers is whether or not the applicant has

demonstrated adequate knowledge about and dedication to implementing all pertinent and relevant Cal/OSHA standards.

Regarding fire prevention matters, staff review and evaluate 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, staffed, 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 will identify and recommend that the applicant mitigate this impact by providing increased resources to the fire department.

Staff has also established methodology 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

The Hidden Hills Solar Electric Generating System (HHSEGS) is proposed for development by a wholly owned subsidiary of BrightSource Energy, Inc. (Applicant). As proposed, HHSEGS would be located on approximately 3,096 acres of privately owned land leased in Inyo County, California, adjacent to the Nevada border. The project site is approximately 8 miles south of Pahrump, Nevada, and approximately 45 miles northwest of Las Vegas, Nevada.

As proposed, HHSEGS would comprise two solar fields and associated facilities: the northern solar plant (Solar Plant 1) and the southern solar plant (Solar Plant 2). Each solar plant would generate 270 megawatts (MW) gross (250 MW net), for a total net output of 500 MW. Solar Plant 1 will occupy approximately 1,483 acres (or 2.3 square miles), and Solar Plant 2 will occupy approximately 1,510 acres (or 2.4 square miles). A 103-acre common area would be established on the southeastern corner of the site to accommodate an administration, warehouse, and maintenance complex, an onsite 138

kV switchyard and a natural gas metering station. A temporary construction laydown and parking area on the west side of the proposed project site would temporarily occupy approximately 180 acres.

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 HHSEGS would be exposed to loud noises, moving equipment, trenches, and confined space entry and egress problems. The workers may experience falls, trips, burns, lacerations, and numerous other injuries. They have the potential to be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, electrical sparks, and electrocution. It is important for the HHSEGS to have well-defined policies and procedures, training, and hazard recognition and control at its facility to minimize such hazards and protect workers. If the facility complies with all LORS, workers will be adequately protected from health and safety hazards.

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 HHSEGS would be exposed to hazards typical of construction and operation of a solar thermal electric power generating facility.

Construction Safety Orders are contained in 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 adequate outlines of the above programs (HHSG 2011a, § 5.16.4). Prior to the start of construction of HHSEGS, detailed programs and plans would be provided to the California Energy Commission compliance project manager (CPM) and to the SIFPD pursuant to the Condition of Certification **WORKER SAFETY-1**.

Operations and Maintenance Safety and Health Program

Prior to the start of operations at HHSEGS, the Operations and Maintenance Safety and Health Program would be prepared. This operational safety program would include the following programs and plans:

- Injury and Illness Prevention Program (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 HHSEGS, 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 (HHSG 2011a, § 5.16.4.4). Prior to operation of HHSEGS, all detailed programs and plans would be provided to the CPM and SIFPD 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 comprise 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 (HHSG 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 (HHSG 2011a, § 5.16.2.3). 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 SIFPD 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 HHSEGS 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 a satisfactory outline for an emergency action plan (HHSG 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 workers will be adequately trained and protected, but has not included precautions against exposure to herbicides. Therefore, to ensure that workers are indeed protected, staff has identified and proposed additional requirements to Conditions of Certification **WORKER SAFETY-1** and **-2**. These requirements consist of the following provision:

- The development and implementation of Best Management Practices (BMP) for the storage and application of herbicides used to control weeds beneath and around the solar heliostats.

A BMP requiring proper herbicide storage and application will mitigate potential risks to workers from exposure to herbicides and reduce the chance that herbicides will contaminate either surface water or groundwater. Staff 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.

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 Hidden Hills 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 Valley Fever. 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.

Between 2001 and 2010, there was only one reported case of VF in Inyo County (in 2006). Staff believes that no special measures beyond the standard measures required by Cal-OHSA for respiratory protection are needed and thus proposes no condition of certification on this topic.

Additional Mitigation Measures

Protecting construction workers from injury and disease is among the greatest challenges in occupational safety and health. The following facts are reported by the National Institute for Occupational Safety and Health (NIOSH):

- More than 7 million persons work in the construction industry, representing 6 percent of the labor force. Approximately 1.5 million of these workers are self-employed.
- Of approximately 600,000 construction companies, 90 percent employ fewer than 20 workers. Few have formal safety and health programs.
- From 1980 to 1993, an average of 1,079 construction workers were killed on the job each year—more fatal injuries than in any other industry.
- Falls caused 3,859 construction worker fatalities (25.6 percent) between 1980 and 1993.
- Construction injuries account for 15 percent of workers' compensation costs.
- Assuring safety and health in construction is complex, involving short-term work sites, changing hazards, and multiple operations and crews working in close proximity.
- In 1990, Congress directed NIOSH to undertake research and training to reduce diseases and injuries among construction workers in the United States. Under this mandate, NIOSH funds both intramural and extramural research projects.

The hazards associated with the construction industry are thus well documented. These hazards increase in complexity in the multi-employer worksites typical of large, complex, industrial-type projects such as the construction of solar power plants. In order to reduce and/or eliminate these hazards, it has become standard industry practice to hire

a Construction Safety Supervisor to ensure a safe and healthful environment for all personnel. That this standard practice has reduced and/or eliminated hazards has been evident in the audits staff recently conducted of power plants under construction. The federal Occupational Safety and Health Administration (OSHA) has also entered into strategic alliances with several professional and trade organizations to promote and recognize safety professionals trained as Construction Safety Supervisors, Construction Health and Safety Officers, and other professional designations. The goal of these partnerships is to encourage construction subcontractors in four areas:

- to improve their safety and health performance;
- to assist them in striving for the elimination of the four hazards (falls, electrical, caught in/between and struck-by hazards), which account for the majority of fatalities and injuries in this industry and have been the focus of targeted OSHA inspections;
- to prevent serious accidents in the construction industry through implementation of enhanced safety and health programs and increased employee training; and
- to recognize those subcontractors with exemplary safety and health programs.

To date, there are no OSHA or Cal/OSHA requirements that an employer hire or provide for a Construction Safety Officer. OSHA and Cal/OSHA regulations do, however, require that safety be provided by an employer and the term *Competent Person* is used in many OSHA and Cal/OSHA standards, documents, and directives. A Competent Person is usually defined by OSHA as an individual who, by way of training and/or experience, is knowledgeable of standards, is capable of identifying workplace hazards relating to the specific operations, is designated by the employer, and has authority to take appropriate action. Therefore, in order to meet the intent of the OSHA standard to provide for a safe workplace during power plant construction, 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 past decade 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 Condition of Certification **WORKER SAFETY-4**. A Safety Monitor, hired by the project owner, yet reporting to the Chief Building Official (CBO) and CPM, will serve as an “extra set of eyes” to ensure that safety procedures and practices are fully implemented at all power plants certified by the Energy Commission.

Fire Hazards

During construction and operation of the proposed HHSEGS 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 COCs would be adequate to assure protection from all fire hazards.

Staff reviewed the information provided in the AFC and reviewed correspondence from a representative of the SIFPD 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. Staff also reviewed the May 9, 2012 Fire Risk Assessment submitted by the applicant (CH2 2012z). 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 SIFPD (CEC 2012h, SIFPD2012a, HHSg 2011a, §§ 5.10.3.6.2 and 5.16.4.7).

Construction

During construction, the permanent fire protection systems proposed for the HHSEGS 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 on the site. The fuel depot will contain a maximum of 34,000 gallons of diesel fuel (HHS 2011a, Table 5.5-3R1).

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 dispensing 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 SIFPD, which would 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 Inyo 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 SIFPD review and the CPM review and approve the fire protection systems for the fuel depot.

Regarding the need for emergency response during construction and the impacts on the SIFPD, 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 plant would include both fixed and portable fire extinguishing systems. The fire water would be stored in a 250,000 gallon water storage tank with a dedicated fire protection supply of 100,000 gallons, one tank in each

power block. The source of the water will be on-site wells (HHSO 2011a, Appendix 2F.3.1.4) 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 (HHSO 2011a, § 2.2.9).

Fire hydrants would be installed throughout the site 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 will 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 and to the SIFPD prior to construction and operation of the project to confirm the adequacy of the proposed fire protection measures.

SIFPD Impacts

The project site is within the jurisdiction of the Southern Inyo Fire Protection District (SIFPD). SIFPD has one station in Tecopa and one temporary location in Charleston View. The Tecopa fire station would be the first responder for medical emergencies at the project site (CH2 2011e, p. 14). A response from the Tecopa Station, 27 miles from the project site, would take about 30 to 40 minutes (HHSO 2011a, § 5.5.4.3 and CEC 2012h). As of February 2012, SIFPD staff at the Tecopa station consisted of two personnel with Emergency Medical Technician-Basic (EMT-B) certification, one Firefighter II (FFII), two Firefighter I (FFI) in training, and four Entry Level Firefighter/First Responders. With the exception of the Fire Chief and the Administrative Officer, which are paid, SIFPD personnel are volunteers that respond on a 24-hour, 7-day per week basis. The SIFPD equipment consists of two Light Rescue Units, two Type 2 Engines, one Basic Life Support Ambulance and one Ambulance. (CH2 2012z, pg. 7-1) All firefighters in SIFPD have first response medical training called Basic Life Support (BLS) training. The Tecopa station has one ambulance staffed with three personnel and a fire truck staffed by two personnel, which would likely respond to emergencies at the project site. (CH2 2011e, p. 14, and CEC 2012h).

Staff's conversations with both Fire Chief Larry Levy of SIFPD and Fire Chief Scott F. Lewis of Pahrump Valley Rescue Service (PVRS) have confirmed that there is a longstanding practice of providing mutual aid between their respective fire and EMS agencies. However, currently there is not a formal, signed mutual aid agreement between the two agencies. With ongoing growth in demand for response services in the areas caused by, among other things, solar energy plants, this informal practice could

well be tested going forward, and cannot be relied upon in this siting case to enable the local fire services to maintain its level of service under its increasing demands.

In an email from Larry Levy, Acting Chief of the SIFPD (CEC 2012h), and in a letter from William D. Ross, who provides legal representation for the SIFPD (SIFPD2012a), it is stated that the HHSEGS project would have an impact on SIFPD's ability to maintain its level of service for fire, hazmat, and EMS emergencies to its service district. Note that this conclusion was reached before the recent project changes that effectively would double the construction workforce and associated traffic, and would likely increase the proposed project's impacts on EMS response.

Staff has considered the position of the SIFPD 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) 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 were incomplete as they did not include

documentation of a major fire that occurred 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 incident required fire department response. Another comparative example is the Ivanpah Solar Electric Generating Station (Ivanpah), a central receiving station power tower-type project, where construction has resulted in five calls over 19 months to San Bernardino County since construction commenced in October 2010, and its construction activities and workforce are similar to that of the HHSEGS. (CH2 2012z, pg. 8-2)

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 HHSEGS power plant (along with the other solar power plants) will 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 (°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.

Furthermore, emergency response would be needed during construction when construction worker crew sizes are large, reaching 2,293 workers per day (1,682 day shift and 611 swing shift) during Month 19 of construction. The fact that a fuel depot will be on-site also speaks to the need for emergency response capability. As was indicated above, SIFPD operates one year-round fire station in Tecopa, California that is 27 miles southwest of HHSEGS and has an approximate 30- to 40-minute response time. SIFPD indicated in communications in March and July of 2011 that local firefighters are equipped to handle simple HazMat incidents, but that PVFRS and Nye County Emergency Services would need to be called in for assistance with more complex situations, although they do not currently have formal mutual aid agreements with SIFPD.

Staff has considered the position of the SIFPD and all relevant information as well as past experience at existing solar power plants. The fire, hazmat, and EMS needs at the proposed plant are real and would pose significant added demands on SIFPD's 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. The SIFPD does not obtain significant funding from Inyo County and thus would not benefit from any taxes that would be paid to the county. 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, and largely volunteer. In response to a staff inquiry related to Emergency Services dated September, 2011 (CEC 2012h), SIFPD Acting Fire Chief, Larry Levy, suggested that, "the most effective and immediate way for the project to bare its proportional share would be by way of a special tax." Acting Chief Levy went on to list a number of special tax mechanisms, including a Mello-Roos tax and a Fire Suppression Service Assessment.

Staff evaluated the potential and likely demands on the SIFPD with the proposed mitigations provided by the applicant. Staff concludes that there would be an intrinsically

lower fire risk at HHSEGS resulting from its use of water and steam, rather than a flammable 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 HHSEGS 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 SIFPD. Without HTF storage tanks and solar field piping arrays, staff has determined that the potential for a large conflagration does not exist at HHSEGS.

Staff understands that there are ongoing discussions between the applicant and SIFPD, but that thus far, with regards to potential impacts from construction and operation of HHSEGS, no actions have been taken and no agreements have been made. Therefore, staff is proposing mitigation to reduce these impacts to less than significant by requiring an initial payment to the SIFPD for capital and personnel support and an agreement with the SIFPD (see proposed Conditions of Certification **WORKER SAFETY-6 and -7**).

Emergency Medical Services Response

Staff conducted a statewide survey to determine the frequency of Emergency Medical Services (EMS) response to operating 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. In such cases there is potential for draw-down situations to occur where there are insufficient resources to respond to all calls for emergency response.

Emergency Medical Services

At staff's request, the applicant provided a draft Fire and Emergency Services Risk and Needs Analysis (FESNA) on May 9, 2012 (CH2 2012z). The analysis suggests that by complying with LORS, the project would not create significant impacts on the local SIFPD or local emergency response resources, because any responses needed for fire, medical, or technical rescue needs would be sourced from either the Pahrump Valley Fire-Rescue Services (PVFRS) or Nye County Emergency Services (NCES) in Pahrump, Nevada. The mechanism of how these services would be sourced and paid for from another jurisdiction in the state of Nevada rather than from the local Authority Having Jurisdiction (AHJ), in this case SIFPD, has not been clearly established. Correspondence from Larry Levy, Acting Chief of the SIFPD (CEC 2012h), and William D. Ross, who provides legal representation for the SIFPD (SIFPD 2012a), states that the HHSEGS project would have an impact on SIFPD's ability to maintain its level of service for fire, hazmat, and EMS emergencies to its service district.

PVFRS has a long-standing practice of providing SIFPD mutual aid and response, but does not currently have a signed agreement. PVFRS has four stations, all located in Nevada and staffed with full-time and volunteer firefighters. All PVFRS staff has basic medical training. PVFRS has five ambulances and two medical squads distributed among their four stations. PVFRS' main station has two EMTs and one paramedic, as well as two advanced life support- (ALS) certified ambulances and one ALS-equipped medical squad vehicle (CEC 2011j). The estimated response time from Pahrump Valley

Fire Station No. 3 (12 mile distance) is approximately 15-20 minutes, and from Station No.1 (18 mile distance), it is estimated to be approximately 18-25 minutes (CH2 2012z, Table 7-1). PVFRS is the closest responder to the project site with ALS capabilities and is staffed 24 hours a day.

Nye County Emergency Services (NCES) has a HazMat team that operates out of Nye County Fire Department's Station 51 in Pahrump, which is 28 road miles from the project site, and has an approximate response time of 45 minutes. Station 51 is staffed with 15 to 20 volunteers who are trained as HazMat technicians. The team has the following equipment, as of April 2011: one HazMat truck with 25-foot trailer, one biohazard unit, one fire engine, and one ambulance (HHS 2011a, Sect 5.5.4.3).

In response to staff's Emergency Medical Response Needs Assessment Form, SIFPD Acting Fire Chief, Larry Levy, stated that "it is the desire of SIFPD to enhance their EMS in the Charleston View area to provide response capabilities to the project site in the 5-10 minute range. This will require the acquisition of both facilities and equipment as well as the training of additional responders (CEC 2012h). SIFPD estimates that to achieve their desired response times they would need a three-bay station to house a new ambulance and existing fire apparatus in the project area and a minimum of two trained EMTs and four firefighters in the project area." Staff notes that emergency response times to Charleston View are currently in the range of 30 to 40 minutes from Tecopa. Charleston View is located adjacent to the HHSEGS entrances, where both construction worker commute traffic and materials transport trucks would both enter and exit the project site.

Off-site Vehicle Accidents

During the HHSEGS construction period, worker commute traffic and materials transport truck traffic could pose an increased risk for off-site, multi-injury road incidents and accidents. An evaluation of the potential for off-site vehicle accidents was completed by the Applicant, who reported accident rates on Tecopa Road obtained from the California Department of Transportation (Caltrans) and the Statewide Integrated Traffic Records System (that compiles incidents reported by the California Highway Patrol). (CH2 2012z, p. 51, Table 6-3 and 6-4). Based on these reported accidents that occurred on Inyo County roadways in the vicinity of the project for the years 2008, 2009 and 2010, it was estimated that 5 additional accidents would occur on surrounding roadways during the 29 month HHSEGS construction period. Hazards due to off-site vehicle accidents on the roadways in the project vicinity would be less than significant. In order to properly accommodate the increased worker commute traffic and materials transport truck traffic on Tecopa Road at HHSEGS' entry and exit locations, appropriate measures have been recommended by staff in the **Traffic and Transportation** section of this **FSA** and Condition of Certification **TRANS-2**.

Technical Rescue Incidents

Another potential risk associated with HHSEGS construction activities is technical rescue incidents, including high angle rescue, low angle rescue, and confined space rescue, also called "permit space" rescue. No such incidents have been reported as a result of Ivanpah construction activity in San Bernardino County, a similarly tall, central receiving station power tower-type project. In order to ensure that the demand for high

angle rescue, low angle rescue, and confined space “permit space” rescue on the HHSEGS project site would be less than significant, the incorporation of appropriate employer and employee practices and procedures are implemented in **WORKER SAFETY-3**.

The Occupational Safety & Health Administration (OSHA) provisions §1910.146 (k) and Appendix F contains requirements for practices and procedures to protect employees from the hazards associated with confined and elevated spaces, including procedures for hazards analysis, and the determination of an on-site rescue team or off-site emergency team services. The National Fire Protection Association (NFPA) has established the minimum job performance requirements necessary for off-site emergency rescue teams. NFPA 1670 standards establish levels of functional capability for successfully conducting even the most complex rescue operations. This standard was developed to define levels of preparation and operational capability that should be achieved by any authority having jurisdiction (AHJ) that has responsibility for technical rescue operations.

While the frequency of HHSEGS technical “permit space” emergency rescues is not expected to be significant, **WORKER SAFETY-1** (Construction Emergency Action Plan) shall include specifics regarding the analysis of confined and elevated “permit spaces” and the process for determining an on-site rescue team, or an off-site rescue team. An on-site rescue team would be comprised of appropriately trained and designated employees, per §1910.146(k)(2). An off-site emergency rescue teams, per NFPA 1670 standards, would be personnel from either SIFPD (the authority having jurisdiction) or PVFRS (via a mutual aid agreement).

On-site Medical Emergencies

Additionally, staff has determined that the potential for both work-related and non-work-related heart attacks exists at power plants. In fact, staff’s research on the frequency of EMS response to gas-fired power plants shows that many of the responses for cardiac emergencies involved non-work-related incidences, including those involving visitors. The need for prompt response within a few minutes is well documented in the medical literature. Staff believes that the quickest medical intervention can only be achieved with the use of an on-site automatic external defibrillator (AED); the response from an off-site provider would take longer regardless of the provider location. This fact is also well documented and serves as the basis for many private and public locations (e.g., airports, factories, government buildings) maintaining on-site cardiac defibrillation devices. Therefore, staff concludes that, with the advent of modern cost-effective cardiac defibrillation devices, it is proper in a power plant environment to maintain such a device on site in order to treat cardiac arrhythmias resulting from industrial accidents or other non-work related causes.

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 to be trained in its use, and that a representative number of workers on site during construction and commissioning also be trained in its use. For a more detailed analysis of EMS capabilities, impacts and suggested mitigation measures, please see the **Socioeconomics** section of this **FSA**.

Closure and Decommissioning Impacts and Mitigation

A closure of the proposed HHSEGS (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 (HHS 2011a, § 2.5.2). 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 HHSEGS. Therefore based on staff's analysis for the construction and operation phases of this project and the closure plan requirements in the **General Conditions** section of this FSA, staff concludes that hazardous materials-related impacts from closure and decommissioning of the HHSEGS would be insignificant with respect to CEQA.

CUMULATIVE IMPACTS

Fire protection and emergency services demands caused by routine and emergency incidents at the proposed HHSEGS would continue for the expected 30-year life of the project. Staff considers that if the potential for direct impacts due to construction and operation of the proposed HHSEGS is mitigated to a level of insignificance, then the potential for cumulative impacts with other existing or foreseeable nearby facilities would also be sufficiently mitigated because any such impacts would occur independently of other facilities. However, staff cannot confirm that there would be no cumulative impacts until mitigation for direct impacts has been determined.

COMPLIANCE WITH LORS

Staff concludes that construction and operation of the HHSEGS project with staff's proposed mitigation in the 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 Hidden Hills Solar Electric Generating System in accordance with the requirements of CEQA. With respect to CEQA, staff concludes that if the applicant for the proposed HHSEGS 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 fulfills the requirements of Conditions of Certification **WORKER SAFETY-3** through **-5** 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 Southern Inyo Fire Protection District and all relevant information as well as past experience at other solar power plants in California. SIFPD resources (both personnel and equipment), are limited, commensurate with the low population density of the area it serves. The SIFPD has indicated that it will be significantly impacted (CEC 2012h) because of the magnitude of the proposed project and the large (relative to local population) workforce. Due to the minimal resources of the local SIFPD, staff agrees with the SIFPD that the emergency response requirements of HHSEGS would likely create a significant public impact.

At staff's request, the applicant provided Fire and Emergency Services Risk and Needs Analyses (FESNA) on May 9, 2012 (CH2 2012z). The analyses suggest that by complying with LORS, the project will not create significant impacts on the local SIFPD or local emergency response resources because any responses needed for fire, medical, or technical rescue needs would be sourced from Pahrump Valley Fire-Rescue Services (PVFRS) in Pahrump, Nevada. The official mechanism by which these various services (including technical rescue) would be sourced and paid for from another jurisdiction, like PVFRS in the state of Nevada, rather than from the local Authority Having Jurisdiction (AHJ), in this case SIFPD, has not been established.

Staff's conversations with both Fire Chief Levy of SIFPD and Fire Chief Scott F. Lewis of Pahrump Valley Fire-Rescue Service (PVFRS) have confirmed that there is a longstanding practice of providing mutual aid between their respective fire and EMS agencies, however, there is not currently a formal, signed mutual aid agreement between the agencies. With ongoing growth in demand for response services in the areas caused by, among other things, solar energy plants, this casual practice could well be tested going forward, and cannot be relied upon in this siting case. Generally, mutual aid is reserved for and is requested only when the primary responding agency is unable to adequately respond, and is not considered to be a method for providing primary response.

Assurance of the ability of the SIFPD to continue to provide its current level of response to the public requires expansion of SIFPD's resources in equipment, location, and personnel in order to prevent potential draw-down situations in which there would not be enough resources to provide an adequate level of service response to potentially near-simultaneous emergency incidents (including off-site road accidents).

Staff understands that there are ongoing discussions between the applicant and SIFPD, but that thus far, with regards to potential impacts from construction and operation of HHSEGS, no actions have been taken and no agreements have been reached and made public. Therefore, staff is proposing mitigation to reduce these impacts to less than significant by requiring an initial payment to the SIFPD for capital and personnel support and an agreement with the SIFPD (see proposed Conditions of Certification **WORKER SAFETY-6 and -7**).

Most of the transmission line and natural gas pipeline linears would be located in Nevada on United State Bureau of Land Management (BLM) land. Therefore, the

environmental and permit review of impact from the Nevada portion of the linears would be conducted by BLM.

PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

The following 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 worker safety- and fire protection-related impacts to less than significant and for the project to conform to all applicable LORS.

WORKER SAFETY-1 The project owner shall submit to the Compliance Project Manager (CPM) a copy of the Project Construction Safety and Health Program containing the following:

- a Construction Personal Protective Equipment Program;
- a Construction Exposure Monitoring Program;
- a Construction Injury and Illness Prevention Program;
- a Construction Heat Stress Protection Plan that implements and expands on existing Cal OSHA regulations as found in 8 CCR 3395;
- a Construction Emergency Action Plan; and
- a Construction Fire Prevention Plan that includes the above-ground fuel depot.
- 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.

Verification: The Construction Emergency Action Plan and the Fire Prevention Plan shall be submitted to the Southern Inyo Fire Protection District for review and comment 60 days prior to construction. The Personal Protective Equipment Program, the Exposure Monitoring Program, the Injury and Illness Prevention Program, and the Heat Stress Protection Plan shall be submitted to the CPM for review and approval of program compliance with all applicable safety orders 30 days prior to construction.

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.

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;
- 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); and
- Personal Protective Equipment Program (Cal Code Regs.,tit. 8, §§ 3401—3411).
- 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.

Verification: The Fire Prevention Plan and the Emergency Action Plan shall also be submitted to the Southern Inyo Fire Protection District for review and comment 60 days prior to the start of operations. The Operation Injury and Illness Prevention Plan, Heat Stress Protection Plan, BMP for Herbicides, and Personal Protective Equipment, and Personal Protective Equipment Program shall be submitted to the CPM for review and approval concerning compliance of the programs with all applicable safety orders 30 days prior to the start of operations.

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.

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 all 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; assure that all the plans identified in Conditions of Certification Worker Safety-1 and -2 are implemented; and,
- provide evidence that proper practices and procedures for the protection of employees involved in construction of the solar power tower, solar receiving steam generator, and/or confined and elevated (high angle) “permit spaces” occurs per federal and state standards (including OSHA §1910.146(k) and Cal/OSHA Standards Part 1910) and the equipment manufacturer’s requirements.

Verification: The CSS shall submit in the monthly compliance report (MCR) 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 project construction);
- 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.

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 after replacement.

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 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 30 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 either:

- (1) Reach an agreement with the Southern Inyo Fire Protection District (SIFPD) 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 conducted by an independent contractor who shall be selected and approved by the CPM and would fulfill all mitigation identified in the independent fire needs assessment and a risk assessment. The study will 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 be conducted pursuant to the Fire Needs Assessment and Risk Assessment shall evaluate the following:

- (a) The project's proportionate (incremental) contribution to potential cumulative impacts on the SIFPD 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 SIFPD 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 SIFPD 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, SIFPD, and the consultant (including emails) and included in any conversations between or among the project owner, SIFPD 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 SIFPD do not agree to the recommendations of the independent consultant's study, the Energy Commission CPM or designee shall, based on the results of the study and comments from the project owner and SIFPD, make the final determination regarding the funding to be provided to the SIFPD to accomplish the above-identified mitigation.

Site mobilization shall not occur until funding of mitigation occurs pursuant to either of the resolution options set forth above.

Verification: At least 30 days before construction, the project owner shall provide to the CPM:

- (1) A copy of the individual agreement with the SIFPD or, if the owner joins a power generation industry association, a copy of the group's bylaws and a copy of the group's

agreement with the SIFPD; and evidence in each January Monthly Compliance Report that the project owner is in full compliance with the terms of such bylaws and/or agreement; or

(2) a copy of the completed study showing the mitigation or the precise amount the project owner shall pay for mitigation; and documentation that the amount has been paid.

Annually thereafter, the owner shall provide TO the CPM verification of funding to the SIFPD, if annual payments were approved or recommended under either of the above-described funding resolution options.

WORKER SAFETY -7 The project owner shall provide a \$200,000 payment to Southern Inyo Fire Protection District prior to the start of construction. This funding shall off-set any initial funding required by **WORKER SAFETY-6** above until the funds are exhausted. This offset will be based on a full accounting by the Southern Inyo Fire Protection District regarding the use of these funds.

Verification: At least 30 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-6** based upon the accounting provided by the Southern Inyo Fire Protection District.

REFERENCES

CEC 2012h – California Energy Commission/S. Kerr (tn: 63659) Report of Conversation w/ Larry Levy, SIFPD re: medical needs. 2/15/2012

CH2 2012p – CH2MHill/J. Carrier (tn: 64558) Supplemental Data Response, Set 2, Boiler Optimization Plan and Design Change. 4/2/2012

CH2 2011e – CH2MHILL/J. Carrier (tn: 62057) Applicant's Attachment DR20-1 Omitted from Data Response Set 1A. 12/05/2011

CH2 2012d – CH2MHill/J. Carrier (tn: 63635) Applicant's Data Response, Set 2A. 02/09/2012

CH2 2012j – CH2MHill/ M. Finn (tn: 64163) Applicant's Data Response Set 1B-5. 3/15/2012

CH2 2012z – CH2MHill/J. Carrier (tn: 65119) Applicant's Data Response, Set 1C-3. Fire Risk Assessment. 5/08/2012

HHSG 2011a – BrightSource Energy/J. Woolard (tn: 61756) Application for Certification, Volume 1 & 2. 08/5/2011

HHSG 2011b – BrightSource Energy/C. Jensen (tn: 62125) Supplement to AFC for HHSEGS. 09/07/2011

HHSG 2011c – BrightSource Energy/C. Jensen (tn: 62322) AFC Supplement B.
09/23/2011

SIFPD2012a – Southern Inyo Fire Protection District (tn: 65013) Request for Listing of
Interested Agency. 04/30/2012 -- Ross letter

VF2010 – State of California—Health and Human Services Agency California,
Department of Public Health, Coccidioidomycosis Yearly Summary Report, 2001
– 2010

WORKER SAFETY / FIRE PROTECTION

List of Comment Letters

		WS/FP Comments?
1	Inyo County	
2	Bureau of Land Management	
3	National Park Service	
4	The Nature Conservancy	
5	Amargosa Conservancy	
6	Basin & Range Watch	
7	Pahrump Paiute Tribe	
8	Richard Arnold, Pahrump Piahute Tribe	
9	Big Pine Tribe of Owens Valley	
10	Intervenor Cindy MacDonald	X
11	Intervenor Center for Biological Diversity	
12	Intervenor, Old Spanish Trail Association	
13	Applicant, BrightSource Energy, Inc.	X

Comment #	DATE	COMMENT TOPIC	RESPONSE
10	July 21, 2012	Intervenor Cindy MacDonald	
10.1	p. 2-5	<p>"Fire and Emergency Services" -- The applicant's intent to utilize Nevada for fire and emergency services has initiated jurisdictional disputes. It may also increase property taxes to landowners in the vicinity through provisions contained within the California Constitution, Section XIII A, sections 13910 through 13916. As a result, the infrastructure requirements for functional fire and emergency medical services necessary to protect and insure the public interest and safety in and around the proposed Hidden Hills Solar Electric Generating System site cannot be considered reasonably available.</p>	<p>Staff notes that the local fire department has indentified impacts to emergency services from the project. This is "drawdown," where exisiting emergency service users may not get their current level of emergency services if local resources are having to repond to emergencies relating to the power plant. Staff is recommending adoption of conditions of certification that would address these issues prior to start of construction. These agreements might include reliance on formal mutual aid agreements and new infrastructure, but would have to mitigate the effects of drawdown such that local residents could expect their current levels of emergency services. Concerns about increased parcel taxes are speculative.</p>

Appendix 1 -- PSA Response to Comments, Worker Safety / Fire Protection

Comment #	DATE	COMMENT TOPIC	RESPONSE
13	July 23, 2012	Applicant, BrightSource Energy, Inc.	
13.2	p. 331	suggested change to PSA page 4.16-15 SIFPD Impacts, after 1st paragraph, request to insert text explaining Applicant's interpretation of the difference in designs of their proprietary "power tower" technology and parabolic trough technology.	Staff included in the FSA a discussion of the effect of absence of HTF.
13.3	p. 332	suggested change to PSA page 4.16-17 SIFPD Impacts, after 1st paragraph. Applicant feels 0.83 emergencies per plant per year does not constitute "significant" even in desert environment and objects to staff's assessment otherwise	Staff recognizes that an expected number of incidents cannot be determined from the existing, incomplete data. Whether higher levels of calls might occur remains unknown. Existing data is taken from smaller solar power plants and may not be predictive of the current siting case. The existing data does not include potential impacts on EMS services that would result from increased worker commute traffic. These impacts would be affected by the nature of the roads used, commute times, weather, etc. Finally, the significance of any impacts would depend on the resources and level of service demands on the local responders.
13.4	p. 332	suggested change to PSA page 4.16-17 SIFPD cts,last paragraph, 3rd Sentence, regarding response time, applicant recommends "approximately 40 minutes" be used instead of stated "30 to 50 minutes"	Staff prefers the added information provided by the estimated range of response times. Estimated ranges would be affected by experience of affects resulting from road conditions, weather, volunteer availability, etc.
13.5	p. 332	suggested change to PSA page 4.16-18 SIFPD Impacts,last paragraph, 3rd Sentence, regarding response time, applicant recommends "approximately 40 minutes" be used instead of stated "30 to 50 minutes" -- and that this is not a significant impact. Moreover, state this is an "economic" not "enviromental" issue and therefore <u>not</u> an impact under CEQA.	Staff prefers the added information provided by the estimated range of response times. Staff considers that an incident requiring a large response at the proposed project for a prolonged duration, which might leave the fire department unable to effectively respond to emergency needs of the public, would be significant.

Appendix 1 -- PSA Response to Comments, Worker Safety / Fire Protection

<p align="center">13.6</p>	<p align="center">p. 332</p>	<p>question regarding PSA page 4.16-19 Emergency Medical Services Response, 2nd paragraph, 3rd sentence: is this only for the construction period?</p>	<p>Certainly the construction period creates the highest demand; needs beyond construction will be resolved by Conditions of Certification Worker Safety-6 and -7.</p>
<p align="center">13.7</p>	<p align="center">p. 332</p>	<p>question regarding PSA page 4.16-20 Cumulative Impacts, 1st paragraph, 1st Sentence: which facilities are being referred in this first sentence, and are they within the SIFPD service area?</p>	<p>Potential issues will be resolved by Conditions of Certification Worker Safety-6 and -7.</p>

FACILITY DESIGN

Testimony of 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 Hidden Hills Solar Electric Generating System (HHSEGS). 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 (HHS 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	Inyo 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 require the project to comply with the California Building Standards Code and Inyo 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

HHSEGS would be located on approximately 3,277 acres of privately owned land leased in Inyo County, California, adjacent to the Nevada border. 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 A through F (HHS 2011a), and the Boiler Optimization Plan, Attachment B (CH2 2012p).

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 HHSG 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 and their associated components 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.

HHSEGS 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, below, which, in part, requires the project CBO's review and approval of the owner's proposed lateral force procedures before construction begins.

PROJECT QUALITY PROCEDURES

The 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 (HHS 2011a, AFC § 3.12.6, Appendices 2A through 2G). Compliance with design requirements will be verified through specific inspections and audits. Implementation of this quality assurance/quality control (QA/QC) program will ensure that HHSEGS 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 by the CBC, pays the cost of these reviews and inspections. While building permits in addition to Energy Commission certification are not required for this project, the applicant pays in lieu of CBC permit fees to cover the costs of these reviews and inspections.

Engineering and compliance staff will invite Inyo County or a third-party engineering consultant to act as CBO for this project. When an entity has been assigned CBO duties, Energy Commission staff will complete a memorandum of understanding (MOU) with that entity to outline both its roles and responsibilities and those of its subcontractors and delegates.

Staff has developed proposed conditions of certification to ensure the 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 will design and build the proposed project (conditions of certification **GEN-1** through **GEN-8**). These engineers must be registered in California and sign and stamp every submittal of design plans, calculations, and specifications submitted to the CBO. These conditions require that every element of the project's construction (subject to CBO review and approval) be approved by the CBO before it is performed. They also require

that qualified special inspectors perform or oversee special inspections required by all applicable LORS.

While the Energy Commission and delegate CBO have the authority to allow some flexibility in scheduling construction activities, these conditions are written so that no element of construction (of permanent facilities subject to CBO review and approval) which could be difficult to reverse or correct can proceed without prior CBO approval. Elements of construction that are not difficult to reverse may proceed without approval of the plans. The applicant bears the responsibility to fully modify construction elements in order to comply with all design changes resulting from the CBO's subsequent plan review and approval process.

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 will be completed in a manner that is environmentally sound, safe, and protects the public health and safety, the applicant shall submit a decommissioning plan to the Energy Commission for review and approval before the project's decommissioning begins. The plan shall 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 will likely comply with applicable engineering LORS.
3. The proposed conditions of certification will ensure that HHSEGS is designed and constructed in accordance with applicable engineering LORS. This will be

accomplished through design review, plan checking, and field inspections that will be performed by the CBO or other Energy Commission delegate. Staff will audit the CBO to ensure satisfactory performance.

4. Though future conditions that could affect decommissioning are largely unknown at this time, it can reasonably be concluded that if the project owner submits a decommissioning plan as required in the **General Conditions** portion of this document prior to decommissioning, decommissioning procedures will comply with all applicable engineering LORS.

Energy Commission staff recommends that:

1. The proposed conditions of certification be adopted to ensure that the project is designed and constructed in a manner that protects the public health and safety and complies with all applicable engineering LORS;
2. The project be designed and built to the 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.

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 any construction, addition, alteration, moving, demolition, repair, or maintenance to be performed on any portion(s) of the completed facility that requires CBO approval for compliance with the above codes. The CPM will then determine if the CBO needs to approve the work.

GEN-2 Before submitting the initial engineering designs for CBO review, the project owner shall furnish the CPM and the CBO with a schedule of facility design submittals, and master 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.

Verification: The project owner shall make the required payments to the CBO in accordance with the agreement between the project owner and the CBO. The project owner shall send a copy of the CBO's receipt of payment to the CPM in the next monthly compliance report indicating that applicable fees have been paid.

GEN-4 Prior to the start of rough grading, the project owner shall assign a California-registered architect, or a structural or civil engineer, as the resident engineer (RE) in charge of the project. All transmission facilities (lines, switchyards, switching stations, and substations) are addressed in the conditions of certification in the **Transmission System Engineering** section of this document.

The RE may delegate responsibility for portions of the project to other registered engineers. Registered mechanical and electrical engineers may be delegated responsibility for mechanical and electrical portions of the project, respectively. A project may be divided into parts, provided that each part is clearly defined as a distinct unit. Separate assignments of general responsibility may be made for each designated part.

The RE shall:

1. Monitor progress of construction work requiring CBO design review and inspection to ensure compliance with LORS;
2. Ensure that construction of all facilities subject to CBO design review and inspection conforms in every material respect to applicable LORS, these conditions of certification, approved plans, and specifications;
3. Prepare documents to initiate changes in approved drawings and specifications when either directed by the project owner or as required by the conditions of the project;
4. Be responsible for providing project inspectors and testing agencies with complete and up-to-date sets of stamped drawings, plans, specifications, and any other required documents;
5. Be responsible for the timely submittal of construction progress reports to the CBO from the project inspectors, the contractor, and other engineers who have been delegated responsibility for portions of the project; and
6. Be responsible for notifying the CBO of corrective action or the disposition of items noted on laboratory reports or other tests when they do not conform to approved plans and specifications.

The resident engineer (or his delegate) must be located at the project site, or be available at the project site within a reasonable period of time, during any hours in which construction takes place.

The RE shall have the authority to halt construction and to require changes or remedial work if the work does not meet requirements.

If the RE or the delegated engineers are reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the resume and registration number of the RE and any other delegated engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the RE and other delegated engineer(s) within five days of the approval.

If the RE or the delegated engineer(s) is subsequently reassigned or replaced, the project owner has five days to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-5 Prior to the start of rough grading, the project owner shall assign at least one of each of the following California registered engineers to the project: a civil engineer; a soils, geotechnical, or civil engineer experienced and knowledgeable in the practice of soils engineering; and an engineering geologist. Prior to the start of construction, the project owner shall assign at least one of each of the following California registered engineers to the project: a design engineer who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; a mechanical engineer; and an electrical engineer. (California Business and Professions Code section 6704 et seq., and sections 6730, 6731 and 6736 require state registration to practice as a civil engineer or structural engineer in California). All transmission facilities (lines, switchyards, switching stations, and substations) are handled in the conditions of certification in the **Transmission System Engineering** section of this document.

The tasks performed by the civil, mechanical, electrical, or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (for example, proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer.

The project owner shall submit, to the CBO for review and approval, the names, qualifications, and registration numbers of all responsible engineers assigned to the project.

If any one of the designated responsible engineers is subsequently reassigned or replaced, the project owner shall submit the name,

qualifications and registration number of the newly assigned responsible engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

A. The civil engineer shall:

1. Review the foundation investigations, geotechnical, or soils reports prepared by the soils engineer, the geotechnical engineer, or by a civil engineer experienced and knowledgeable in the practice of soils engineering;
2. Design (or be responsible for the design of), stamp, and sign all plans, calculations, and specifications for proposed site work, civil works, and related facilities requiring design review and inspection by the CBO. At a minimum, these include: grading, site preparation, excavation, compaction, construction of secondary containment, foundations, erosion and sedimentation control structures, drainage facilities, underground utilities, culverts, site access roads and sanitary sewer systems; and
3. Provide consultation to the RE during the construction phase of the project and recommend changes in the design of the civil works facilities and changes to the construction procedures.

B. The soils engineer, geotechnical engineer, or civil engineer experienced and knowledgeable in the practice of soils engineering, shall:

1. Review all the engineering geology reports;
2. Prepare the foundation investigations, geotechnical, or soils reports containing field exploration reports, laboratory tests, and engineering analysis detailing the nature and extent of the soils that could be susceptible to liquefaction, rapid settlement or collapse when saturated under load;
3. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with requirements set forth in the 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.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible civil engineer, soils (geotechnical) engineer and engineering geologist assigned to the project.

At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of construction, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible design engineer, mechanical engineer, and electrical engineer assigned to the project.

The project owner shall notify the CPM of the CBO's approvals of the responsible engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-6 Prior to the start of an activity requiring special inspection, including prefabricated assemblies, the project owner shall assign to the project, qualified and certified special inspector(s) who shall be responsible for the special inspections required by the 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.

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.

Verification: If a discrepancy is discovered in any of the above data, the project owner shall, within five days, prepare and submit an NCR describing the nature of the discrepancies and the proposed corrective action to the CBO, with a copy of the transmittal letter to the CPM. The NCR shall reference the condition(s) of certification and the applicable CBC chapter and section. Within five days of resolution of the NCR, the project owner shall submit a copy of the corrective action to the CBO and the CPM.

The project owner shall transmit a copy of the CBO's approval or disapproval of the corrective action to the CPM within 15 days. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action to obtain CBO's approval.

STRUC-3 The project owner shall submit to the CBO design changes to the final plans required by the 2010 CBC, including the revised drawings, specifications, calculations, and a complete description of, and supporting rationale for, the proposed changes, and shall give to the CBO prior notice of the intended filing.

Verification: On a schedule suitable to the CBO, the project owner shall notify the CBO of the intended filing of design changes, and shall submit the required number of sets of revised drawings and the required number of copies of the other above-mentioned documents to the CBO, with a copy of the transmittal letter to the CPM. The project owner shall notify the CPM, via the monthly compliance report, when the CBO has approved the revised plans.

STRUC-4 Tanks and vessels containing quantities of toxic or hazardous materials exceeding amounts specified in the 2010 CBC shall, at a minimum, be designed to comply with the requirements of that chapter.

Verification: At least 30 days (or project owner- and CBO-approved alternate time frame) prior to the start of installation of the tanks or vessels containing the above specified quantities of toxic or hazardous materials, the project owner shall submit to the CBO for design review and approval final design plans, specifications, and calculations, including a copy of the signed and stamped engineer's certification.

The project owner shall send copies of the CBO approvals of plan checks to the CPM in the following monthly compliance report. The project owner shall also transmit a copy of the CBO's inspection approvals to the CPM in the monthly compliance report following completion of any inspection.

MECH-1 The project owner shall submit, for CBO design review and approval, the proposed final design, specifications and calculations for each plant major piping and plumbing system listed in 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);
- 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
- Inyo 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

- CH2 2012p – CH2MHill/J. Carrier (tn: 64558) Supplemental Data Response, Set 2, Boiler Optimization Plan and Design Change. 4/2/2012
- HHSG 2011a – J. Woolard (tn: 61756) Application for Certification, Volume 1 & 2. 08/5/2011

Appendix 1: PSA Response to Comments, Facility Design

FACILITY DESIGN

List of Comment Letters

		Facility Design Comments?
1	Inyo County	
2	Bureau of Land Management	
3	National Park Service	
4	The Nature Conservancy	
5	Amargosa Conservancy	
6	Basin & Range Watch	
7	Pahrump Paiute Tribe	
8	Richard Arnold, Pahrump Piahute Tribe	
9	Big Pine Tribe of Owens Valley	
10	Intervener Cindy MacDonald	X
11	Intervener Center for Biological Diversity	
12	Intervener, Old Spanish Trail Association	
13	Applicant, BrightSource Energy, Inc.	X

Comment #	DATE	COMMENT TOPIC	RESPONSE
10	July 21, 2012	Intervener Cindy MacDonald	
10.1	p. 7-1 #1	Laws requiring evaluation and verification during CEQA or AFC process.	The California Building Code gives the CEC the authority and the responsibility to ensure every power plant project under its jurisdiction complies with all the applicable engineering laws, ordinances, regulations, and standards (LORS). Facility Design was developed by the CEC staff in order to ensure power plant projects' compliance with engineering LORS. However, it is not a CEQA requirement. CEQA does not require the development of the Facility Design section.

Appendix 1: PSA Response to Comments, Facility Design

<p align="center">10.2</p>	<p align="center">p. 7-1 #2</p>	<p>How does the PSA assessment conform to CEQA or AFC process?</p>	<p>Facility Design is intended for project compliance with engineering LORS; it is not a CEQA requirement. The assessment is prepared with the expectation that a power plant must be built to comply with the building code (and all other related engineering LORS) in order to function as a facility that will operate in a safe manner as required by the California Building Code. The staff assessment assumes the project will threaten life safety if not built in accordance with those LORS. This is why the building code was created in the first place. Thus, no there assessment is needed. As a part of staff's evaluation of the project features staff ensures that the applicant is aware of the applicable engineering LORS and has confirmed that it will comply with them (as described in its AFC Appendices 2A through 2G). Assessing whether or not the project will actually comply with those LORS is accomplished through the CoCs via the CEC's delegate Chief Building Official's (CBO's) review and inspection process and the oversight provided by the CPM and the CEC's engineering staff.</p>
<p align="center">10.3</p>	<p align="center">p. 7-1 #3</p>	<p>How does CEC verify components integrity when designs have not been prepared yet?</p>	<p>The frame work is already laid out; that is the engineering LORS. The CBO will ensure through design review and on-site inspection that the project is built in compliance with all the applicable LORS. The effective way to ensure project compliance with those LORS is through the CBO's design review and inspection process once the project is issued a license to construct. Whether the plans are approved prior to or after licensing, on-site inspection must be performed during construction and construction cannot be completed until the project adheres to the final, approved as-builts plans.</p>

Appendix 1: PSA Response to Comments, Facility Design

<p align="center">10.4</p>	<p align="center">p. 7-2 #4</p>	<p>How does CEC ensure LORS are met when design elements are to be announced?</p>	<p>Regardless of what equipment is to be used, the California Building Standards Code, the most stringent code used by the industry, has various requirements that ensure any project in California is built to withstand all natural hazards. This will be done through the various CoCs. For example, CIVIL-1 will require approval of grading and drainage plans prior to commencement of actual grading; and actual grading will be inspected by the CBO to ensure the building code requirements have been met. The CBO will ensure, through design review and on-site inspection, that the project is built in compliance with all the applicable LORS. Please also see the above response to Comment 10.3.</p>
<p align="center">10.5</p>	<p align="center">p. 7-2 #5</p>	<p>How does CEC ensure impacts are mitigated without reviewing design elements?</p>	<p>The CBO will ensure, through design review and on-site inspection, that the project is built in compliance with all the applicable LORS. No project feature requiring engineering review will be allowed to be constructed until the CBO's professional engineers have reviewed and approved the plans/specifications for that feature. Other impacts to natural resources are discussed in Soils and Surface Water and Water Supply sections of this FSA. Please also see the above responses to Comments 10.1 through 10.4.</p>
<p align="center">10.6</p>	<p align="center">p. 7-2 #6</p>	<p>How does CEC determine potentially significant impacts if project components have not been evaluated.</p>	<p>No significance criteria applies to Facility Design, as this section is not required by CEQA. However, as explained above, no project feature requiring engineering review will be allowed to be constructed until the CBO's professional engineer has reviewed and approved the plans/specifications for that feature.</p>
<p align="center">10.7</p>	<p align="center">p. 7-2 #7</p>	<p>How does CEC determine effectiveness of mitigation measures if project elements are not been evaluated prior to the final decision.</p>	<p>No project feature requiring engineering review will be allowed to be constructed until the CBO's professional engineers have reviewed and approved the plans/specifications for that feature. Please also see other responses above.</p>

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<p align="center">10.8</p>	<p align="center">p. 7-2 #8</p>	<p>How does CEC determine site suitability if project elements have not been evaluated prior to the final decision?</p>	<p>No project feature requiring engineering review will be allowed to be constructed until it goes through the CBO review and inspection process. For example, grading and drainage plans will be approved by the CBO's qualified engineers prior to construction. First, geotechnical and hydrology reports are prepared with recommendations for mitigation measures. Foundations, grading, and drainage plans will then be developed based on those recommendations. Lastly, the CBOs California-registered engineers will review and approve those plans prior to start of construction, and the CBO's inspector will then ensure appropriate implementation of those plans during construction.</p>
<p align="center">10.9</p>	<p align="center">p. 7-2 #9</p>	<p>Given the lack of information and oversight, how can CEC ensure compliance?</p>	<p>Please see the above responses.</p>
<p align="center">10.10</p>	<p align="center">p. 12-3 #8</p>	<p>What is the reason(s) for the differing design elements description and discrepancy?</p>	<p>Traffic and Transportation (pg. 622 of PSA) took information from AFC, Project Description, Section 2.1.2.4.</p> <p>Soils and Surface Water (pg. 571 of PSA) took information from the Preliminary Construction SWPPP-DESCP (Appendix 5.15A of AFC) in two locations: Post-construction Hydrology Calculations (Attachment H, pg 706) and Grading and Drainage (Attachment I, pg 897).</p>
<p align="center">10.11</p>	<p align="center">p. 12-3 #9</p>	<p>Which one of these design descriptions is currently accurate?</p>	<p>Because the applicant's post-construction calculations used 10 foot wide concentric drive zones around each solar tower, staff considers this to be currently accurate.</p>
<p align="center">10.12</p>	<p align="center">p. 12-3 #10</p>	<p>Which one of these design elements is incorporated in the AFC files and where is it located?</p>	<p>Traffic and Transportation (pg. 622 of PSA) took information from AFC, Project Description, Section 2.1.2.4.</p> <p>Soils and Surface Water (pg. 571 of PSA) took information from the Preliminary Construction SWPPP-DESCP (Appendix 5.15A of AFC) in two locations: Post-construction Hydrology Calculations (Attachment H, pg 706) and Grading and Drainage (Attachment I, pg 897).</p>

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<p align="center">10.13</p>	<p align="center">p. 12-4 #11</p>	<p>How many roads circle the power towers for each plant under <i>each</i> design element?</p>	<p>Because the circular layout of each solar field is contained within two irregular shapes, the number of roads surrounding each tower varies depending on direction from the solar tower. The "Civil Overall Site Plan" (AFC, Appendix 5.15A, Pg. 897, www.energy.ca.gov/sitingcases/hiddenhills/documents/applicant/afc/volume-2-Appendixes/) shows the layout of 10-foot wide dirt roads. Solar Plant 1 would have 13 complete circles, but as many as 41 roads. Solar Plant 2 would have 8 complete circles, but as many as 33 roads. The applicant has not submitted site plans showing 12-foot wide dirt roads within the solar fields.</p>
<p align="center">10.14</p>	<p align="center">p. 12-4 #12</p>	<p>What is the projected total surface in acreage values for <i>each</i> of these maintenance road design elements and what is the difference in values between them? Example, 20-ft roads result in 500 acres of disturbance, 10-ft roads result in 1,000 acres of disturbance.</p>	<p>Because the applicant's post-construction calculations used 10 foot wide concentric drive zones around each solar tower, staff considers this to be currently accurate. Staff did not assess the project using 20 foot wide concentric drive zones.</p> <p>1 acre = 43,560 square feet Paved roads: 16 acres = 696,960 square feet Fully graded dirt roads (12' & 20'): 18.2 acres = 792,792 square feet Partially graded dirt roads (10'): 171 acres = 7,448,760 square feet</p>
<p align="center">10.15</p>	<p align="center">p. 12-4 #13</p>	<p>Do changes in acreage values for maintenance paths/drive zones result in changes to the number of installed heliostats/mirrors? If so, by how many?</p>	<p>No change in number of heliostats necessary.</p>
<p align="center">10.16</p>	<p align="center">p. 12-4 #14</p>	<p>What are the differences in impacts to the Low Impact Design element of the proposed project if the 20-ft drive zones are utilized versus the 10-ft maintenance paths?</p>	<p>Difference in impacts not necessary for speculative increase in width of drive zones; instead, staff analyzes planned facility design aspects, which are 10-ft maintenance paths and 20-ft drive zones.</p>
<p align="center">10.17</p>	<p align="center">p. 12-4 #15</p>	<p>What are the differences between sheet flow, drainage and surface run off between these two design elements?</p>	<p>See the Soils & Surface Water section of this FSA for detailed discussions on sheet flow, drainage and surface run off.</p>

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10.18	p. 12-4 #16	Which of the two designs provide the highest level of environmental protection and/or the least amount of environmental impacts and by what degree?	CEQA does not require comparative analyses on degrees of environmental impact(s).
Comment #	DATE	COMMENT TOPIC	RESPONSE
13	July 23, 2012	Applicant, BrightSource Energy	
13.1	p. 179	Staff to use the CBO website in lieu of submittals to the CPM.	Staff does not agree with this change. The website does not satisfy the CEC's internal compliance monitoring process. For this monitoring process to be in effect, individual hard copies need to be submitted. These paper copies will then be attached, by the CPM, to the tracking sheet and submitted to the technical staff for review and approval.
13.2	p. 180	"Verification" designation missing from CoCs	Staff has corrected this in the FSA .
13.3	p.180	Request to change References on pg.5.1-21 of PSA	Staff has made this change in the FSA .

GEOLOGY AND PALEONTOLOGY

Testimony of Casey Weaver, CEG

SUMMARY OF CONCLUSIONS

The proposed Hidden Hills Solar Electric Generating System (HHSEGS) site is located in an active geologic area along the border between Southern California and Southern Nevada, approximately 45 miles west of Las Vegas Nevada and 57 miles southeast of Death Valley, California. Because of its geologic setting, the site could be subject to strong levels of earthquake-related ground shaking. The closest known active fault is a segment of the Pahrump Valley Fault Zone which is located approximately 1,500 feet northeast of the proposed project site (**Geological Resources - Figure 1**). Additional active faults in the vicinity of the project site are the Garlock fault (35 miles southwest of the site) and the Southern Death Valley fault zone (38 miles to the southwest) (**Geological Resources - Figure 2**). The potential significant effects of strong ground shaking on the HHSEGS structures must be mitigated through structural designs required by the most recent edition of the California Building Code (CBC 2010). CBC 2010 requires that structures be designed to resist seismic stresses from ground acceleration and, to a lesser extent, liquefaction potential.

In addition to strong seismic shaking, the project may be subject to soil failure caused by hydrocollapse, formation of soil fissures and/or dynamic compaction. A design-level geotechnical investigation required for the project by the 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 strong seismic shaking and potential excessive settlement due to collapsible soils, formation of soil fissures and/or dynamic compaction.

There are no known viable geologic or mineralogical resources at the proposed HHSEGS site. Unique geological features (paleosprings) that exist east of the site are associated with fault scarps belonging to segments of the Pahrump Valley fault zone. There is no evidence of the existence of paleosprings on the site. However, channels and associated deposits formed by flows from these springs may traverse the site. Paleontological resources have been documented within 3 miles of the project, but no significant fossils were found during field explorations at the project site or near ancillary facilities (HHSG 2011a § 5.8). 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**.

Based on this information, Energy Commission staff concludes that the potential adverse cumulative impacts to project facilities from geologic hazards during its design life, if any, are less than significant. Similarly, staff concludes the potential adverse cumulative impacts to potential geologic, mineralogic, and paleontologic resources from the construction, operation, and closure of the proposed project, if any, are less than significant. It is staff's opinion that the proposed HHSEGS can be designed and constructed in accordance with all applicable laws, ordinances, regulations, and

standards (LORS), and in a manner that both protects environmental quality and assures public safety.

INTRODUCTION

In this section, California Energy Commission (Energy Commission) staff discusses the potential impacts of geologic hazards on the proposed HHSEGS facility as well as the HHSEGS’s potential impact on geologic, mineralogic, and paleontologic resources. Staff’s objective is to identify resources that could be significantly adversely affected, evaluate the potential of the project construction and operation to significantly impact the resources and provide mitigation measures as necessary to ensure that there would be no significant adverse impacts to 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 conditions of certification - *i.e.*, monitoring and mitigation measures that, if implemented, would reduce any project impacts to geologic hazards and geologic, mineralogic, and paleontologic resources to insignificant levels.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable laws, ordinances, regulations and standards (LORS) are listed in the application for certification (AFC) (HHS 2011a § 5.8). 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)**

<u>Applicable Law</u>	<u>Description</u>
<u>Federal</u>	<i>Portions of the utility corridor are on federal land</i>
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	Provides for protection of objects of antiquity on federal lands.
Omnibus Public Land Management Act of 2009, Title VI—Department of the Interior Authorizations, Subtitle D—Paleontological Resources Preservation	Directs the secretaries of the Interior and Agriculture to manage paleontological resources on BLM and USFS land using scientific principles and expertise, and to inventory paleontological resources on those lands.

<u>Applicable Law</u>	<u>Description</u>
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 Environmental Checklist Form	Asks if project would have impacts on paleontological resources or a unique geological feature.
Local	
County of Inyo General Plan	Compliance with the Public Safety Element of the General Plan. The Plan does not specifically address paleontological resources. However, it places emphasis on the preservation of historic and prehistoric resources and values.
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.
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 proposed HHSEGS project will be located on approximately 3,277 acres of privately-owned land leased in Inyo County, California, adjacent to the Nevada border. The site is approximately 8 miles directly south of Pahrump, Nevada (with a driving distance of 28 miles), and approximately 45 miles west of Las Vegas, Nevada. As detailed in the **PROJECT DESCRIPTION** section of this final staff assessment (**FSA**), HHSEGS will include the construction of the 500 MW power plant (consisting of Solar Plant 1, Solar Plant 2 and a common area), natural gas supply lines, sewer and storm

water collection and conveyance features, transmission lines, and water supply infrastructure.

REGIONAL SETTING

HHSEGS lies in the Pahrump Valley, within the Basin and Range physiographic province (Cook 2004) (**Geological Resources - Figure 3**). The province extends south from southeastern Oregon between the Sierra Nevada and the Wasatch Range of Utah, and then east from the Peninsular Range of southern California to the Guadalupe Mountains of West Texas. A portion of this region, lying primarily in Nevada and western Utah, is called the Great Basin because all waterways drain internally to dry basins. No streams lying within the Great Basin reach the Pacific Ocean or the Gulf of California.

For much of the Paleozoic (about 550 to 240 million years ago), the region was characterized as a relatively shallow marine environment. Sediments laid down in this marine environment were primarily fine grain carbonates but also included sands and silts. Subsequent metamorphism converted these marine sediments to limestone, sandstone, dolomite, and limited shales.

A hiatus (a period of no geologic record) separates the Paleozoic marine rocks from Early Mesozoic non-marine estuarine and continental sediments. Following deposition of the non-marine sediments, a period of crustal compression occurred in the Late Mesozoic. Evidence of this compressional tectonic regime is displayed as the Keystone Thrust in the Spring Mountains east of the site. Here a large crustal slab of Paleozoic rock has been thrust over a layer of much younger Jurassic sandstone, each crustal slab being many thousands of feet thick (Burchfiel 1974).

Beginning in the Miocene (about 22 million years ago), the Basin and Range province was created as the Earth's crust stretched, thinned, and then broke the metamorphosed rocks into some 400 mountain blocks that partly rotated from their originally horizontal positions (Cook 2004). Normal and strike-slip faulting, as well as associated volcanic activity, transformed the landscape to the basin-and-range type topography typical of the Mojave region today.

Late in the development of the Basin and Range province, and continuing into the Quaternary (the last 2 million years), uplift of the Sierra Nevada, as well as Transverse and Peninsular Ranges of California, led to a strengthened rain shadow and progressive desertification in the Great Basin as precipitation declined in the interior (HHS 2011a § 5.8).

PROJECT SITE DESCRIPTION

The project site is located in the southern portion of Pahrump Valley, an internally drained basin bound by the Resting Spring and Nopah Ranges on the west and northwest, by the Kingston Range on the southwest, and by the Spring Mountains on the east. Pahrump Dry Lake lies about 3 miles northwest of the HHSEGS site. To the southeast, a low divide separates Pahrump Valley from Sandy Valley while, to the northeast, another low divide separates it from Stewart Valley. To the north, the Last Chance Range separates the Pahrump Valley from the Amargosa Desert. The nearest

community to the site is the township of Pahrump, Nevada, which is located approximately 8 miles to the north. The site is bordered by paved Old Spanish Trail Highway (also known as Tecopa Road) to the south, unpaved Quartz Street to the west, the California-Nevada border to the east, and an unpaved road along the northern border. Numerous unpaved roads also extend in a north-south and east-west grid pattern across the site from a 1950's housing subdivision that was never constructed.

The subject property is approximately 3,097 acres in size with a high elevation of approximately 2,675 feet on the east side, and low elevation of approximately 2,585 feet on the west side of the property (Ninyo 2011). The topography across the site is relatively planar to slightly undulatory with a gentle slope from east to west.

The site is undeveloped and covered with sparse native and invasive desert vegetation. This vegetation consists primarily of shrubs and grasses. Existing improvements in the site area include the Old Spanish Trail Highway, which borders the site to the south, and an abandoned peach orchard along the southern property border adjacent to Old Spanish Trail Highway at Silver Road. The abandoned orchard occupies approximately 10 acres, and is presently marked by dead fruit trees, sporadic evergreens and other vegetation. A groundwater well that has recently been serviced is located in the abandoned orchard area.

Several ephemeral (typically dry) drainage washes extend across the eastern portion of the project site, originating in Nevada and flowing westerly into California. Field observations indicate that water runoff generally drains toward the west via sheet-flow and within these natural drainage channels.

As part of the preliminary on-site geotechnical investigation, exploratory borings drilled to maximum depths of 20 feet did not encounter groundwater (Ninyo 2011). During this on-site investigation, four existing nonfunctioning groundwater wells (including the well in the abandoned orchard) were discovered and groundwater levels were measured within the wells. Depth to groundwater in these wells ranged from approximately 110 feet below ground surface (bgs) to 130 bgs (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 AND THRESHOLD 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 (**Geological Resources - Figure 4**).

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 HHSEGS was also reviewed. All research was conducted in accordance with accepted assessment protocol (BLM 2008 and 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

No known oil or gas reserves were identified to be present in the project vicinity (CDC 2010). There is no indication that oil, gas, or geothermal resources underlie HHSEGS or the surrounding area.

Numerous hard rock mines are located in the hills surrounding the project site. Since the late 1800's, the mines have produced primarily gold, silver and copper (Kral 1951). To the west of the site in the Nopah range, the Shoshone Mines Unit contains a gold-copper bearing porphyry and along with gold and copper has produced lead, zinc, and silver (Dixon 1990). To the northeast near the northern end of Pahrump Valley, in the low hills west of Spring Mountain, lies the Johnnie District. The Johnnie district is noted for its gold-quartz veins and associated gold-placer deposits (Southern 2005). To the southwest of the project site, the Tecopa area is rich in silver. Additional mines to the south-southwest of the site are mined for talc.

The State of California Department of Mines and Geology (now known as the California Geological Survey) uses Mineral Resource Zone (MRZ) classifications to indicate the presence (or lack thereof) of measured or inferred mineral resources on lands across the state. The classifications identified by the CDMG for the HHSEGS project area include MRZ-3b and MRZ-4 (CDMG 1993). These classifications are defined as follows:

MRZ-3b – Areas underlain by inferred mineral occurrence.

MRZ-4 – No known mineral occurrences.

In the vicinity of the project site, MRZ-3b was mapped across the entire Pahrump Valley for "sodium compounds". As stated in SR-167 (CDMG, 1993), these specific resources "have low mineralization density, no production has occurred, and there is a low potential for undiscovered resources." In addition to the MRZ-3b designation, the entire Pahrump Valley area was also mapped as MRZ-4, (no known mineral occurrence), for hydrothermal mineral deposits (gold, silver, copper, lead, and zinc).

Based on the information above, it is staff's opinion that the project would not have any significant adverse direct or indirect impacts to potential geologic and mineralogic resources.

PALEONTOLOGIC RESOURCES

Over at least the last 700,000 years (Middle Pleistocene to Recent), warm-desert environments typical of the present have been the exception rather than the rule (HHSG 2011a § 5.8-7). Interglaciations, like the current Holocene (the last 10,000 years), last for relatively brief periods of time while intervening glaciations typically extend for more than 50,000 years. This is important in considering paleontological resources because, during these extended glacial periods, the project region was occupied by steppe shrubs and coniferous woodlands rather than today's desert scrub (Spaulding 1985; 1990). During these glacial periods, runoff into the valleys formed perennial lakes, increased recharge to local aquifers, raised the water tables, and basin margin artesian spring systems flowed (HHSG 2011a §5.8-9). Pond and marsh environments, and well-vegetated "phreatophyte flats" were commonly associated with discharge from the basin-margin artesian spring systems and, the older the spring, the greater the extent of the spring-fed environments. This is important in considering paleontological resources because these valley bottom riparian habitats attracted now-extinct Pleistocene megafauna, and their remains can be common in some ancient lake (lacustrine) and paleospring sediments (HHSG 2011a §5.8-9). During these glacial periods, perennial

lakes were established throughout the Basin Range province. It is likely that similar lakes existed within the Pahrump Valley.

Both lacustrine sediments and paleospring deposits can be fossiliferous. Examples of fossiliferous lacustrine deposits include the fossil beds of Lake Manix and more limited fossil occurrences in the beds of Lake Tecopa (HHS 2011a §5.8-9). Examples of fossiliferous paleospring deposits include those from Tule Springs in the Las Vegas Valley. The faunal assemblage fossils most often discovered in these deposits are primarily the grazing members of the extinct Pleistocene megafauna including mammoth (*Mammuthus columbi*), camel (*Camelops hesternus*), at least two species of horse (*Equus* spp.), and giant llama (*Hemiauchenia* sp.) (HHS 2011a §5.8-9). These fossils are most commonly encountered in the Pleistocene deposits where spring pond sediments are most extensive. While less extensive, fossils in early Holocene deposits would be from near the time of the mass extinction of the Pleistocene megafauna, and therefore, be of critical scientific interest (HHS 2011a §5.8-9).

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. 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 Bureau of Land Management (BLM) has developed a potential fossil yield classification system that offers a more detailed system of evaluating the likelihood that a given geological unit may yield fossils (BLM and Chirstensen 2007). This system is described in detail, and also summarized in **Geology and Paleontology Table 2**.

Geology and Paleontology Table 2
SVP Paleontological Sensitivity Ratings (Sensitivity) and Equivalent
Potential Fossil Yield Classifications (PFYC) Consistent with
BLM Guidelines

Sensitivity (PFYC)	Definition
High and Very High (PFYC 4, 5)	Assigned to geological formations known to contain paleontological resources that include rare, well-preserved, and/or fossil materials important to on-going paleoclimatic, paleobiological and/or evolutionary studies. They have the potential to produce, or have produced vertebrate remains that are the particular research focus of many paleontologists, and can represent important educational resources as well.

Geology and Paleontology Table 2
SVP Paleontological Sensitivity Ratings (Sensitivity) and Equivalent
Potential Fossil Yield Classifications (PFYC) Consistent with
BLM Guidelines

Sensitivity (PFYC)	Definition
Moderate and Unknown (PFYC 3a, 3b)	Stratigraphic units that have yielded fossils that are moderately well-preserved, are common elsewhere, and/or that are stratigraphically long-ranging would be assigned a moderate rating. This evaluation can also be applied to strata that have an unproven but strong potential to yield fossil remains based on its stratigraphy and/or geomorphologic setting.
Low (PFYC 2)	Sediment that is relatively recent, or that represents a high-energy subaerial depositional environment where fossils are unlikely to be preserved. A low abundance of invertebrate fossil remains, or reworked marine shell from other units, can occur but the paleontological sensitivity would remain low due to their lack of potential to serve as significant scientific or educational purposes.
Very Low and Zero (PFYC 1)	Stratigraphic units with very low potential include pyroclastic flows and sediments heavily altered by pedogenesis. Most igneous rocks have zero paleontological potential. Other stratigraphic units deposited subaerially in a high energy environment (such as alluvium) may also be assigned a marginal or zero sensitivity rating. Manmade fill is also considered to possess zero (no) paleontological potential.

Source: HHSEGS 2011

The results of a records search conducted by San Bernardino County Museum suggested that paleolake or paleospring sediments might be widespread across the site (HHSG 2011a, Appendix 5.8A). In an attempt to evaluate the likelihood of project development to impact paleontological resources during site excavations, the applicant's Paleontological Resources Specialist (PRS) conducted an initial 5 day long site survey followed by a day of monitoring the excavation of 10 geotechnical test pits in the project area (HHSG 2011a §5.8-10).

The site survey focused on areas of high albedo (white and near-white) which comprise exposures of the older, fine-grained and carbonate-rich basin fill material. During the site survey, a number of bleached bone fragments were located but these proved upon testing to be recent. No mineralized bone (suggestive of fossilization) was discovered. Tufa nodules (formed by spring discharge) were commonly discovered as lag concentrate in some areas, and at least one tufa ledge was noted. However, no direct evidence of ground water discharge (paleosprings) was located on the site. No paleontological resources were found during the surficial survey (HHSG 2011a §5.8-10).

In addition to the site survey, backhoe test pit excavations and spoils were monitored to check for fossil material encountered and to identify sediment at depth that might

possess high paleontological sensitivity. During the initial survey and subsequent field investigation, it was noted that a blanket of Holocene, alluvial silty sand appears to mantle older, more indurated, carbonate-rich, light-colored silty clay to clayey sand. The older sediments display strong soil development at depth, and are likely of Pleistocene age (HHSG 2011a §5.8-9).

The stratigraphy of soils exposed in the geotechnical test pits appears consistent with a model of recent (post-Pleistocene and likely late Holocene), sandy alluvium encroaching from the east and covering an older surface, which may be of Pleistocene age (HHSG 2011a §5.8-10). Gastropod shells, bone fragments, relatively well-sorted gravel lenses, and carbonized wood are indicators of paleospring deposits, but none were encountered in the test pits.

No paleontological resources, or records of previous fossil finds, were found within one mile of the HHSEGS and no paleontological resources were encountered during the excavation of the geotechnical test pits.

Based on the absence of discovering paleontological resources while monitoring geotechnical test pit excavations, conducting pedestrian surveys of areas where fine-grained, carbonate-rich sediment is exposed at the surface, and repeated survey of the most promising areas by the project PRS, the applicant concluded that the alluvium of the project area is considered to possess low paleontological sensitivity (PFYC 2) (HHSG 2011a, §5.8-6).

While the applicant considers the likelihood of encountering paleontological resources during construction to be low, significant paleontological resources associated with subsurface lacustrine deposits and paleospring environments have been discovered in the region (HHSG 2011a, Appendix 5.8A). Paleosprings have been identified along the Stateline fault to the east of the site, and it is likely that water emanating from those springs flowed across the site. Depending on the ancient volume and rate of flow, paleospring deposits could exist beneath the site.

In the “Paleontology Literature and Records Review” conducted by the San Bernardino County Museum (SBCM) for this project, it was stated that “excavation into undisturbed subsurface lake and/or spring sediments in the Pahrump Valley has a high potential to impact significant paleontologic resources” (HHSG 2011a, Appendix 5.8A). The SBCM review recommended monitoring of excavation in areas identified as likely to contain paleontologic resources. Staff concurs with this recommendation. Therefore, staff considers monitoring of construction activities in accordance with the proposed conditions of certification is necessary. Proposed Conditions of Certification **PAL-1** to **PAL-7** are designed to mitigate any potential paleontological resource impacts, as discussed above, to a less than significant level. Essentially, these conditions would require a worker education program in conjunction with monitoring of proposed earthwork activities by qualified professional paleontologists (paleontologic resource specialist; PRS). Staff believes these conditions would also address the intent of the Inyo County General Plan, which places emphasis on the preservation of historic and prehistoric resources and values (HHSG 2011a §5.8-15).

Earthwork would be halted in the immediate area of the find at any time potential fossils are recognized by either the paleontological monitor or the worker. 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 paleontological resource specialist 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 can 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.

Based on the information above, it is staff's conclusion that the project would not have any significant adverse direct or indirect impacts to paleontological resources.

GEOLOGICAL HAZARDS

The AFC provides documentation of potential geologic hazards at the proposed HHSEGS plant site (HHS 2011a §5-4). Review of the AFC, coupled with staff's independent research, indicates 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 strong seismic shaking, subsidence (including ground fissuring), expansive clay soils and settlement due to hydrocompaction, compressible soils and dynamic compaction, would need to be addressed in a project geotechnical report per CBC 2010 requirements.

Staff's independent research included the review of available geologic maps, reports, and related data of the proposed HHSEGS 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 HHSEGS site is located in southwestern California in an area that is tectonically dominated by translational slippage between the North American and Pacific crustal plates. On a broad scale, the North American-Pacific tectonic plate boundary in California is a transform shear that extends from the Gulf of California to Cape Mendocino. The width of shear extends from the eastern border of California and into western Nevada, to several miles west of the coast of California. Traversing the length of California, the San Andreas fault zone is the most noteworthy of the fault zones within this transform shear boundary. Fully 60 percent of the relative plate motion occurs along the San Andreas fault zone (Faulds 2008). The remainder of the shear is taken up by the associated faults within this plate boundary. With increasing distance west of the San Andreas, the continental crust (and the faults contained within it) becomes more a part of the Pacific plate and shares its northwesterly absolute motion. With increasing distance east of the San Andreas, the continental crust (and the faults contained within

it) becomes more a part of the North American plate and shares its southeasterly absolute motion.

The area of faulting to the east of the San Andreas is referred to as the Eastern California shear zone (Guest 2007). The Eastern California shear zone is an important component of the Pacific–North America plate boundary. This region of active, predominantly strike-slip, deformation extends from the southern Mojave Desert along the east side of the Sierra Nevada and into western Nevada. The Eastern California Shear Zone is thought to accommodate nearly a quarter (10 to 12 mm/yr) of relative plate motion between the Pacific and North America plates (Frankel 2008).

The project site lies within the Eastern California Shear Zone (ECSZ). Named faults within the ECSZ in the project vicinity include from west to east, the Owens Valley, Panamint Valley, Death Valley and Stateline fault zones (**Geological Resources - Figure 2**).

The Owens Valley fault, located along the western boundary of the ECSZ traverses the central part of the Owens Valley, extending 100 km from the northern shore of Owens Lake to just north of Big Pine. The fault exhibits impressive strike-slip geomorphic features, including pressure ridges, sag ponds, echelon scarps, vegetation lineaments, fault scarps, and groundwater barriers (Beanland 1994).

The Southern Panamint Valley fault zone is delineated by well-defined geomorphic evidence characteristic of both dextral strike-slip and normal dip-slip displacement along north to northwest-striking faults. The Southern Panamint Valley fault zone is delineated by two or more parallel traces. The eastern traces are characterized by geomorphic features indicative of normal dip-slip offset such as well-defined scarps on latest Pleistocene and Holocene alluvial fans along the prominent west-facing bedrock range front, vertically offset drainages, and faceted spurs (Bryant 1989). Western traces are delineated by geomorphic features indicative of Holocene strike-slip offset such as deflected drainages, linear ridges, side hill benches, closed depressions, ponded alluvium, and well-defined linear scarps on Holocene alluvium, linear toughs, and linear tonal contrasts on Holocene alluvium (Bryant 1989).

The Southern Death Valley fault zone is characterized by oblique slip, with a lateral component of a few hundred meters. Movement along these traces has formed normal faults and gentle-to-isoclinal folds that have uplifted fan gravel and lacustrine sediments as much as 200 m above the modern alluvial fan surface.

The Stateline Fault forms the eastern boundary of the ECSZ and marks the transition from stable North America to its mobile western margin (Guest 2007, Hislop, 2011). This 200 km long fault system lies just east of the project site (**Geological Resources - Figure 1**). Recent geologic mapping has documented approximately 30 km of dextral offset along the fault over approximately the last 13 thousand years, which translates to a minimum long-term geologic slip rate of approximately 2.5 mm/year (Guest 2007). Understanding the spatial and temporal evolution of the Stateline Fault is important for seismic hazard assessment in the region and for use in models describing the development of the ECSZ.

The segment of the Stateline fault within the project area is referred to as the Pahrump Valley fault zone (Shields 1997). The Pahrump Valley fault zone (PVFZ) is active and represents a potential seismic hazard for the region. The PVFZ is the longest seismogenic structure within 100 km of the Pahrump area. Additional segments of the PVFZ extend north through Stewart Valley into Ash Meadows and the southern Amargosa Desert (Shields 1997). To the south, it extends through Mesquite Valley and possibly into Sandy and even Ivanpah Valleys (Louie 1997). Combining as many as six segments over a total length of more than 100 km, the PVFZ may be able to produce a magnitude 7 event (Louie 1997, Shields 1997).

In southern Pahrump Valley, the PVFZ divides into three fault-line scarps, each dissected by headward erosion of the uplifted playa and alluvial surfaces (Anderson 1998). These scarps are located approximately 2,000, 4,000, and 5,000 meters northeast from the center of the site. The scarp closest to the site has the sharpest features and is geomorphically the youngest scarp, with about 10 m of relief. The scarps further east from the site are about twice as high, have gentler slopes and appear more eroded. Their subdued geomorphic expression indicates they are older and their last scarp forming earthquake occurred previous to that of the westernmost scarp.

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 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 HHSEGS power plant site or associated linear facilities. Similar to the rest of southern California, the project vicinity has a number of sources of seismicity. One of the largest historical earthquakes in California (estimated Mw 7.5), occurred in 1872 along the Owens Valley fault, approximately 130 miles northwest of the site.

There have been two significant earthquakes in the region within the last 15 years. The 1992 Landers event ruptured along a series of faults in the central portion of the Eastern California Shear Zone, about 124 miles southwest of the project site. This moment magnitude (Mw) 7.3 event was accompanied by significant ground rupture, with over 18 feet of slip noted at certain locations, and over 3 feet of slip noted over 53 miles of the rupture. In 1999, less than 7 years later, a Mw 7.1 event occurred on the Bullion and Lavic Lake faults (referred to as the Hector Mine Earthquake). These events were located approximately 98 miles to the southwest of the project site. The overall length of ground rupture has been estimated at 28 miles with significant slip (greater than an inch or so) occurring over a distance of about 22 miles. Maximum displacement was estimated at 17 feet of right slip and an average slip of approximately 8 to 10 feet. 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 3**). 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.

These parameters are project-specific and, based on HHSEGS’s location, were calculated using latitude and longitude inputs of 35.985 degrees north and 115.901 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 HHSEGS 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 will also be designed to accommodate strong seismic shaking. The potential for and mitigation of the effects of strong seismic shaking during an earthquake should 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**. Compliance with these conditions of certification would ensure the project is built to current seismic standards and potential impacts would be mitigated to insignificant levels in accordance with current standards of engineering practice.

**Geology and Paleontology Table 3
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	0.484 g
S1 – Mapped Spectral Acceleration, Long (1.0 Second) Period	0.198 g
Fa – Site Coefficient, Short (0.2 Second) Period	1.413
Fv – Site Coefficient, Long (1.0 Second) Period	2.009
SDS – Design Spectral Response Acceleration, Short (0.2 Second) Period	0.456 g
SD1 – Design Spectral Response Acceleration, Long (1.0 Second) Period	0.265 g
SMS – Spectral Response Acceleration, Short (0.2 Second) Period	0.684 g
SM1 – Spectral Response Acceleration, Long (1.0 Second) Period	0.397 g

ASCE = American Society of Civil Engineers
Values from USGS 2010b

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 HHSEGS site is approximately 130 feet below ground surface (HHSG 2011a §5.15-12). 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 should be confirmed, and the liquefaction potential on the proposed HHSEGS site should 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 HHSEGS site is underlain by predominantly unsaturated, cohesive, fine-grained materials that are not typically associated with liquefaction. However, ground water levels should be confirmed and the liquefaction potential of underlying beds beneath the proposed HHSEGS site should 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.

The potential for and mitigation of the effects of dynamic compaction of proposed site native and fill soils during an earthquake should 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**. 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. As stated in the preliminary geotechnical report, “some of the encountered native soils were slightly too moderately gypsiferous and slightly too highly porous, with poreholes up to approximately 1/4-inch in diameter” (Ninyo 2011). Conclusions in the preliminary geotechnical report suggest site soils are subject to a high collapse potential and should be considered unsuitable for support of structures and improvements in their existing condition (Ninyo 2011). The potential for and mitigation of the effects of hydrocompaction of site soils should 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**. Typical mitigation measures would include over-excavation/replacement, mat foundations or deep foundations, depending on severity and foundation loads.

Subsidence

Local subsidence or settlement may occur when areas containing compressible soils are subjected to foundation loads. Conclusions presented in the preliminary geotechnical report indicate surficial soils have high porosity. These soils are considered to be prone to settlement and should be considered unsuitable for support of structures and improvements in their existing condition (Ninyo 2011).

Settlement can also occur in poorly consolidated soils during ground shaking. Earthquake-induced settlement can cause distress to structures supported on shallow foundations, damage to utilities that serve pile-supported structures, and damage to utility lines that are commonly buried at shallow depths (Kramer 1996). During settlement, the soil materials are physically rearranged by the shaking to result in a less stable alignment of the individual grains. Settlement of sufficient magnitude to cause significant structural damage is normally associated with rapidly deposited alluvial soils, or improperly founded or poorly compacted fill.

Within the project vicinity, the greatest subsidence hazard is posed by the occurrence of earth fissures. Earth fissures are surface expressions of deep fracture systems typically caused by groundwater withdrawal that exceeds aquifer recharge (Snelson 2005). Generally, the surface expressions of earth fissures are not identified until surface flows from flash flooding or over-watering enter the fissure causing erosion of the fissure sidewalls. These ground failures can be exacerbated by faults at depth, shallow bedrock, and/or differential compaction (Snelson 2005).

Earth fissures can be up to several feet wide and deep, and thousands of feet long. The initial stage of development of the earth fissure is a narrow crack in the soil, which forms

due to tensional forces sometimes related to groundwater withdrawal and associated land subsidence. Erosion processes, such as gullying and subsurface water migration during periods of heavy runoff, widen and deepen the crack into a ground fissure. Due to underground erosion, or piping, tunnel-like features and other subsurface voids form along the ground cracks. When the soils above the voids erode and collapse, sinkholes, linear depressions, and/or trench-like features occur at the ground surface.

Earth fissures have been documented within the Pahrump Valley and have been responsible for significant damage to structures in the city of Pahrump (dePolo 1999). It is believed that subsidence in these areas is likely related to groundwater overdraft. These fissures could be exacerbated by both surface and groundwater flow and by local seismicity.

The nearest mapped ground fissure zone is located approximately 8 miles north of the project site. Ground lineations in Pahrump Valley sediments, which may be indicative of ground fissuring, were also noted approximately 2 miles west and 6 miles northwest of the project site (dePolo 2003).

During site reconnaissance associated with the preliminary geotechnical evaluation, numerous ground surface lineations, which appear to have been caused by ground fissures, were identified (Ninyo 2011). These lineations ranged from a few inches to several feet wide and were up to hundreds of yards long. The lineations generally extended in north-south and northwest-southeast directions across the site. The lineations were observed to be associated with an increase in vegetation, eroded or loose soil, relatively slight depressions in the ground surface, and, in a few areas, ground cracks up to approximately 2 inches wide and a few inches deep (Ninyo 2011).

The potential for and mitigation of the effects of subsidence of site soils should 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**. 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. The potential for and mitigation of the effects of expansive soils on the proposed site should 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**. 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.

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 is no water bodies located at an elevation above the project site within the project vicinity. Therefore, the site is not subject to either tsunami or seiche hazards. For further analysis see the **SOIL RESOURCES AND WATER RESOURCES** sections.

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** should 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 CERTIFICATION GEN-1, GEN-5** and **CIVIL-1** in the **FACILITY DESIGN** section of

this **FSA** 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

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.

Paleontological resources have been documented in the general area of the proposed project and in sediments similar to those that are present on the site. However, to date, none have been found on the plant site or along project linear routes within California during cursory field studies of the HHSEGS. If significant paleontological resources are uncovered during construction they would be protected and preserved in accordance with **CONDITIONS OF CERTIFICATION PAL-1 to PAL-7**. These conditions would also mitigate any potential cumulative impacts.

The proposed HHSEGS would be situated in an active geologic environment. Strong ground shaking potential must be mitigated through foundation and structural design as required by the CBC 2010. The potential for ground subsidence and fissuring must be addressed and mitigated through appropriate facility design. Expansive materials, as well as compressible soils and soils that may be subject to settlement due to dynamic compaction, must be addressed and mitigated in accordance with a design-level geotechnical investigation as required by the CBC 2010, and proposed **CONDITIONS OF CERTIFICATION GEN-1, GEN-5, and CIVIL-1** under the **FACILITY DESIGN** section of this **FSA**.

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. However, Preliminary Staff Assessment (PSA) comments were received from the applicant, BrightSource Energy. These PSA Response to Comments can be reviewed in **Appendix 1**.

PROPOSED FINDINGS OF FACT

Based on our analysis of the project, we propose the following findings:

1. Several northwest-striking active and potentially active faults are present in the project area.
2. Since no active faults are known to cross the boundary of new construction at the project site, the project is not subject to the set-back requirements mandated by the Alquist-Priolo Special Studies Zone Act.
3. The primary geologic hazards that could affect the project include strong earthquake-related ground shaking and ground subsidence caused by earth fissuring and possibly from groundwater withdrawal.
4. **CONDITIONS OF CERTIFICATION GEN-1, GEN-4, GEN-5, and CIVIL-1** of the **FACILITY DESIGN** section require the project owner to conduct a site-specific geotechnical investigation, which confirms the soil profile, including composition and depth of fill materials as well as subsurface information such as groundwater depth and the location of expansive clays beneath the project footprint, before project design can be finalized.
5. **CONDITIONS OF CERTIFICATION GEN-1, GEN-4, GEN-5, and CIVIL-1** of the **FACILITY DESIGN** section require the project owner to design the project to current engineering standards to ensure that potential geologic hazards to the project will be adequately mitigated.
6. The evidence assumes that liquefaction, lateral spreading, dynamic compaction, landslides, flooding, tsunamis, and seiches pose low or negligible project risks but this assumption must be confirmed by the site-specific geotechnical investigation referenced in **FINDINGS #4** and **#5**.
7. There is no evidence of existing or potential geologic or mineralogic resources at the project site or along the linear alignments.
8. Although many paleontologic sites are documented within three miles of the site, there are no records documenting paleontologic finds on the HHSEGS site or along the project's linear alignments.
9. Any potential impacts to newly discovered paleontologic resources during excavation and construction, will be mitigated to a level of less than significant by the project owner's implementation of a Paleontological Monitoring and Mitigation Plan, including a Worker Environmental Awareness Program, and employ an on-site Paleontologic Resource Specialist with authority to halt construction activities when paleontologic resources are identified.
10. There is no evidence that project construction or operation will result in cumulative impacts to geologic, mineralogic, or paleontologic resources.

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 should have no adverse impact with respect to geologic, mineralogic, and paleontologic resources. Staff proposes to ensure compliance with applicable LORS through the adoption of the proposed conditions of certification listed below.

It is staff's opinion that the likelihood of encountering paleontologic resources would be high in areas where lacustrine and paleospring deposits occur. Staff would consider reducing monitoring intensity, at the recommendation of the project PRS, following examination of sufficient, representative excavations to fully understand site stratigraphy.

PROPOSED CONDITIONS OF CERTIFICATION

General Conditions of Certification with respect to engineering geology are proposed under Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **FACILITY DESIGN** section. Proposed paleontological Conditions of Certification **PAL-1** through **PAL-7** follow.

PAL-1 The project owner shall provide the compliance project manager (CPM) with the resume and qualifications of the proposed 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 a 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 the PRS 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, which meet 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 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 Monday morning in the case of a weekend event, where construction has been halted because of a paleontological find.

The project owner shall ensure that the PRS prepares a summary of monitoring and other paleontological activities placed in the monthly compliance reports. The summary will include the name(s) of PRS or PRM(s) active during the month, general descriptions of training and monitored construction activities, and general locations of excavations, grading, and other activities. A section of the report shall include the geologic units or subunits encountered, descriptions of samplings within each unit, and a list of identified fossils. A final section of the report will address any issues or concerns about the project relating to 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
HIDDEN HILLS SOLAR ELECTRIC GENERATING SYSTEM
(11-AFC-02)

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

List of Comment Letters

Geo / Paleo Comments?

1	Inyo County	
2	Bureau of Land Management	
3	National Park Service	
4	The Nature Conservancy	
5	Amargosa Conservancy	
6	Basin & Range Watch	
7	Pahrump Paiute Tribe	
8	Richard Arnold, Pahrump Piahute Tribe	
9	Big Pine Tribe of Owens Valley	
10	Intervenor Cindy MacDonald	
11	Intervenor Center for Biological Diversity	
12	Intervenor, Old Spanish Trail Association	
13	Applicant, BrightSource Energy, Inc.	X

Comment #	DATE	COMMENT TOPIC	RESPONSE
13	July 23, 2012	Applicant, BrightSource Energy	
13.1	p. 194	Addition of BLM in LORS table	BLM reference incorporated into LORS table
13.2	p. 194	Italicize Latin epithets	Unnecessary and not incorporated
13.3	p. 194	Clarification of effects relative to their significance.	Comments accepted and incorporated
13.4	p. 194	Change "or" to "and"	Comment not accepted. Would change meaning of sentence and be incorrect English.
13.5	p. 195	Emphasize significance to cumulative impacts	Comments accepted and incorporated
13.6	p. 195	Emphasize significance to impacts	Comments accepted and incorporated
13.7	p. 195	Different description of Antiquities Act	Comments accepted and incorporated

13.8	p. 195	Delete duplication of reference to NEPA	Comments accepted and incorporated
13.9	p. 195	Different description of Omnibus Public Land Management Act	Comments accepted and incorporated
13.10	p. 196	Different description of CEQA, Appendix G	Comments accepted and incorporated
13.11	p. 196	Requested addition of BLM reference to LORS table	Comments accepted and incorporated
13.12	p. 196	Requested revision to project description	Comments accepted and incorporated
13.13	p. 196	Requested rewording description of regional geology to replace "metamorphism" to "diagenesis"	Comment not accepted. The description of the occurrence of metamorphic rocks is clearly described in the preceding paragraph. Text is accurate as presented.
13.14	p. 196	Requested rewording description of regional geology to replace "metamorphosed rocks" to "crust"	Comment not accepted. The description of the occurrence of metamorphic rocks is clearly described in the preceding paragraph. Text is accurate as presented.
13.15	p. 196	Emphasized development of rainshadow caused desertification of "Great Basin"	Comments accepted and incorporated
13.16	p. 196	Requested removal of the word "abandoned" referring to nonfunctioning onsite groundwater wells	Replaced "abandoned" with the word "nonfunctioning"
13.17	p. 197	Applicant states case law notes that impacts analysis under CEQA is limited to potential effects of the project on the environment and not effects or risks to the project or people from the environment and requests removal of bullet under Method and Threshold for Determining Significance that states such.	Comment not accepted. Case cited is not relevant to this section
13.18	p. 197	Requested inclusion of BLM 2008 in text reference	Comments accepted and incorporated
13.19	p. 197	rearrangement of words to emphasize significance of adverse impacts	Comments accepted and incorporated
13.20	p. 197	Requested inclusion of BLM 2008 in text reference	Comments accepted and incorporated
13.21	p. 197	Requested change from the word "reconnaissance" to "survey".	Even though the Applicant's documents used the word "reconnaissance" through out its documents, the requested revisions have been accepted and incorporated.

13.22	p. 197	Requested the removal of reference to "dry lake" as a deposit where fossils would typically be found.	Comment partially accepted. Numerous articles in literature refer to dry lakes as yielding significant geological resources. Maybe none more notable than Fossil Lake in Oregon. It is interesting to note that the recent mission to Mars was focused on an ancient lake bed to search for evidence of life. For clarification, the words dry lake deposits have been replaced with "subsurface lacustrine deposits"
13.23	p. 197	Requested change to require monitoring of excavations unless and until sediments with high paleontological sensitivity are identified in the project area.	Comment not accepted. The absence of evidence is not evidence of absence. Monitoring must occur until and unless the Paleontological Resources Specialist (PRS) recommends to the CPM that monitoring is not necessary and that the CPM agrees with the PRS recommendation.
13.24	p. 198	Requested clarification that earthwork would be halted specifically in the immediate area of a paleontological find.	Comments accepted and incorporated
13.25	p. 198	Requests revision to allow PRS to determine changes in monitoring protocol without CEC approval of that change.	Comment not accepted. The CPM can authorize changes in monitoring protocol based on the PRS recommendation. The PRS does not have independent unilateral authority to make changes in CEC approved monitoring protocol.
13.26	p. 198	Requests specification that impacts would be mitigated to insignificant levels.	Comments accepted and incorporated
13.27	p. 198	Requests rewording cumulative impacts section by minimizing the potential of encountering paleontological resources during construction. Also requests adding clarification that adherence to Conditions of Certification would mitigate any potential cumulative impacts to insignificant levels.	Comment partially accepted. The absence of evidence is not evidence of absence. The discussion of the difference in geology between the site and Stump Springs is superfluous and is not accepted. In the comments, the applicant did state that paleontologically sensitive sediments have been found along limited sections of the project's linears. That statement has been accepted and incorporated into the document. The inclusion of the phrase adherence to Conditions of Certification would mitigate any potential cumulative impacts to insignificant levels is accepted and incorporated.

GEOLOGICAL RESOURCES - FIGURE 3

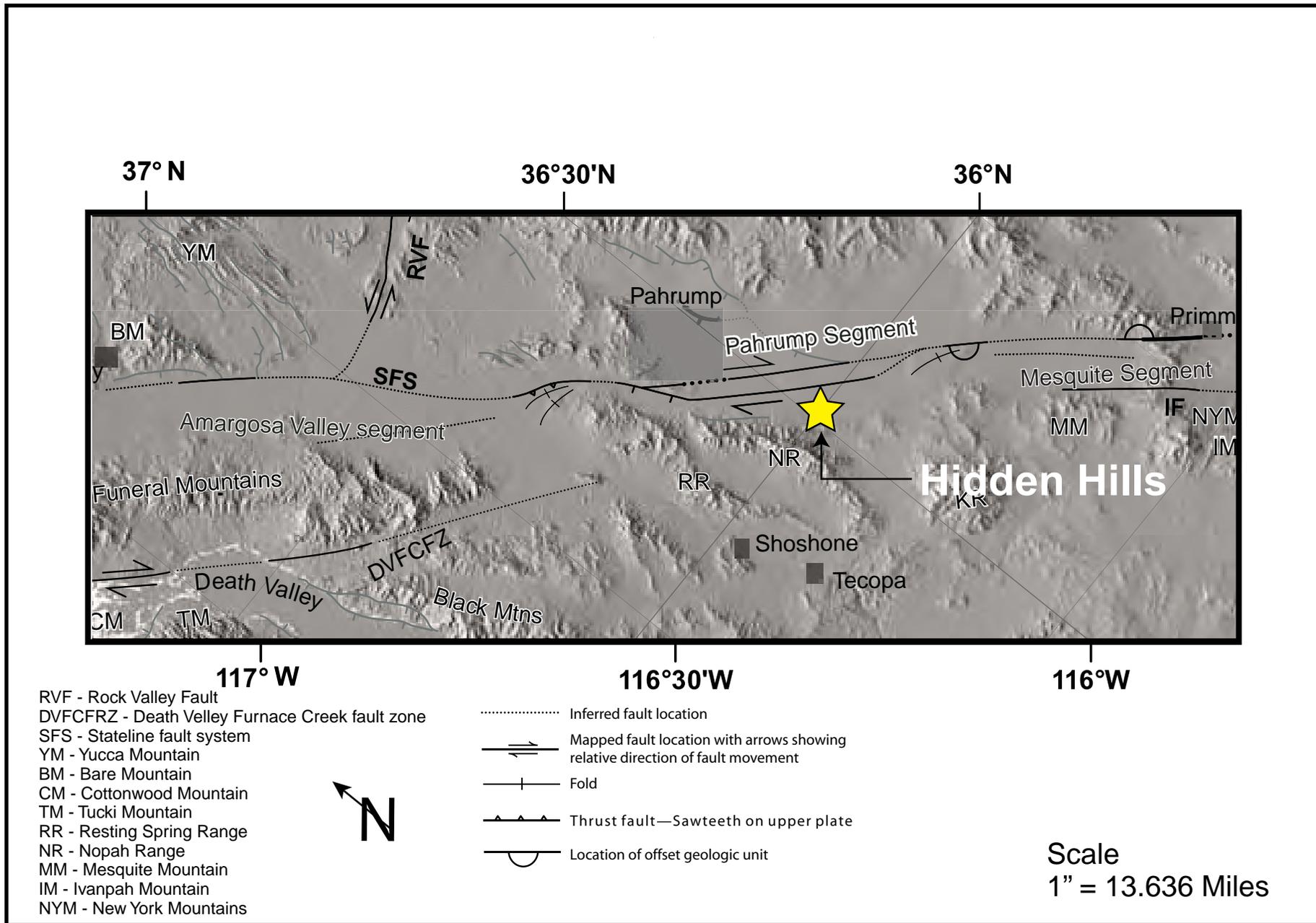
Hidden Hills Solar Electric Generating System (HHSEGS) - Geomorphic Provinces



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Department of Conservation, California Geological Survey, 2002.

GEOLOGICAL RESOURCES - FIGURE 1
 Hidden Hills Solar Electric Generating System (HHSEGS) - Fault Map



GEOLOGICAL RESOURCES

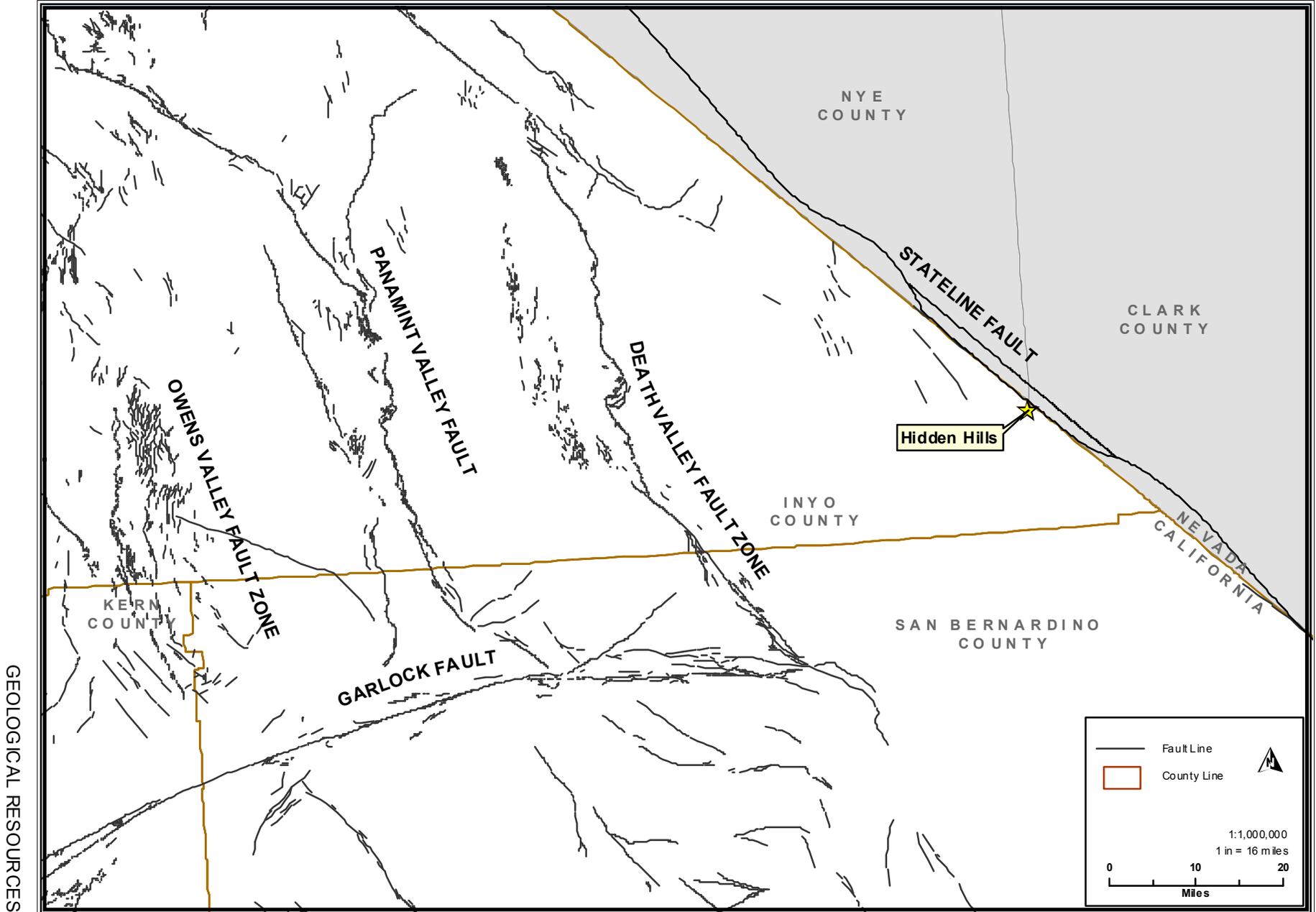
- RVF - Rock Valley Fault
- DVFCFRZ - Death Valley Furnace Creek fault zone
- SFS - Stateline fault system
- YM - Yucca Mountain
- BM - Bare Mountain
- CM - Cottonwood Mountain
- TM - Tucki Mountain
- RR - Resting Spring Range
- NR - Nopah Range
- MM - Mesquite Mountain
- IM - Ivanpah Mountain
- NYM - New York Mountains

- Inferred fault location
- Mapped fault location with arrows showing relative direction of fault movement
- Fold
- ▲▲▲ Thrust fault—Sawteeth on upper plate
- ⌒ Location of offset geologic unit

Scale
 1" = 13.636 Miles

GEOLOGICAL RESOURCES - FIGURE 2

Hidden Hills Solar Electric Generating System (HHSEGS) Regional - Fault Map



GEOLOGICAL RESOURCES

CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Dept of Conservation - California Geological Survey - 2010 Fault Activity Map of California
Geological Society of America Bulletin, Nov/Dec 2007

GEOLOGICAL RESOURCES - FIGURE 4
 Hidden Hills Solar Electric Generating System (HHSEGS) - General Geologic Map

GEOLOGICAL RESOURCES

EXPLANATION

Basin-fill deposits

-  Quaternary playa deposits
-  Quaternary and Tertiary unconsolidated coarse-grained deposits
-  Quaternary and Tertiary lacustrine and associated fine-grained deposits

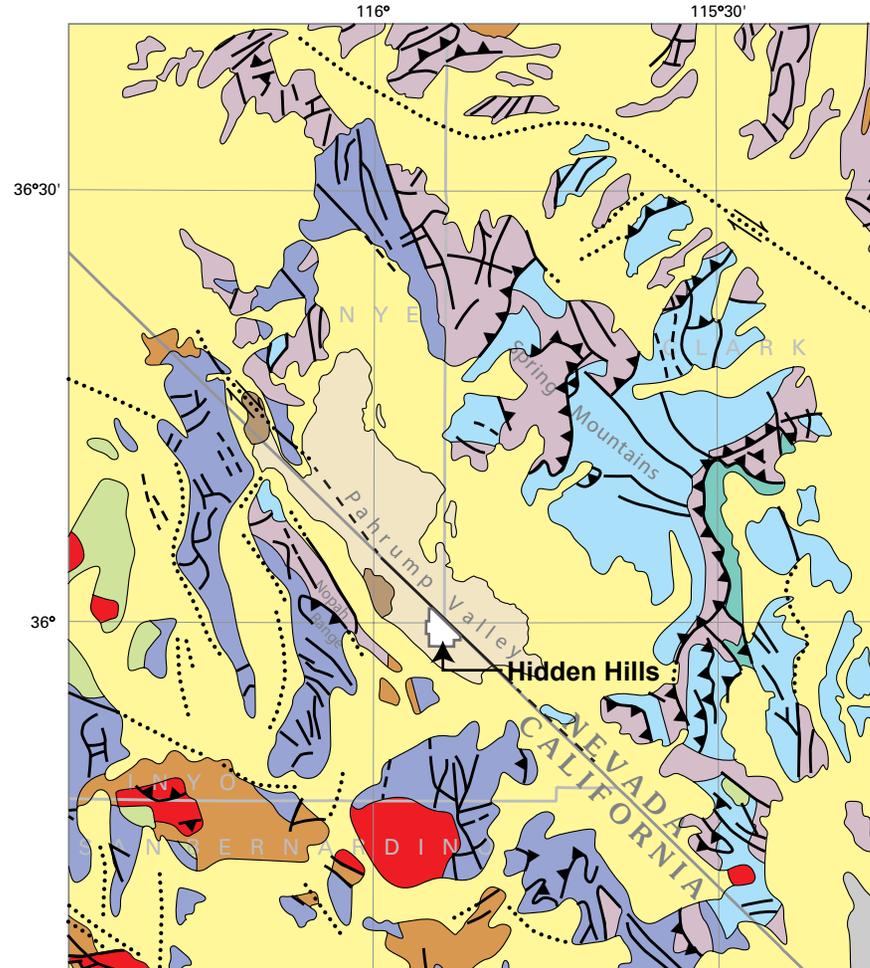
Consolidated Rocks

-  Tertiary consolidated deposits
-  Tertiary to Triassic marine and continental rocks
-  Triassic to Mississippian carbonate rocks
-  Devonian to Cambrian carbonate and clastic rocks
-  Cambrian and Precambrian clastic rocks
-  Quaternary and Tertiary volcanic rocks
-  Miocene to Triassic intrusive rocks
-  Precambrian basement rocks

 Fault—Dashed where approximately located. Dotted where concealed. Arrows show relative movement

 Thrust fault—Sawteeth on upper plate

 Inferred fault location

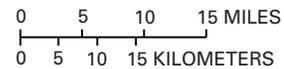


Base modified from U.S. Bureau of the Census TIGER/Line files, 1:100,000, 1990

Modified from Plume and Carlton, 1988 and Harrill, 1986



SCALE 1:1,000,000



Plume, R.W., and Carlton, S.M., 1988, Hydrogeology of the Great Basin region of Nevada, Utah, and adjacent States: U.S. Geological Survey Hydrologic Investigations Atlas HA-694-A.

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POWER PLANT EFFICIENCY

Testimony of Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

The project would decrease reliance on fossil fuel, and would increase reliance on renewable energy resources. It would not create significant adverse effects on fossil fuel energy supplies or resources, would not require additional sources of energy supply, and would not consume fossil fuel energy in a wasteful 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.

HHSEGS would occupy approximately 6.2 acres per MW of power output, a figure higher than that of some other solar power technologies.

INTRODUCTION

HHSEGS would generate 500 megawatts (MW) (nominal net output) of electricity. HHSEGS would be a solar thermal power plant in Inyo County, California. It would use solar energy to generate most of its electrical capacity. The project would use proprietary solar thermal power tower technology¹ 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 3,097 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 when solar energy diminishes or 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, including the proposed HHSEGS project, would result in significant adverse impacts on the environment, as defined in the California Environmental Quality Act (CEQA). If the Energy Commission finds that HHSEGS'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 insignificance.

Solar land use efficiency

Solar thermal power plants typically consume much less fossil fuel (usually in the form of natural gas) than other types of 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 MWh-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 effect of 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 HHSEGS, a solar thermal power plant producing a total of 500 MW (nominal net output). The project would consist of two solar fields (Solar Plant 1 and Solar Plant 2) using concentrating solar thermal tower technology, and would be located in Inyo 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 3,097 acres. 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 (HHSG 2011a, AFC §§ 1.1, 2.1, 2.2.5; CH2 2012p, Boiler Optimization Plan, p. 101).

The project's power cycle would be based on a steam cycle (also known as the Rankine cycle) (HHSG 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 when solar energy diminishes or during transient cloudy conditions. On an annual basis, heat from natural gas would be limited by fuel use and other conditions to roughly 5 percent of the heat from the sun (HHSG 2011a, AFC Appendix Table 5.1B-13R, Amended April 2012).

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

HHSEGS 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 746,400 million British thermal units (MMBtu) (AFC § 5.1, Amended April 2012, Table 5.1-13R); equal to roughly 5 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**), this 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 (HHSG 2011a, AFC Figure 2.2-3, enthalpy across the heat exchanger versus net electrical output). This efficiency figure compares favorably with a conventional boiler.

Therefore, staff considers the impact of the project's fuel consumption on energy supplies and energy efficiency to be less than significant.

Adverse Effects on Energy Supplies and Resources

The applicant has described its source of natural gas for the project. A 12-inch-diameter natural gas supply pipeline for HHSEGS would connect to an existing Kern River Gas Transmission (KRGT) pipeline approximately 32.4 miles southeast of the project site. A tap station on the main KRGT transmission pipeline would be installed at that interconnection point just north of Goodsprings in Clark County, Nevada. (CH2 2012ee) A gas metering station would be required at the interconnection point to measure and record gas volumes from the KRGT metering station (HHSG 2011a, AFC §§ 2.1, 2.2.3). KRGT'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 natural gas for this

project. Staff believes that there would be adequate natural gas supply and pipeline capacity to meet the project's needs (2012 California Gas Report²).

Additional Energy Supply Requirements

Because KRGT's natural gas supply system is extensive and readily available as explained above (in **Adverse Effects on Energy Supplies and Resources**), staff believes there would be no likelihood that HHSEGS 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 HHSEGS or 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 FSA for further information.

Alternative Generating Technologies

Alternative generating technologies for HHSEGS are considered in the AFC (HHS 2011a, AFC § 6.7). For purposes of this analysis, natural gas, oil, coal, nuclear, geothermal, biomass, hydroelectric, wind, solar photovoltaic (PV), and parabolic trough solar thermal technologies were all considered. Because HHSEGS's consumption of fossil fuel for power production and other uses would be limited to roughly 5 percent of the total energy input from the sun, staff believes that the HHSEGS project would not constitute a significant adverse impact on fossil fuel energy resources compared to feasible alternatives.

The solar insolation falling on the earth's surface can be regarded as an energy resource. Since this energy is inexhaustible, its consumption does not present the concerns inherent in fossil fuel consumption. What is of concern, however, is the extent of land area required to capture this solar energy and convert it to electricity. Setting aside many acres of land for solar power generation removes it from alternative power generation uses. Specifically, from a power plant efficiency viewpoint, the concern is related to the quantities of land that would be unavailable, at least for the life of a project, to be utilized for alternative generating technologies. Thus, in comparing a solar plant's technology to alternative technologies, staff considers the land area that would

² http://www.socalgas.com/regulatory/documents/cgr/2012%20CGR_Final.pdf
December 2012

be unavailable, and not only the land that would be graded and leveled. For example, for a solar power plant, whether or not the space between two rows of mirrors/panels would be leveled and/or graded, that area of land would not be available (at least for the operating life of the project) for the utilization of alternative power generation technologies.

For the purpose of comparing a project to alternative generating technologies, staff focuses more on land use efficiency rather than energy-based efficiency because land use efficiency is less subject to variations, and thus, more suitable for comparison. Energy-based efficiency can vary, sometimes significantly, throughout the life of the project depending on factors such as the need for dispatchability.

Thus, staff's comparison of the power plant efficiency of HHSEGS to other technologies focuses on land use efficiency rather than some other metric.

To assess HHSEGS's land use efficiency staff compares the land use efficiency of the solar projects licensed by, or currently before, the Energy Commission, to HHSEGS. This comparison helps determine a range of viable land-use efficiencies and where HHSEGS falls within that range.

At the time of this FSA's publication, there are 11 solar power plant projects that are either going through the Energy Commission siting process, or have been previously licensed by the Energy Commission for construction and operation³. 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.

HHSEGS would produce power at the rate of 500 MW net, and would generate energy at the rate of 1,432,000 MWh per year, while occupying 3,097 acres (HHSG 2011a, AFC §§ 1.1, 1.2.1, Appendix Table 5.1B-13R). Accordingly, staff calculates power-based and energy-based land use efficiencies thus:

Power-based efficiency: $500 \text{ MW} \div 3,097 \text{ acres} = \mathbf{0.16 \text{ MW/acre}}$ or **6.2 acres/MW**

Energy-based efficiency: $1,432,000 \text{ MWh/year} \div 3,097 \text{ acres} = \mathbf{463 \text{ MWh/acre-year}}$

As seen in **Efficiency Table 1**, HHSEGS, employing the power tower technology would be less efficient in the use of land than the Beacon Solar Energy Project, which as licensed would have used the linear parabolic trough technology. HHSEGS would be slightly more efficient than Genesis Solar Energy Project, which also uses the linear parabolic trough technology. Also, HHSEGS would be more efficient in the use of land than the Ivanpah SEGS project -- which employs the same proprietary technology as HHSEGS -- and the Calico Solar and Imperial Valley Solar projects, which as licensed would have employed the Stirling Engine technology. Based on information regarding several solar PV (photovoltaic) projects, the expected average occupied land per MW of

³ <http://www.energy.ca.gov/siting/solar/index.html>

output is approximately 7.0 acres/MW (see the **Alternatives** section of this FSA for the source of this figure). Compared to 6.2 acres/MW for HHSEGS, PV is less land-use efficient.

On an energy-based efficiency basis, HHSEGS would generate 463 MWh/acre-year; this compares favorably to all other solar projects listed in **Efficiency Table 1** (2nd column from the left).

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

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
HHSEGS (11-AFC-2)	500	3,096	1,432,000	746,400	0.16	463	424
Rio Mesa (11-AFC-4)	500	3,805	1,424,600	746,355	0.13	374	343
Genesis Solar (09-AFC-8)	250	1,800	600,000	60,000	0.14	333	329
Ridgecrest Solar (09-AFC-8)	250	1,440	500,000	44,818	0.17	347	343
Beacon Solar (08-AFC-2)	250	1,321	600,000	36,000	0.19	454	450
Ivanpah SEGS (07-AFC-5)	400	3,744	960,000	432,432	0.11	256	238
Calico Solar (08-AFC-13)	850	8,200	1,840,000	0	0.11	224	224
Imperial Valley Solar (08-AFC-5)	750	6,500	1,620,000	0	0.12	249	249
Solar Millenium (Blythe) (09-AFC-6)	1000	5,950	2,100,000	172,272	0.17	353	349
Solar Millenium (Palen) (09-AFC-7)	500	2970	1,000,000	89,636	0.17	337	332

Abengoa Solar (09-AFC-5C)	250	1684	630,000	94,280	0.15	374	366
Rice Solar (09-AFC-10)	150	1,410	450,000	0	0.11	319	319
Avenal Energy (08-AFC-1) ²	600	25	3,023,388	24,792,786	24.0	120,936	N/A

¹ Net energy output is reduced by natural gas-fired combined cycle proxy energy output; see **Efficiency Appendix A**.

² Example natural gas-fired combined cycle plan

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 HHSEGS 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 (HHSG 2011a, AFC §§ 2.5.1, 2.5.5.2). An alternative heat rejection system would utilize evaporative cooling towers.

The local climate in the project area is characterized by high temperatures and low relative humidity (low wet-bulb temperature). In low temperatures and high relative humidity (low dry-bulb temperature), the air-cooled condenser performs relatively efficiently compared to the evaporative tower. However, at the project area (low wet-bulb temperature and high dry-bulb temperature) the air-cooled condenser performance is relatively poor compared to that of an evaporative cooling tower. Furthermore, the performance of the heat rejection system affects the performance of the steam turbine, impacting turbine efficiency. However, to conserve water in the project site's desert environment, the applicant proposes to employ dry cooling. Even though evaporative cooling could offer greater efficiency, staff believes the applicant's selection of dry cooling is a reasonable tradeoff, as it would prevent potentially 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

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 HHSEGS 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 HHSEGS 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

HHSEGS 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/MITIGATION MEASURES

No conditions of certification are proposed.

FINDINGS

1. HHSEGS would provide approximately 500 MW (net output) of electrical power, using solar energy to generate most of its capacity and using natural gas auxiliary boilers to maintain steam seals and other system temperatures, reduce startup time, and provide limited power augmentation.
2. HHSEGS is likely to experience an average steam cycle efficiency of 44 percent, which is favorable when compared to the 35 to 40 percent steam efficiency for modern steam turbines.
3. The project would burn natural gas at a nominal rate of approximately 746,400 MMBtus per year. Compared to the project's expected overall production rate and compared to a typical fossil fuel-fired power plant of equal capacity, the amount of fossil fuel consumption is less than significant.
4. The impact of the project's fuel consumption on energy supplies and energy efficiency is less than significant.
5. HHSEGS would not require the development of new fuel supply resources.
6. None of the alternative generating technologies is superior to the proposed project at meeting the project objective of using a renewable source of energy in an efficient and reliable manner.
7. The project would decrease reliance on fossil fuel and would increase reliance on renewable energy resources. Consequently, the project would help in reducing California's dependence on fossil fuel-fired power plants.
8. The project would occupy approximately 6.2 acres per MW of power output, a figure higher than some other solar power technologies. On an energy-based efficiency basis, HHSEGS would generate 463 MWh/acre-year; this compares favorably to all other solar projects listed in **Efficiency Table 1** (2nd column from the left).

9. No nearby power plant projects or other projects consuming large amounts of fossil fuel hold the potential for cumulative energy consumption impacts when aggregated with the project.
10. No Federal, State, or local laws, ordinances, regulations, or standards apply to the efficiency of this project.

CONCLUSIONS

Compared to the project's expected overall production rate of approximately 1,432,000 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; HHSEGS 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.

HHSEGS would occupy approximately 6.2 acres per MW of power output, a figure less than that of 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

CH2 2012p – CH2MHill/J. Carrier (tn: 64558) Supplemental Data Response, Set 2, Boiler Optimization Plan and Design Change. 04/02/2012

CH2 2012ee– CH2MHill/J. Carrier (tn: 66319) Applicant's PSA Comments, Set 2. 7/23/2012

HHSG 2011a – BrightSource Energy/J. Woolard (tn: 61756) Application for Certification, Volume 1 & 2. 08/5/2011

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**

The annual fuel consumption in MMBtu/year, converted to MWh/year at 53.7% energy conversion efficiency, and then, subtracted from the total MWh/year (solar + fuel), results

in the total MWh/year from only the solar energy input. This number is then divided by the number of acres, which results in the energy-based efficiency (last column in **Efficiency Table 1**).

EFFICIENCY

List of Comment Letters

		Efficiency Comments?
1	Inyo County	
2	Bureau of Land Management	
3	National Park Service	
4	The Nature Conservancy	
5	Amargosa Conservancy	
6	Basin & Range Watch	
7	Pahrump Paiute Tribe	
8	Richard Arnold, Pahrump Piahute Tribe	
9	Big Pine Tribe of Owens Valley	
10	Intervenor Cindy MacDonald	
11	Intervener Center for Biological Diversity	
12	Intervener, Old Spanish Trail Association	
13	Applicant, BrightSource Energy, Inc.	X

Comment #	DATE	COMMENT TOPIC	RESPONSE
13	July 23, 2012	Applicant, BrightSource Energy	
13.2		References to HHSEGS occupying 6.5 acres/MW.	Staff has revised this figure to account for subtraction of 180 acres of temporary laydown area from the total project footprint; the new figure for HHSEGS is 6.2 acres/MW. Also please see responses to Applicant Comments 13.50 and 13.62.
13.3		Additional explanation to further describe "the effect" in subsection entitled "Solar Land Use Efficiency", 2nd set of bullets, 2nd bullet.	This phrase is described in the PSA in the sentence immediately following the sentence containing this phrase. However, to further describe this, staff has revised this paragraph in the FSA . Also see the text at the end of Efficiency Appendix A .

Appendix 1: PSA Response to Comments -- Efficiency

13.4		Add, to the last sentence under "Adverse Effects on Energy Supplies and Resources", a citation to CEC Natural Gas Assessment.	Staff has included the correct citation in the FSA .
13.5		Add to the statement in "Additional Energy Supply Requirements", a citation to CEC Natural Gas Assessment.	Staff does not believe it is necessary to repeat the citation. The current sentence refers the reader to the sub-section under "Adverse Effects on Energy Supplies and Resources", where the citation is included.
13.6		in subsection "Alternative Generating Technologies" additional metrics need to be taken into account. PV may destroy all habitat, while concentrating solar power may preserve some habitat value.	Please see the response to Comment 13.7. This paragraph has been updated to further explain the reasoning behind the staff's method of analysis for alternative technologies as related to power plant efficiency. From a power plant efficiency viewpoint, the concern is related to the quantities of land that would be unavailable for the life of the project. Such a land area, whether disturbed or not, would not be available, at least for the life of the project, for the utilization of alternative generation technologies.

Appendix 1: PSA Response to Comments -- Efficiency

<p align="center">13.7</p>		<p>Why is land use efficiency the only metric being focused on? What about other metrics like energy-based efficiency, water use, or graded and leveled land area?</p>	<p>From a power plant efficiency viewpoint, the concern is related to the quantities of land that would be unavailable, at least for the life of a project, to be utilized for alternative generating technologies, because setting aside the land area for solar power generation removes it from alternative power generation uses. Thus, in comparing a project's technology to alternative technologies, staff considers the land area that would be unavailable for the life of the project, and not only the land that would be graded and/or leveled. For example, for a solar power plant, whether or not the space between two rows of mirrors/panels would be leveled and/or graded, that area of land would not be available (at least for the operating life of the project) for alternative power generation technologies. Staff has compared this project with other projects using the energy-based efficiency (in terms of MWh/year) (see Efficiency Table 1 and the text). However the focus remains on land use efficiency, because it's less subject to variations and thus more suitable for comparison. Energy-based efficiency can vary, sometimes significantly, throughout the life of the project depending on factors such the need for dispatchability. Staff has recognized the benefits of this project in regards to water use in subsection "Alternative Heat Rejection System", but does not believe water use should be the focus of the power plant efficiency analysis.</p>
<p align="center">13.8</p>		<p>Add a column to Efficiency Table 1 for acres/MW to coincide with comparison described in text.</p>	<p>Staff does not believe this is necessary, as the column showing the efficiency figures in terms of numerical ratios is self-explanatory in displaying the degree of the efficiency of HHSEGS as compared to the other projects.</p>
<p align="center">13.9</p>		<p>revise values in Efficiency Table 1 to reflect the project being downsized to 500 MW.</p>	<p>Staff has done this.</p>

Appendix 1: PSA Response to Comments -- Efficiency

13.10		In "Alternative Heat Rejection System", the comparison of tradeoff would be more meaningful if it were quantified.	Staff's goal from writing this sentence is simply to acknowledge that there is a tradeoff; staff does not believe the tradeoff needs to be quantified in this section. Furthermore, in order to precisely quantify the loss in efficiency, an engineering evaluation for this project would need to be undertaken, which staff believes is unnecessary. Also, the values for efficiency losses and reduction in water consumption are two different metrics and quantifying them for the purpose of making comparison is not very meaningful.
13.11		Conclusions, 4th paragraph, 1st sentence: correct "incude" to include".	There is no such a typo.

POWER PLANT RELIABILITY

Testimony of Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

The applicant predicts an equivalent availability factor of 92- 98%¹. Staff believes this is achievable. Based on a review of the Application for Certification (AFC), staff concludes that the Hidden Hills Solar Electric Generating System (HHSEGS) 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% for HHSEGS (see below), staff uses typical industry norms as a benchmark, rather than the applicant’s projection, to evaluate the project’s reliability.

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

¹ The plant would be available 92-98% of the time when the source of energy (the sunlight) is available, which is when the plant is expected to be available to come online. This availability factor mainly reflects maintenance and unplanned outages, and is a reflection of the maturity and capability of the technology.

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, the HHSEGS has signed a power purchase agreement with Pacific Gas & Electric Company.

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) HHSEGS, a solar thermal power plant facility employing an advanced solar power technology. This project, using mostly renewable solar energy², would provide dependable power to support the grid. This project would help serve the need for renewable energy in California, as most of 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.

² Auxiliary boilers will supplement power generation when solar insolation drops below the level required to keep the turbines online.

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; both planned and unplanned outages subtract 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 HHSEGS would be as reliable as other power plants on the electric system and will 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 (HHS 2011a, AFC § 2.3.2.5) 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 (HHSO 2011a, AFC § 2.3.2.2). The project, as proposed in the AFC, would be able to operate 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 possible 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. Balance of plant equipment would be provided with redundancy; examples include spare circulating pumps, feed water pumps and condensate pumps (HHSO 2011a, AFC § 2.3.2.2). 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 (HHSO 2011a, AFC § 2.3.2.5). Equipment manufacturers provide maintenance recommendations with their products; the applicant would base its maintenance program on these recommendations. The program will 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 production³. A 12-inch diameter natural gas supply pipeline for HHSEGS would connect to a Kern River Gas Transmission (KRG T) pipeline approximately 32.4 miles southeast of the project site. A tap station on the main KRG T transmission pipeline would be installed at that interconnection point just north of Goodsprings in Clark County, Nevada. A gas metering station would be required at the interconnection point to measure and record gas volumes from the KRG T metering station (HHSO 2011a, AFC §§ 2.1, 2.2.3, CH2 2012ee, p.1). KRG T's natural gas supply

³ On an annual basis, heat input from natural gas would be limited by fuel use and other conditions to less than 10% of the heat input from the sun.

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 for plant service needs, steam boiler makeup, heliostat washing, and fire protection. Groundwater would be drawn daily from six onsite groundwater supply wells; two new wells per power block (primary and backup) and two wells at the administration complex. The entire 500-MW net project would require up to 84.5 gallons per minute (gpm) (average) raw water make-up, with 30 to 50 gpm required by each plant, and 3.5 gpm (average) required for potable water use. Turbine cooling would be provided by air-cooled condensers, supplemented by a partial dry-cooling system for auxiliary equipment cooling (HHS 2011a, AFC §§ 2.3.2.4, 5.15, 2.2.5). The applicant intends to drill a temporary well to be used during construction only, primarily for the onsite concrete batch plant used to serve project construction needs. Staff believes these sources yield sufficient likelihood of 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 Inyo County in the eastern part of California. These areas are considered to exhibit low seismic activity (HHS 2011a, AFC § 5.4.3.3); 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 (HHS 2011a, AFC 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's elevation ranges from approximately 2,590 feet above mean sea level (amsl) to approximately 2,680 feet amsl (HHS 2011a, AFC § 5.4.3). The project site is

located in an area affected by two Federal Emergency Management Agency established Special Flood Hazard Zones. Both zones are classified as Zone A, which is defined as an area subject to a 1% annual chance of flooding with no base flood elevation determined (HHS 2011a, AFC § 5.15.3.1.4). With proper plant design (ensured by adherence to the proposed **Facility Design** conditions of certification), and appropriate mitigation measures to reduce potential flooding impacts caused by large storm events proposed in **Soils and Surface Water** conditions of certification, including **SOILS-5**), staff believes there are no concerns with power plant functional reliability due to flooding. For further discussion, see **Soils and Surface Water**, **Water Supply** and the **Geology and Paleontology** sections of this **FSA**.

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 85.15% as the generating unit average for the years 2005 through 2009 for natural gas units of 400–599 MW (NERC 2010).

The project would use triple-pressure, 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 HHSEGS 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% (HHS 2011a, AFC § 2-2.1) 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 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, as most of the electricity generated would be produced by a reliable source of energy that is available during the hot summer afternoons, when power is needed most.

CONCLUSION

The applicant predicts an equivalent availability factor of 92-98%, which staff believes is achievable. Based on a review of the AFC, staff concludes that the plant 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.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

REFERENCES

- CH2 2012p – CH2MHill/J. Carrier (tn: 64558) Supplemental Data Response, Set 2, Boiler Optimization Plan and Design Change. 4/2/2012
- CH2 2012ee– CH2MHill/J. Carrier (tn: 66319) Applicant’s PSA Comments, Set 2. 7/23/2012
- GTW (Gas Turbine World) 2006 – Gas Turbine World, July-August 2006, p. 9.
- HHSG 2011a – BrightSource Energy/J. Woolard (tn: 61756) Application for Certification, Volume 1 & 2. 08/05/2011
- McGraw-Hill (McGraw-Hill Energy Information Services Group). 1994. Operational Experience in Competitive Electric Generation. Executive Report.
- NERC (North American Electric Reliability Council). 2010. 2005–2009 Generating Availability Report.

TRANSMISSION SYSTEM ENGINEERING

Testimony of Sudath Edirisuriya and Mark Hesters

SUMMARY OF CONCLUSIONS

The proposed Hidden Hills Solar Electric Generating Station System (HHSEGS) outlet lines and termination are acceptable and would comply with all applicable laws, ordinances, regulations, and standards (LORS). The analysis of environmental impacts for project transmission lines and equipment, both from the power plant up to the point of interconnection with the existing transmission network as well as upgrades beyond the interconnection that are attributable to the project and located in California have been evaluated by staff and are included in the environmental sections of this staff assessment.

- HHSEGS project should design and construct with adequate reactive power resources to compensate the consumption of Var by the generator step-up transformers, distribution feeders and generator tie-lines.
- The identified new Special Protection Systems (SPS) should be implemented to curtail the generation of the Queue Cluster Alpha Phase One (QCA) projects to mitigate the overload criteria violations caused by the projects on the Valley Electric Association (VEA) system.
- The identified conceptual interconnection facilities, Reliability network upgrades and Delivery network upgrades are necessary to safely and reliably interconnect the QCA projects.

STAFF ANALYSIS

This transmission system engineering (TSE) analysis examines whether this project's proposed interconnection conforms to all LORS required for safe and reliable electric power transmission. Additionally, under 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 (Title 14, California Code of Regulations §15378). The Energy Commission must therefore 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.

Commission staff relies upon the responsible interconnecting authority for analysis of impacts on the transmission grid, as well as for the identification and approval of new or modified facilities required downstream from the proposed interconnection for mitigation purposes. The proposed project would connect to the VEA's 230-kV transmission network and requires both analysis by VEA and the approval of the California ISO.

VEA'S ROLE

VEA is responsible for ensuring electric system reliability in its service territory for the proposed transmission modifications. For the HHSEGS project and at the request of the applicant, Navigant Consulting Inc. performed the QCA interconnection study to determine whether or not the proposed transmission modifications conform to reliability

standards. Because the project would be connected to the California ISO controlled transmission grid, the California ISO's role is to review and approve the QCA study and its conclusions.

CALIFORNIA ISO'S ROLE

The California ISO is responsible for ensuring electric system reliability for all participating transmission owners and is also responsible for developing the standards necessary to achieve system reliability. The project power will be dispatched to the California ISO grid via VEA's Crazy Eyes Tap 230kV substation. Therefore, California ISO reviews the studies of the VEA system to ensure adequacy of the proposed transmission interconnection. The California ISO determines the reliability impacts of the proposed transmission modifications on the VEA transmission system in accordance with all applicable reliability criteria. According to the California ISO tariffs, the California ISO will determine the "need" for transmission additions or upgrades downstream from the interconnection point to insure reliability of the transmission grid. On completion of the VEA's QCA study, the California ISO will review the study results, provide its conclusions and recommendations, and issue a final approval/disapproval letter for the interconnection of the proposed HHSEGP project. The California ISO may provide written and verbal testimony on its findings at the Energy Commission hearings.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

- California Public Utilities Commission (CPUC) General Order 95 (GO-95), *Rules for Overhead Electric Line Construction*, sets forth uniform requirements for the construction of overhead lines. Compliance with this order ensures both adequate service and the safety of both the public and the people who build, maintain, and operate overhead electric lines.
- CPUC General Order 128 (GO-128), *Rules for Construction of Underground Electric Supply and Communications Systems*, sets forth uniform requirements and minimum standards for underground supply systems to ensure adequate service and the safety of both the public and the people who build, maintain, and operate underground electric lines.
- The National Electric Safety Code, 1999, provides electrical, mechanical, civil, and structural requirements for overhead electric line construction and operation.
- The combined NERC/WECC (North American Electric Reliability Corporation/Western Electricity Coordinating Council) planning standards provide system performance standards for assessing the reliability of the interconnected transmission system. These standards require continuity of service as their first priority and the preservation of interconnected operation as their second. Some aspects of NERC/WECC standards are either more stringent or more specific than the either agency's standards alone. These standards are designed to ensure that transmission systems can withstand both forced and maintenance outage system contingencies while operating reliably within equipment and electric system thermal, voltage, and stability limits. These standards include 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 WECC standards, *NERC and WECC Planning Standards with Table I and WECC Disturbance-Performance Table*, and on Section I.D, *NERC and WECC Standards for Voltage Support and Reactive Power*. These standards require that power flows and stability simulations verify defined performance levels. Performance levels are defined by specifying allowable variations in thermal loading, voltage and frequency, and loss of load that may occur during various disturbances. Performance levels range from no significant adverse effects inside and outside a system area during a minor disturbance (such as the loss of load from a single transmission element) to a catastrophic loss level designed to prevent system cascading and the subsequent blackout of islanded areas and millions of consumers during a major transmission disturbance (such as the loss of multiple 500-kV lines along a common right-of-way, and/or of multiple large generators). While the controlled loss of generation or system separation is permitted under certain specific circumstances, this sort of major uncontrolled loss is not permitted (WECC, 2002).

- NERC's reliability standards for North America's electric transmission system spell out the national policies, standards, principles, and guidelines that ensure the adequacy and security of the nation's transmission system. These reliability standards provide for system performance levels under both normal and contingency conditions. While these standards are similar to the combined NERC/WECC standards, certain aspects of the combined standards are either more stringent or more specific than the NERC performance standards alone. NERC's reliability standards apply to both interconnected system operations and to individual service areas (NERC, 2006).
- California ISO planning standards also provide the standards and guidelines that ensure the adequacy, security, and reliability of the state's member grid facilities. These standards also incorporate the combined NERC/WECC and NERC standards. These standards are also similar to the NERC/WECC or NERC standards for transmission system contingency performance. However, the California ISO standards also provide additional requirements that are not found in either the WECC/NERC or NERC standards. The California ISO standards apply to all participating transmission owners interconnecting to the California ISO-controlled grid. They also apply to non-member facilities that impact the California ISO grid through their interconnections with adjacent control grids (California ISO, 2002a).
- California ISO/FERC (Federal Energy Regulatory Commission) electricity tariffs contain guidelines for building all transmission additions/upgrades within the California ISO-controlled grid. (California ISO, 2003a).

PROJECT DESCRIPTION

The HHSEGS would utilize heliostat solar thermal technology which consists of elevated mirrors guided by tracking system mounted on a pylon. The heliostats will focus the sun's rays on solar receiver steam generator (SRSG) mounted on a solar power tower near the center of each solar field.

The two 270 MW SRSGs will generate maximum plant net output of 500 MW. The auxiliary load for each SRSG would be 20 MW, resulting in a maximum net output of

250 MW at a 90 percent power factor. Each SRSG unit would be connected to the low side of its dedicated 18/230kV and 210/280/350 megavolt ampere (MVA) generator step-up (GSU) transformer through 18kV, 12,000 ampere gas-insulated (SF6) breakers. The high side of each generator step-up transformer would be connected to the HHSEGS switchyard through an underground segment of 230kV, 1000 kcmil, copper per phase cable and overhead segment of 230kV, 795 kcmil ACSR per phase conductors. Power would be transmitted from plant one to the onsite switchyard via an approximately 3,800 foot underground cable and a 10,275 foot overhead transmission line. Plant Two would be connected to the switchyard via a 7,300 foot underground cable and a 3,270 foot overhead transmission line. The project's HHSEGS switchyard would use a breaker and-a-half configuration with six 230-kV circuit breakers, disconnect switches, and other switching gear that will allow delivery of the project's output to the proposed Crazy Eyes Tap 230kV substation. The proposed commercial operation date of the project is June 30, 2015. (HHSEGS, 2011a section 3.0 pages 3-1 to 3-10 and Figure 3.2-1, 3.2-2R, TSE-1 and TSE-2)

INTERCONNECTION FACILITIES

The applicant proposes to build a 230kV single circuit, with 795 kcmil, "Drake" ACSR conductor (generator-tie line) to interconnect the power plant switchyard to the grid. The proposed generator tie-line is rated to carry the full output of the project. The generator tie-line leaves the State of California boarder 900 feet from the HHSEGS switchyard when it crosses over the eastern border of the project site. The interconnection would require an approximately 10 mile long generation tie line from the HHSEGS to the proposed Crazy Eyes Tap substation where the project would interconnect to the VEA electric grid. The generator tie line would originate at the HHSEGS's onsite switchyard, cross the state line into Nevada, and continue east for approximately 1.5 miles until reaching Tecopa Road (also known as Old Spanish Trail Highway). At Tecopa Road, the route would head northeast paralleling Tecopa Road until it reaches the Crazy Eyes Tap Substation, which would be located immediately east of the Tecopa Road/SR 160 intersection. The Crazy Eyes Tap substation would interconnect to the existing VEA's Pahump Bob Tap 230kV line.

Assessment of Impacts and discussion of mitigation

For the interconnection of this proposed project to the grid, the interconnecting utility VEA and the control area operator (California ISO) are responsible for ensuring grid reliability. These two entities determine the transmission system impacts of the proposed project and any mitigation measures needed to ensure system conformance with utility reliability criteria, NERC planning standards, WECC reliability criteria, and California ISO reliability criteria. System impact and facilities 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 effect of the project 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. System impact and facilities studies analyze the grid both 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 analyze the impact of the project for the proposed first year of operation, and are based on a forecast of loads, generation, and transmission. Load forecasts are developed by the interconnected utility. Generation and transmission forecasts are established by an interconnection queue. The studies focus 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 studies show that the interconnection of the project causes the grid to be out of compliance with reliability standards, then the study will identify mitigation alternatives or ways in which the grid could be brought into compliance with reliability standards. When a project connects to the California ISO-controlled grid, both the studies and mitigation alternatives must be reviewed and approved by the California ISO. If either the California ISO or interconnecting utility determines that the only feasible mitigation includes transmission modifications or additions requiring CEQA review, the Energy Commission must analyze those modifications or additions according to CEQA requirements.

SCOPE OF INTERCONNECTION STUDY

The individual study QCA was performed by Navigant Consulting Inc. for VEA due to on-going effort to merge VEA generation queue and the transmission facilities with California ISO. The study identified operational constraints of transmission facilities of VEA, SCE and NV energy systems. The study is based upon the power flow data files used in the California ISO's Queue Cluster Four (QC4) Phase One study for the East-of-Pisgah area undertaken in 2011. The study included two new solar thermal projects in the capacity of 540MW and 270 MW to be interconnected to the proposed VEA's 230kV Crazy Eyes Tap substation.

Power Flow Study Assumptions:

The QCA study base cases were developed from the on-peak and off-peak base cases used by Southern California Edison (SCE) and the California ISO in the QC4 studies for the East-of-Pisgah (EOP) area and reflected the generation dispatch assumptions applied in and the new transmission projects identified as part of the QC4 studies. The QC4 base cases were modified, as necessary, to create reference cases in which VEA system and its existing and planned interconnection points with the California ISO controlled grid were model at Eldorado, the Western Area Power Administration (WAPA) system at Mead and Amargosa, and the NV Energy system at Northwest and Jackass Flats. Additionally, pertinent levels of on-peak and off-peak loads within the VEA system were modeled. The project power flow studies were conducted with and without HHSEGS connected to VEA's grid at the Crazy Eyes Tap 230kV substation, using peak and off-peak conditions. The power flow study assessed the project's impact on thermal loading of the transmission lines and equipment. Transient and post-transient studies were conducted using the heavy summer base case to determine whether the project would create instability in the system following certain selected outages. Short circuit studies were conducted to determine if HHSEGS would overstress existing substation facilities. The detailed study assumptions are described in the study.

Power Flow Study results:

Base case with no upgrades of the VEA system:

The initial step in identifying the system upgrades and additions required to facilitate the delivery of the proposed projects from the VEA system to the balance of the California ISO controlled grid consisted of developing on-peak and off-peak power flow cases with no upgrades or additions to the VEA system and assessing the resultant Category A loadings on the VEA system.

Following facilities are identified as Category “A” normal overloads in the existing VEA system without any system upgrades.

Over Load facilities:

- Crazy Eyes Tap-Bob Tap 230kV line was overloaded by 130% under on-peak conditions and 156% overloaded under off-peak condition.
- Crazy Eyes Tap-Pahrump 230kV line was overloaded by 147% under on-peak condition and 118% under overloaded off-peak condition.
- Pahrump #1 230/ 138 kV transformer was overloaded by 116% under on-peak condition and less than 90% loaded under off-peak condition.
- Pahrump #2 230/ 138 kV transformer was overloaded by 110% under on-peak condition and less than 90% loaded under off-peak condition.

Study has identified two mitigation measures for the above overload criteria violations

Mitigations:

- Re-conductoring of the impacted 230kV lines or
- Developing a new 230kV line between the Crazy Eyes Tap and Eldorado.

The reconductoring option has been selected due to cost effectiveness and ability to meet the project in-service date. As a result, the post-QCA on-peak and off-peak base cases were modified to reflect reconductoring of the Pahrump-Crazy Eyes tap, the Crazy Eyes Tap-Bob Tap, and the Bob Tap-Mead 230kV line sections with 3M “Drake” ACCR conductor. Reconductoring above facilities would increase the conductor normal rating by 700 MW and emergency rating by 750 MW.

Power Flow Studies with Pahrump-Mead 230kV line sections reconducted:

VEA system overloads for category A, B and C contingencies for the modified base cases are summarized below;

- Pahrump #1 230/138kV transformer was overloaded under on-peak category A, B and C and off-peak category B conditions.
- Pahrump #2 230/138kV transformer was overloaded under on-peak category A, B and C and off-peak category B conditions.

- Crazy Eyes Tap-Pahrump 230kV line was overloaded under on-peak category B and C and off-peak category B and C conditions.
- Pahrump-Desert View 230kV line was overloaded under on-peak category B and C and off-peak category B and C conditions.
- Amargosa 230/138kV transformer was overloaded under on-peak category B and C and off-peak category A, B and C conditions.
- Pahrump-Gamebird 138kV line was overloaded under on-peak category B and C and off-peak category A, B and C conditions.
- Pahrump-Vista 138kV line was overloaded under on-peak category B and C conditions.
- Crazy Eyes Tap-Bob Tap 230kV line was overloaded under on-peak category B and C and off-peak category B and C conditions
- Valley Tap-Johnnie 138kV line was overloaded on-peak category C and off-peak category C conditions.
- Pahrump-Gamebird 138kV line was overloaded on-peak category C conditions.
- Gamebird-Sandy 138kV line was overloaded off-peak category B conditions.
- Gamebird-Amargosa 138kV line was overloaded off-peak category B conditions.

Proposed Mitigation:

With respect to the post-contingency overloads noted on the reconductored Crazy Eyes Tap-Bob Tap and Crazy Eyes Tap-Pahrump lines, VEA has determined that the application of Special Protection Schemes (SPS) which would drop one of the three QCA 270MW units is the most cost effective way of mitigation.

The following SPS would be applied for the Category B and C outages.

Category B:

Crazy Eyes Tap-Bob Tap 230kV line.

Crazy Eyes Tap-Pahrump 230kV line.

Category C:

Crazy Eyes Tap-Bob Tap 230kV line and Gamebird-Sandy 138 kV line.

Crazy Eyes Tap-Pahrump 230kV line and Pahrump-Gamebird 138kV line.

Crazy Eyes Tap-Pahrump 230kV line and Pahrump 230kV transformer #1

The application of such SPS would also mitigate any other overloads resulting from these five outages. Additionally, the following upgrades are required to

mitigate the overloads resulting from outages other than the five contingencies listed above.

- Pahrump #1 230/138kV transformer overload could be mitigated by replacing transformer with unit rated at 176 MVA normal and 220MVA emergency.
- Pahrump #2 230/138kV transformer overload could be mitigated by replacing transformer with unit rated at 176 MVA normal and 220MVA emergency.
- Amargosa 230/138kV transformer overload could be mitigated by installing 138kV Pase Shifting Transformer (PST) 75MVA at Gamebird on line to Sandy/Amargosa to limit post-contingency flows through transformer.
- Pahrump-Vista 138kV line overload could be mitigated by installing 138kV PST (75MVA) at Gamebird on line to Sandy/Amargosa to limit post-contingency flows through transformer.
- Pahrump-Gamebird 138kV line overload could be mitigated by reconductoring using ACCR conductor.

Impacts on the SCE system:

Category B and C contingencies were simulated on the SCE 500kV and 230kV facilities located in the East-of-Pisgah (EOP) area on the on-peak and off-peak cases with the VEA 230kV line reconductoring model. These studies indicated that the QCA projects interconnection with the VEA system had no impacts on the SCE system in the EOP area.

Impacts on other systems:

New overloads were found on certain Nevada Energy 138kV lines between VEA's Lathrop Wells Substation and Nevada Energy's Northwest Substation for the Category B and C outages involving the Crazy Eyes Tap-Bob Tap 230kV line. These overloads could be mitigated by the proposed application of SPS for these outages. The simulation of Category B and C outages on the NVE and WAPA systems did not indicate that the interconnection of the QCA generation with the VEA system had any negative impacts on the NVE and WAPA system.

Dynamic Stability Study results:

Dynamic stability analyses were conducted on both the QCA peak and off-peak base cases with the above noted upgrades modeled to ensure that the transmission system remains stable with the addition of QCA projects. These analyses assessed the impacts of the outages of VEA system, SCE system and other systems. The disturbance simulations were performed for a study period of 10 seconds and monitored bus voltages and frequencies at several buses of the VEA, SCE and NV energy systems. The study monitored the generator angles of the QCA and the adjacent generator units of the Southern Nevada. These simulations indicated that, with the addition of QCA projects and the identified upgrades in place there are no Dynamic instability problems for the selected outages of VEA, SCE or NV energy systems.

Transient and Post Transient Stability Analysis:

NERC/WECC planning standards require that the system maintain post-transient voltage stability when either critical path transfers or area loads increase by 5 percent

for category "B" contingencies, and 2.5 percent for category "C" contingencies. Transient stability analysis was conducted using both the peak and off-peak full loop base cases to ensure that the transmission system remains stable with the addition of QCA generation projects. Transient stability simulations also indicated that there are some stability issues such as low bus voltages and frequencies or excessive angular changes at the QCA projects on the VEA system without the application of the SPS. These stability problems could be mitigated by the proposed SPS.

Reactive Power Deficiency Analysis:

The power flow base cases are built assuming that dynamic reactive power support will be available for all the cluster 4 projects. With this assumption, there were no reactive power deficiencies identified with the addition of the QCA projects in the EOP area.

Short Circuit Study results:

Short circuit studies were performed on VEA system to determine the fault duty impact of adding the QCA projects to the transmission system and to ensure system coordination. The fault duties were calculated with and without the projects to identify any equipment overstress conditions. Once overstressed circuit breakers are identified, the fault current contribution from each individual project in QCA is determined. All bus locations where the QCA projects increase the short circuit duty by 0.1kA or more and where duty is in excess of 60% of the minimum breaker nameplate rating are listed in Table 7. The information summarized in Table 7 regarding the estimated fault currents at the VEA busses indicates that the only significant differences between the pre-QCA and post-QCA fault levels are at the proposed Bob Tap and Crazy Eyes Tap substations and the equipments at these substations can be sized to accommodate the estimated fault currents.

With respect to the information for the three SCE busses summarized in Table 7 pre- and post-studies indicates that the interconnection of the QCA projects with the VEA system would result in a 5% increase in the fault currents at existing Eldorado 220kV bus. Therefore breaker ratings and other relevant protection equipments should be further evaluated in the existing Eldorado 220kV substation.

COMPLIANCE WITH LORS

The QCA study indicates that the project interconnection would comply with NERC/WECC planning standards and California ISO reliability criteria. The applicant will design and build the proposed 230-kV overhead transmission lines.

Staff concludes that assuming the proposed conditions of certification are met; the project would likely meet the requirements and standards of all applicable LORS.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Please see **Appendix 1** for Preliminary Staff Assessment (PSA) Response to Comments – TSE.

CONCLUSIONS AND RECOMMENDATIONS

- HHSEGS project should design and construct with adequate reactive power resources to compensate the consumption of Var by the generator step-up transformers, distribution feeders and generator tie-lines.
- The identified new SPS should be implemented to curtail the generation of the QCA projects to mitigate the overload criteria violations caused by the projects on Valley Electric Association system.
- The identified conceptual interconnection facilities, Reliability network upgrades and Delivery network upgrades are necessary to safely and reliably interconnect the QCA projects.

CONDITIONS OF CERTIFICATION FOR TSE

TSE-1 The project owner shall furnish to the Compliance Project Manager (CPM) and to the Chief Building Official (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: At least 60 days prior to the start of construction (or a lesser number of days mutually agreed to by the project owner and the CBO), the project owner shall submit the schedule, a Master Drawing List, and a Master Specifications List to the CBO and to the CPM. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment (see a list of major equipment in **Table 1: Major Equipment List** below). Additions and deletions shall be made to the table only with CPM and CBO approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

**TRANSMISSION SYSTEM ENGINEERING Table 1
Major Equipment List**

Breakers
Step-Up Transformer
Switchyard
Busses
Surge Arrestors
Disconnects
Take Off Facilities
Electrical Control Building
Switchyard Control Building
Transmission Pole/Tower
Grounding System

TSE-2 Prior to the start of construction, the project owner shall assign an electrical engineer and at least one of each of the following to the project: A) a civil engineer; B) a geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering; C) a design engineer who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; or D) a mechanical engineer. (Business and Professions Code Sections 6704 et seq. require state registration to practice as a civil engineer or structural engineer in California.

Protocol: The tasks performed by the civil, mechanical, electrical, or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (e.g., proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California-registered electrical engineer. The civil, geotechnical or civil, and design engineer assigned in conformance with Facility Design condition **GEN-5**, may be responsible for design and review of the TSE facilities.

Protocol: The project owner shall submit to the CBO for review and approval, the names, qualifications, and registration numbers of all engineers assigned to the project. If any one of the designated engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer. This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform with predicted conditions used as a basis for design of earthwork or foundations.

Protocol: 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: At least 30 days prior to the start of rough grading (or a lesser number of days mutually agreed to by the project owner and the CBO), 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 (California Building Code, 2010, Chapter 1, Section 108.4, Approval Required; Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector; Appendix Chapter 33, Section 3317.7, Notification of Noncompliance). The discrepancy documentation shall become a controlled document and shall be submitted to the CBO for review and approval and shall reference this condition of certification.

Verification: The project owner shall submit a copy of the CBO's approval or disapproval of any corrective action taken to resolve a discrepancy to the CPM within 15 days of receipt. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action required obtaining the CBO's approval.

TSE-4 For the power plant switchyard, outlet line, and termination, the project owner shall not begin any increment of construction until plans for that increment have been approved by the CBO. These plans, together with design changes and design change notices, shall remain on the site for one year after completion of construction. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS. The following activities shall be reported in the Monthly Compliance Report:

1. Receipt or delay of major electrical equipment;
2. Testing or energization of major electrical equipment; and
3. The number of electrical drawings approved, submitted for approval, and still to be submitted.

Verification: At least 30 days prior to the start of each increment of construction (or a lesser number of days mutually agreed to by the project owner and the CBO), the project owner shall submit to the CBO for review and approval the final design plans, specifications, and calculations for equipment and systems of the power plant switchyard, outlet line, and termination, including a copy of the signed and stamped statement from the responsible electrical engineer attesting to compliance with the applicable LORS, and send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

TSE-5 The project owner shall ensure that the design, construction, and operation of the proposed transmission facilities will conform to all applicable LORS, including 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.

1. The HHSEGS project will be interconnected to the VEA grid via a 220-kV, 795 kcmil per phase, and approximately 10 miles long single circuit (generator- tie line). The proposed HHSEGS switching station would construct with six 230kV breakers, breaker- and- a- half configuration with 3- bays and 4 positions. The power plant outlet line shall meet or exceed the electrical, mechanical, civil, and structural requirements of CPUC General Order 95 and General Order 98 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.
2. Breakers and busses in the power plant switchyard and other switchyards, where applicable, shall be sized to comply with a short-circuit analysis.
3. 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.
4. The project conductors shall be sized to accommodate the full output from the project.
5. Termination facilities shall comply with applicable SCE interconnection standards.
6. The project owner shall provide to the CPM:
 - a. The final Detailed Facility Study (DFS) including a description of facility upgrades, operational mitigation measures, and/or Special Protection System (SPS) sequencing and timing if applicable,
 - b. Executed project owner and California ISO Facility Interconnection Agreement.

Verification: At least 60 days prior to the start of construction of transmission facilities (or a lesser number of days mutually agree to by the project owner and CBO), the project owner shall submit to the CBO for approval:

1. Design drawings, specifications, and calculations conforming with CPUC General Order 95 and General Order 98 or NESC; Title 8, California Code of Regulations, Articles 35, 36, and 37 of the “High Voltage Electric Safety Orders”; NEC; applicable interconnection standards, and related industry standards for the poles/towers, foundations, anchor bolts, conductors, grounding systems, and major switchyard equipment.
2. For each element of the transmission facilities identified above, the submittal package to the CBO shall contain the design criteria, a discussion of the calculation method(s), a sample calculation based on “worst-case conditions,”¹ and a statement signed and sealed by the registered engineer in responsible charge, or other acceptable alternative verification, that the transmission element(s) will conform with CPUC General Order 95 or NESC; Title 8, California Code of Regulations, Articles

¹ Worst-case conditions for the foundations would include for instance, a dead-end or angle pole.

35, 36 and 37 of the “High Voltage Electric Safety Orders”; NEC; applicable interconnection standards, and related industry standards.

3. Electrical one-line diagrams signed and sealed by the registered professional electrical engineer in responsible charge, a route map, and an engineering description of equipment and the configurations covered by requirements **TSE-5** 1) through 5) above.
4. The final Detailed Facility Study, including a description of facility upgrades, operational mitigation measures, and/or SPS sequencing and timing if applicable, shall be provided concurrently to the CPM.

TSE-6 The project owner shall provide the following Notice to the California Independent System Operator (California ISO) prior to synchronizing the facility with the California transmission system:

1. At least one week prior to synchronizing the facility with the grid for testing, provide the California ISO a letter stating the proposed date of synchronization; and
2. At least one business day prior to synchronizing the facility with the grid for testing, provide telephone notification to the California ISO Outage Coordination Department.

Verification: The project owner shall provide copies of the California ISO letter to the CPM when it is sent to the California ISO one week prior to initial synchronization with the grid. A report of the 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:

1. “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”; applicable interconnection standards; NEC; and related industry standards, and these conditions shall be provided concurrently.
2. 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.”

3. 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

- California ISO (California Independent System Operator). 1998a. Cal-ISO Tariff Scheduling Protocol. Posted April 1998, Amendments 1,4,5,6, and 7 incorporated.
- California ISO (California Independent System Operator). 1998b. Cal-ISO Dispatch Protocol. Posted April 1998.
- California ISO (California Independent System Operator). 2002a. Cal-ISO Grid Planning Standards. February 2002.
- HHSEGS (Hidden Hills Solar Electric Generating Station System-Q714). 2012a. Brightsource Energy, Inc., Hidden Hills Ranch (Queue Cluster 4 Phase One Interconnection Study Report) submitted to the California Energy Commission.
- HHSEGS (Hidden Hills Solar Electric Generating Station System). 2012b. Brightsource Energy, Inc., Hidden Hills Ranch (Queue Cluster 4 phase One Draft Report) submitted to the California Energy Commission.
- HHSEGS (Hidden Hills Solar Electric Generating Station System). 2012b. Brightsource Energy, Inc., Hidden Hills Ranch (Queue Cluster Alpha phase One Interconnection Study Report) submitted to the California Energy Commission.
- HHSEGS (Hidden Hills Solar Electric Generating Station System). 2012c. Brightsource Energy, Inc., Hidden Hills Ranch Application for Certification. Submitted to the California Energy Commission.
- NERC/WECC (North American Reliability Council/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.

Emergency overload – See “Single Contingency.” This is also called an L-1.

Kcmil or KCM – Thousand circular mil. A unit of the conductor’s cross sectional area. When divided by 1,273, the area in square inches is obtained.

Kilovolt (kV) - A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground.

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. It equals the product of the line voltage in kilovolts, current in amperes, and the square root of 3, divided by 1,000.

Megawatt (MW) – A unit of power equivalent to 1,341 horsepower.

Normal operation/normal overload – The condition arrived at when all customers receive the power they are entitled to, without interruption and at steady voltage, and with no element of the transmission system loaded beyond its continuous rating.

N-1 condition – See “single contingency.”

Outlet - Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation facilities to the main grid.

Power flow analysis – A 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 – 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) – An automatic control provision, which, for instance, will trip a selected generating unit upon a circuit overload.

SF6 (sulfur hexafluoride) – An insulating medium.

Single contingency – Also known as “emergency” or “N-1 condition,” the occurrence when one major transmission element (circuit, transformer, circuit breaker, etc.) or one generator is out of service.

Solid dielectric cable – Copper or aluminum conductors that are insulated by solid polyethylene type insulation and covered by a metallic shield and outer polyethylene jacket.

Switchyard - An integral part of a power plant and 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 a generator. The new single circuit line is inserted into an existing circuit by utilizing breakers at existing terminals of the circuit, rather than installing breakers at the interconnection in a new switchyard.

Undercrossing – A transmission configuration where a transmission line crosses below the conductors of another transmission line, generally at 90 degrees.

Underbuild - A transmission or distribution configuration where a transmission or distribution circuit is attached to a transmission tower or pole below (under) the principle transmission line conductors.

TRANSMISSION SYSTEM ENGINEERING

List of Comment Letters

		TSE Comments?
1	Inyo County	
2	Bureau of Land Management	
3	National Park Service	
4	The Nature Conservancy	
5	Amargosa Conservancy	
6	Basin & Range Watch	
7	Pahrump Paiute Tribe	
8	Richard Arnold, Pahrump Piahute Tribe	
9	Big Pine Tribe of Owens Valley	
10	Intervenor Cindy MacDonald	X
11	Intervenor Center for Biological Diversity	
12	Intervenor, Old Spanish Trail Association	
13	Applicant, BrightSource Energy, Inc.	X

Comment #	DATE	COMMENT TOPIC	RESPONSE
10	July 21, 2012	Intervenor Cindy MacDonald	
10.1	p. 16-2 #1	Determine the project switchyard location on-site or off-site	On-site
10.2	p. 16-2 #2	Not applicable	
10.3	p. 16-2 #1	feasibility of a construction traffic route to be utilized as transmission route after the construction work completed.	TSE staff does not determine the transmission route of the project. It can be utilized as a transmission route, if proper Right Way (R/W), G.O. 95 and 128 standards are satisfied.
10.4	p. 16-2 #2	Would utilizing the alternative route reduce or prevent adverse impacts to the vegetable, wildlife and critical habitat resources.	TSE staff does not evaluate the environmental impacts.

Appendix 1 -- PSA Response to Comments, TSE

Comment #	DATE	COMMENT TOPIC	RESPONSE
13	July 23, 2012	Applicant, BrightSource Energy	
13.1	p. 259 #1	State the correct name of the project.	Agree to use the project name as "Hidden Hills Solar Electric Generating System (HHSEGS)"
13.2	p. 259 #2	Find the attached Valley Electric Associated Queue Cluster Alpha Phase One Study.	The applicant submitted Phase One Interconnection Study Report on July 23, 2012
13.3	p. 259 #3	Modify the project description passage	Agree to modify the paragraph to a certain extent.
13.4	p. 260 #4	Correct the conductor size of the Generator tie line.	Agree to use the correct conductor size as 795 kcmil "Drake" ACSR ,conductor per phase.
13.5	p. 260 #5	Include the modified Generator tie line route.	The new proposed generator tie line route which interconnect the Crazy Eyes tap 230kV substation will be included into the Final Staff Assessment .

ALTERNATIVES

Testimony of Jeanine Hinde¹

INTRODUCTION

This analysis evaluates a reasonable range of potentially feasible alternatives to the proposed Hidden Hills Solar Electric Generating System (HHSEGS) project. Staff reviewed the alternatives analysis provided by the project applicant in the application for certification (AFC) for the HHSEGS project, using that as a starting point for the alternatives analysis in this staff assessment.

Staff reviewed many potentially feasible off-site alternatives and alternative renewable technologies during the initial work to determine the scope and content of this analysis, including those that were also reviewed in the AFC for the proposed project. That review led to selection by staff of the following six project alternatives for full analysis and comparison to the proposed HHSEGS project:

- No-Project Alternative
- Sandy Valley Off-site Alternative (same technology as the proposed project)
- Solar Power Tower with Energy Storage Alternative (at the proposed HHSEGS site)
- Solar Photovoltaic Alternative (at the proposed HHSEGS site)
- Parabolic Trough Alternative (at the proposed HHSEGS site)
- Reduced Acreage Alternative

Staff concludes that the primary environmental benefits of the Solar Photovoltaic (PV) Alternative compared to the proposed project are greatly reduced impacts on Visual Resources, Biological Resources, and Cultural Resources. The Solar PV Alternative reduces the magnitude of potential impacts on Water Supply. The Solar PV Alternative would eliminate the potential for mortality and morbidity of avian species from exposure to concentrated solar flux over the solar collector arrays. Because the Solar PV Alternative would not involve installation of solar power towers or other extremely tall structures, the potential for avian species to collide with the types of equipment and permanent facilities that would be part of the proposed project would be reduced under the Solar PV Alternative. If substantially reducing the extent and severity of direct environmental effects is the priority, then the Solar PV Alternative would be environmentally superior to the proposed project. An analysis of the environmentally superior alternative comparing the effects of each of the project alternatives to the proposed HHSEGS project is at the end of this alternatives analysis.

Preparation of this alternatives analysis included reviews of many other renewable energy technologies that are at various stages of development, research, and implementation in California. Discussions of other renewable energy technologies that

¹ **Alternatives Appendix-1** lists other staff contributors to this analysis of project alternatives.

are not considered potentially feasible alternatives to the proposed project are presented in **Alternatives Appendix-2** of this staff assessment, **Other Renewable Energy Technologies**.

CEQA REQUIREMENTS

As lead agency for the proposed Hidden Hills Solar Electric Generating System project (HHSEGS or proposed project), the California Energy Commission (Energy Commission) is required to consider and discuss alternatives to the proposed project. The guiding principles for the selection of alternatives for analysis in an environmental impact report (EIR) are provided by the California Environmental Quality Act Guidelines (State CEQA Guidelines) (Cal. Code Regs., tit. 14, § 15000 et seq.). Section 15126.6 of the State CEQA Guidelines indicates that the alternatives analysis must:

- describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project;
- consider alternatives that would avoid or substantially lessen any significant environmental impacts of the proposed project, including alternatives that would be more costly or would otherwise impede the project's objectives; and
- evaluate the comparative merits of the alternatives.

These regulations also apply to the document used as a substitute for an EIR in a certified program (Cal. Code Regs., tit. 14, §§ 15251 and 15252).

The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives (Cal. Code Regs., tit. 14, § 15126.6[a]). CEQA does not require an EIR to “consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives....” The range of reasonable alternatives must be selected and discussed in a manner that fosters meaningful public participation and informed decision making (Cal. Code Regs., tit. 14, § 15126.6[f]). That is, the range of alternatives presented in this analysis is limited to ones that will inform a reasoned choice by Energy Commission decision makers. Under the “rule of reason,” an EIR “need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative” (Cal. Code Regs., tit. 14, § 15126.6[f][3]).

The lead agency is also required to (1) evaluate a “no-project alternative,” (2) identify alternatives that were initially considered but then rejected from further evaluation, and (3) identify the “environmentally superior alternative” among the other alternatives (Cal. Code Regs., tit. 14, § 15126.6).

Alternatives may be eliminated from detailed consideration by the lead agency if they fail to meet most of the basic project objectives, are infeasible, or could not avoid any significant environmental effects (Cal. Code Regs., tit. 14, § 15126.6[c]).

ALTERNATIVES SCREENING

The ideal process to select alternatives to include in the alternatives analysis begins with the establishment of project objectives. Section 15124 of the State CEQA Guidelines addresses the requirement for a statement of objectives (Cal. Code Regs., tit. 14, § 15124[b]):

A clearly written statement of objectives will help the lead agency develop a reasonable range of alternatives to evaluate in the EIR and will aid the decision makers in preparing findings or a statement of overriding considerations, if necessary. The statement of objectives should include the underlying purpose of the project.

A goal of state policy is to implement California's Renewables Portfolio Standard (RPS) program, which was established in 2002 under Senate Bill (SB) 1078, accelerated in 2006 under SB 107, and expanded in 2011 under SB X 1-2. Other related legislation has altered specific parts of the RPS program. The RPS program requires a retail seller of electricity to increase procurement from eligible renewable energy resources to 33 percent of total procurement by 2020. The California Public Utilities Commission (CPUC) and the Energy Commission are jointly responsible for implementing the program.

The importance of achieving these renewable energy goals was emphasized with the enactment of Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006, which sets aggressive greenhouse gas reduction goals for the state.

The Renewable Energy Resources Program (SB 107) states that the Energy Commission's program objective is "to increase, in the near term, the quantity of California's electricity generated by in-state renewable electrical generation facilities, while protecting system reliability, fostering resource diversity, and obtaining the greatest environmental benefits for California residents" (Pub. Resources Code, § 25740.5[c]).

Staff has identified the project objectives, as follows:

- Safely and economically construct and operate a nominal 500-megawatt renewable electrical generation facility resulting in sales of competitively priced renewable energy consistent with the needs of California utility companies.
- Develop a renewable energy facility that will supply electricity for use by retail sellers and publicly owned electric utilities to help satisfy their required California Renewables Portfolio Standard (RPS) program goals.
- Develop a renewable energy facility capable of providing grid support by offering power generation that is flexible.
- Ensure construction and operation of a renewable electrical generation facility that will meet permitting requirements and comply with applicable laws, ordinances, regulations, and standards (LORS).

- Develop a renewable energy facility in a timely manner that will avoid or minimize significant environmental impacts to the greatest extent feasible.
- Obtain site control and use within a reasonable time frame.
- Develop a renewable energy facility in an area with high solar value and minimal slope.

These project objectives are generally based on the project objectives set forth by the project applicant; however, they have been altered by staff to facilitate this analysis of a reasonable range of potentially feasible alternatives, in accordance with requirements of the State CEQA Guidelines for an alternatives analysis. The project applicant's project objectives are listed in the "Executive Summary" of the AFC for the HHSEGS project (Hidden Hills Solar I and II, LLCs 2011a).

ALTERNATIVES CONSIDERED IN THE APPLICATION FOR CERTIFICATION

Review of Off-site Alternatives

Section 6.0, "Alternatives," of the AFC evaluated eight off-site alternatives and the No-Project Alternative (Hidden Hills Solar I and II, LLCs 2011a).

Subsection 6.2 of the AFC discusses alternative sites that were part of the screening analysis for off-site alternatives to the HHSEGS project site. Alternative sites that were considered include the following (see **Alternatives Figure 1**):

- Centennial Flat
- Panamint Valley
- Chicago Valley
- Tecopa
- Sandy Valley
- Death Valley Junction
- Calvada South
- Trona

Of these eight off-site alternatives, the project applicant carried forward the Calvada South and Trona sites for further analysis (Hidden Hills Solar I and II, LLCs 2011a). The remaining six were not retained by the project applicant for further analysis based on a limited review of the sites' characteristics compared to the applicant's screening criteria. Subsection 6.2.1.1, "Alternative Sites That Are Not Feasible," of the AFC briefly discusses the reasons for eliminating the six alternatives. Some of the stated reasons are excessively long linears (i.e., long transmission lines and natural gas pipelines), biological sensitivity (e.g., in known ranges of desert tortoise [*Gopherus agassizii*] or Mohave ground squirrel [*Spermophilus mohavensis*]), possible shortfalls of contiguous

private land acreage, location relative to the China Lake Naval Air Weapons Station (NAWS), and high visual sensitivity. Water supply for the six rejected alternatives is described either as “uncertain,” “medium,” or “poor.” Subsection 6.2.1.3, “Alternative Sites Would Fail to Satisfy Some of the Project Objectives,” states that the Panamint Valley, Tecopa, Chicago Valley, and Death Valley Junction alternative sites have constrained transmission capacity requiring system upgrades “that would make it more difficult, if not impossible, for those areas to be available by 2015.” Chicago Valley is identified as the only location that has sufficient contiguous private land to meet the development schedule. Tecopa and Sandy Valley are identified as being too small to allow for the project as proposed.

Based partially on information provided in the AFC, Energy Commission staff (staff) concurs with the project applicant’s rejection of the Centennial Flat, Panamint Valley, Chicago Valley, Tecopa, and Death Valley Junction alternative sites. Staff reviewed the screening level information provided by the project applicant on the Sandy Valley site and determined that more information was needed to adequately evaluate the site.

Alternatives Table 1 summarizes information from the AFC on the Sandy Valley off-site alternative.

Alternatives Table 1 Information from the Application for Certification on the Sandy Valley Off-site Alternative	
Criteria	Sandy Valley Off-site Alternative
Area and slope	Uncertain whether contiguous land of adequate size is available. No information on slope is provided.
Ability to obtain site control	Sufficient private land may be available, but many parcels are in agricultural use.
General plan and zoning	No information provided.
Transmission lines	Approximately 50 miles of new transmission line required.
Natural gas pipeline	The Kern River Gas Transmission pipeline is about 25 miles away.
Water supply	Individual wells supply water.
Desert tortoise	The site is among the alternatives with the highest ratings for tortoise habitat suitability; however, much of the land has already been disturbed by agricultural use. ¹
Visual quality	No information provided.
Economic viability	“Medium” because the linears are long, but not as long as for other alternative sites.

Alternatives Table 1
Information from the Application for Certification on the
Sandy Valley Off-site Alternative

Criteria	Sandy Valley Off-site Alternative
Source: Hidden Hills Solar I and II, LLCs 2011 Notes: ¹ The U.S. Geological Survey habitat rating is 0.6, and the site is adjacent to areas with ratings of 0.5 and 0.6. These are mid-range index values on a scale that ranges from 0.0 (lowest value) to 1.0 (highest value) (Nussear et al. 2009).	

In data requests submitted to the applicant in November 2011 and January 2012, staff requested additional information on the Sandy Valley site. Responses to those data requests were received in February 2012. Staff's analysis of the Sandy Valley off-site alternative incorporates information from those data responses. (Please refer to the discussion and analysis below under, "Alternatives Evaluated in Detail.")

Subsections 6.2.2 and 6.2.3 of the AFC provide discussions of the Calvada South and Trona sites and compare the potential environmental impacts of those alternatives to the HHSEGS project (Hidden Hills Solar I and II, LLCs 2011a). The Calvada South and Trona sites have been carefully evaluated by staff and eliminated from detailed consideration in this staff assessment because neither of them could have avoided or lessened the environmental impacts of the proposed project, and in some cases, could have resulted in much greater impacts compared to the proposed project. Staff reviewed the information in the AFC and used other maps and resource data to characterize the two sites.

The project applicant identifies greater impacts on biological resources at the Calvada South and Trona sites compared to the proposed project. Greater impacts on visual resources are identified at the Trona site because of the Trona Pinnacles, an unusual geological feature in the Searles Dry Lake basin. However, staff observes that the Trona Pinnacles are south of Searles Valley and approximately 16 miles south of the Trona site identified in the AFC. At this distance, it is likely that views of the Trona Pinnacles would be unaffected by a project at the Trona site.

Based on a review of regional maps, staff observes that the Trona site is located along Trona-Wildrose Road, which is a county highway that connects with a segment of State Route (SR) 178 near Ridgecrest and turns north near the turnoff to the Trona Pinnacles before continuing through remote areas, including the Panamint Valley. The highway continues north and meets SR 190 east of Panamint Springs within Death Valley National Park (see **Alternatives Figure 1**). Given the location of the Trona site along a remote highway providing access to Death Valley National Park and other scenic areas, it is presumed that the visual impacts from a project at the Trona site would be high.

The AFC identifies a greater impact on water resources at the Trona site compared to the proposed project, describing water for that alternative as "troublesome" and a water supply that is "very high in salinity and minerals."

Subsection 6.2.2.1 of the AFC, “HHSEGS Project Site,” describes the proposed project site as having “low density populations of desert tortoise and low-quality tortoise habitat.” Pedestrian transect surveys conducted by biologists for the project applicant on April 13 and May 18, 2011, resulted in observations of two live tortoises at the site and 13 additional tortoises within the *zone of influence* transects surrounding the project site (Hidden Hills Solar I and II, LLCs 2011a). Refer to the **Biological Resources** section of this staff assessment for a discussion and analysis of sensitive plant and animal species at the HHSEGS project site, including desert tortoise.

Subsection 6.2.3.2 of the AFC, “Biological Resources,” states that “desert tortoise density surveys performed at HHSEGS and the Calvada South sites indicated a higher density of desert tortoise at Calvada South.” However, no information is provided in the AFC documenting the conclusion on desert tortoise density at the Calvada South site. The United States Geological Survey (USGS) desert tortoise habitat index value for the Calvada South site is 0.9 (Nussear et al. 2001). The discussion in the AFC also states that the Calvada South site has a higher density of native vegetation and less surface disturbance compared to the HHSEGS site. The AFC identifies a “higher biological concern” at the Trona site due to its location in the Mohave Ground Squirrel Conservation Area and potential to impact critical habitat for the Inyo California towhee (*Pipilo crissalis eremophilus*). The USGS desert tortoise habitat index value for the Trona site is 0.8 (Nussear et al. 2009).

Subsection 6.2.2 of the AFC briefly discusses transmission lines for the Calvada South and Trona alternative sites. The Calvada South site is approximately 2 miles southeast of the HHSEGS site, and the new transmission lines for this alternative would be similar in length to those required for the proposed project. According to information in the AFC, approximately 40 miles of new transmission line would be required to connect a project at the Trona site to the Inyokern Substation near U.S. Route 395. The feasibility of interconnecting at the Inyokern Substation is unknown.

An approximately 35-mile-long natural gas pipeline would be constructed to connect the proposed project to the existing interstate natural gas pipeline that is owned and operated by the Kern River Gas Transmission Company (KRG T). A natural gas supply for the Calvada South alternative site would require construction of a slightly longer pipeline to connect to the KRG T pipeline. Subsection 6.2.2.3 of the AFC states that a Pacific Gas & Electric Company (PG&E) natural gas pipeline up to 12 inches in diameter is located approximately 12 miles south of the Trona site. Staff observes that this PG&E pipeline has a 10-inch diameter, which is insufficient to serve the project. Based on data mapped by staff on natural gas pipelines in the project region, staff observes that the closest high-capacity natural gas pipeline is more than 50 miles south of the Trona site.

The Trona site is approximately 15 miles east of the China Lake Naval Air Weapons Station (NAWS). Based on a review of regional maps, staff observes that the Trona site is approximately 20 miles northeast of Armitage Airfield, which is in the southern portion of the China Lake NAWS. The Department of the Navy promotes mutually compatible land uses near the military installation to reduce potential conflicts with the U.S.

Department of Defense (DOD) military mission and protect public health and safety in the region. Although work has not been done to assess potential conflicts of a large renewable energy project at the Trona site with the China Lake NAWS mission, it is presumed that extensive coordination with DOD would be required, and resolution of potential land use conflict issues is unknown.

Staff has not retained the Calvada South site for further analysis based partially on the predicted high habitat values at the site. In addition, the screening level review of the site's characteristics has not resulted in identification of any potential environmental impacts that would be avoided or reduced at the Calvada South site compared to the proposed project.

Staff has identified several issues and potentially severe environmental impacts at the Trona site indicating its probable infeasibility as an alternative to the proposed project:

- *Visual Resources* – probable high visual impacts due to the site's remote character and location relative to Death Valley National Park.
- *Water Supply* – uncertain water supply for the project given that potable water is piped from either Indian Wells Valley (as stated in the AFC) or Ridgecrest (as indicated by staff).
- *Biological Resources* – potential high biological resource values due to its location in the Mohave Ground Squirrel (*Spermophilus mohavensis*) Conservation Area, a high USGS desert tortoise (*Gopherus agassizii*) habitat index value, and the potential to impact critical habitat for the Inyo California towhee (*Pipilo crissalis eremophilus*).
- *Transmission Line Interconnection* – unknown feasibility of interconnecting at the Inyokern Substation near U.S. Route 395.
- *Location Relative to Military Lands* – predicted need for extensive coordination with DOD because of the site's location near the China Lake NAWS.

Review of Alternative Project Configurations

The AFC briefly evaluates changing the proposed project configuration by eliminating the auxiliary natural-gas fired boilers. The analysis states that "elimination of these boilers was considered due to the reduction in air emissions and cost...." The analysis concludes that the boilers "have been included to enhance the operation and economics of the project" (Hidden Hills Solar I and II, LLCs 2011a). The applicant has since conducted boiler optimization studies, and as a result, has removed plans for some of the auxiliary boilers from the proposed project.

The applicant considered developing a smaller plant with a net generating electrical capacity of 100 or 200 megawatts (MWs). The discussion of a project with reduced capacity briefly and generally addresses the proportionately lower impacts on resources such as air quality, biological resources, cultural resources, paleontological resources, soil erosion, waste management, and visual resources. The applicant concludes that a smaller plant "would not feasibly accomplish most of the basic objectives of the project and would not avoid or substantially lessen one or more of the significant effects.

Furthermore, a smaller plant may result in an inefficient use of the land by failing to fully realize the solar potential of the area.”

The Reduced Acreage Alternative is analyzed as a potentially feasible alternative in this staff assessment. Refer to the subsection below, “Alternatives Evaluated in Detail,” for an analysis of this project alternative.

Review of Alternative Renewable Technologies

Other renewable solar technologies discussed in the AFC include central tower with integral thermal storage, parabolic trough, and solar photovoltaic. These three alternative technologies are analyzed as potentially feasible alternatives in this staff assessment. Refer to the subsection below, “Alternatives Evaluated in Detail,” for a full analysis of these alternative technologies.

PUBLIC AND AGENCY PARTICIPATION

Preparation of the HHSEGS alternatives analysis included staff’s participation in two publicly-noticed issues resolution workshops in Tecopa, California, and several status conferences that were held before the Energy Commission in Sacramento. Comments from the public and intervenors on the alternatives analysis were considered by staff in determining the scope and content of the analysis. Included here is a summary list of topics pertaining to the alternatives analysis that were presented by commenters and addressed by staff:

- *Request to include an analysis of the bloom box technology (i.e., Bloom’s Energy Server™ or solid oxide fuel cells) in the analysis of project alternatives* – A discussion of solid oxide fuel cells is included in **Alternatives Appendix-2, Other Renewable Energy Technologies**.
- *Request to include a photovoltaic alternative* – A utility-scale photovoltaic alternative is included in this alternatives analysis. Refer to the section below, “Alternatives Evaluated in Detail,” for a full analysis of this alternative.
- *Request to include an analysis of distributed generation* – A discussion and analysis of distributed generation is provided below.

Staff also coordinated with Inyo County staff on the content and scope of the alternatives analysis, including an analysis of the potential land use effects of the off-site alternative that is evaluated by staff. Refer to the section below, “Sandy Valley Off-site Alternative,” for a full analysis of this alternative.

Comments submitted on the preliminary staff assessment (PSA) that was published by Energy Commission staff in May 2012 (Energy Commission 2012a) addressed the need for an alternative with a reduced site footprint. In response to those comments, staff has included an additional alternative at the proposed project site that would reduce the total acreage by approximately one-half. See the subsection below, “Reduced Acreage Alternative,” for a full analysis of this alternative.

ALTERNATIVES ELIMINATED FROM DETAILED CONSIDERATION

Section 15126.6(c) of the State CEQA Guidelines addresses the requirement to identify any alternatives that were considered by the lead agency but were rejected as infeasible and briefly explain the reasons underlying the lead agency's determination. Staff evaluated the potential for a 500-megawatt (MW) renewable energy facility to be constructed and operated in the Barstow preliminary renewable energy study area (RESA) and determined that it would not reduce or avoid any of the significant impacts of the proposed project. Staff researched and analyzed the potential for the *distributed generation* category of renewable energy production to be a potentially feasible alternative to the proposed project; the analysis and related conclusions are provided below. *Energy efficiency* strategies are critical to reducing energy consumption in the state. A full discussion of energy efficiency is provided below to acknowledge the importance of achieving all cost-effective energy efficiency for the state.

Barstow Preliminary Renewable Energy Study Area

Staff's work to identify potentially feasible alternatives included a review of the October 2011 Draft Preliminary Conservation Strategy (Draft PCS), which is a key part of the Desert Renewable Energy Conservation Plan (DRECP) under development by the Renewable Energy Action Team (REAT) (Energy Commission 2011a). The purpose of the DRECP is to ensure protection and conservation of California desert ecosystems while facilitating the review and approval of appropriate renewable energy development projects.

Development of the Draft PCS included identification of RESAs based on the presence of available renewable energy resources and a lower potential for conflicts with conservation goals. The Draft PCS map synthesizes physical, biological, and land use data and is based on key biological elements identified by REAT agencies.

The first preliminary draft of the RESAs includes an area of approximately 249,400 acres near the city of Barstow. Acreages depicted in the Barstow RESA are summarized in **Alternatives Table 2**.

Alternatives Table 2 Acreages in the Barstow Renewable Energy Study Area by Preliminary Conservation Strategy (PCS) Map Category	
PCS Map Categories	Barstow RESA (acres)
Agriculture	5,563
Developed Lands	18,550
Legally and Legislatively Protected Areas ¹	2,046
Lower Biological Value Areas	44,312
Military Lands	3,565
Moderate to High Biological Value Areas	141,968
Off-Highway Vehicle Lands	—

Alternatives Table 2 Acreages in the Barstow Renewable Energy Study Area by Preliminary Conservation Strategy (PCS) Map Category	
PCS Map Categories	Barstow RESA (acres)
Other Managed and Designated Areas ²	33,378
State Vehicle Recreation Area Lands	—
Total	249,382
Source: Energy Commission 2011a	
Notes:	
¹ These areas include lands that have legal or legislative mandates for natural resource protection and are predominantly federally and state-owned lands.	
² These areas include public lands with specific designations for the management of biological resources.	

In addition to the city of Barstow, smaller communities in the area include Hinkley, Lenwood, Daggett, Yermo, and Newberry Springs. The Barstow-Daggett Airport is a general aviation airport located in Daggett. The airfield includes two runways; aircraft operations averaged 100 per day for the 12-month period ending June 22, 2011 (AirNav 2011). **Alternatives Figure 2** shows the Barstow RESA and the surrounding area.

The Barstow RESA includes the junction of Interstates 15 and 40 (I-15 and I-40) and segments of these highways east of Barstow. SR 58 and SR 247 enter the western part of the Barstow RESA and end at I-15 near Barstow. The Burlington Northern Santa Fe Railway (BNSF Railway) and Union Pacific Railroad (UPRR) provide long-haul freight service across the western two-thirds of the country. BNSF Railway and UPRR each operate double-track railroad lines that cross the Barstow RESA. The railroads parallel I-15 and I-40 in the eastern portion of the study area. AMTRAK's Southwest Chief route provides passenger service on the BNSF Railway from Los Angeles to Chicago. The Southwest Chief passenger trains travel through the Barstow area twice each night.

The Barstow RESA is within the planning area of the West Mojave Plan, which was adopted in 2006 by the U.S. Bureau of Land Management (BLM) as an amendment to the California Desert Conservation Area (CDCA) Plan. The purpose of the West Mojave Plan is twofold: (1) present a comprehensive strategy to conserve and protect the desert tortoise, Mohave ground squirrel, and over 100 other sensitive plants and animals and the natural communities they inhabit; and (2) provide a streamlined program for complying with the requirements of the California and federal Endangered Species Acts (BLM 2006).

The amended CDCA plan established a 1 percent threshold for new ground disturbance in the Habitat Conservation Area covered by the CDCA plan. New *areas of critical environmental concern* (ACEC) were established, including the Mojave fringe-toed lizard ACEC shown on **Alternatives Figure-2**. New ACECs were established for management of desert tortoise conservation and recovery, including the Fremont-Kramer *desert wildlife management area* (DWMA), Superior-Cronese DWMA, and Ord-Rodman DWMA (BLM 2006) (**Alternatives Figure-2**). Other agencies did not adopt the habitat conservation plan proposed in the West Mojave Plan to cover their jurisdictions;

therefore, the adopted plan applies only to public lands (BLM 2012). Part of the Mojave River crosses the Barstow RESA. Most of its flow is underground while its surface channels remain dry most of the time.

East of Barstow Area

The eastern portion of the Barstow RESA east of Barstow includes rural residential uses and a military base. Preparation of the alternatives analysis for the Ivanpah Solar Electric Generating System (ISEGS) project included an analysis of a potential off-site alternative on approximately 4,000 acres of disturbed private land between the Mojave River and I-15 (**Alternatives Figure-2**). The California Department of Fish and Game (DFG) Camp Cady Wildlife Area is located immediately south of the former alternative site. The alternatives analysis for ISEGS concluded that the private land alternative should be eliminated from consideration due to its potential to cause significant impacts on many environmental resources (Energy Commission 2009a).

The Energy Commission's website documenting renewable energy projects that are undergoing review includes a list and maps of projects (Energy Commission 2012b). Projects mapped in the east side of the Barstow RESA include the 1,500-acre Riverbluff PV Solar Farm, which is identified as a point on the REAT 2011 project tracking map at the former site of the ISEGS private land alternative. If the Riverbluff project is constructed as planned, it would have a generating capacity of 230 MWs. A much smaller solar PV project called Solutions for Utilities Phase 1 and 2 is also mapped in the east side of the Barstow RESA. It is listed as a 3-MW project on 22 acres. The smaller sizes of the two PV projects relative to the proposed HHSEGS project indicate that the area may be best suited for renewable energy projects with smaller profiles overall compared to the proposed project.

The railroads that parallel I-15 and I-40 effectively hem in the east side of the Barstow RESA. Based on staff's review of the area using Google Maps images, the railroad crossings are grade crossings. Moving equipment, people, and construction materials to the area would likely be impossible without construction of at least one road bridge over the railroad. Staff observes the considerable challenges that would accompany coordination with BNSF or UPRR. Staff concludes that development of a large-scale renewable energy facility in this area is unlikely to provide a feasible alternative to the proposed project.

Harper Dry Lake Area

Harper Dry Lake is in the western portion of the Barstow RESA. The Abengoa Mojave Solar Project (AMSP) is under construction next to Harper Dry Lake (**Alternatives Figure-2**). The Solar Electric Generating Systems VIII and IX facilities are immediately northwest of the AMSP site. These renewable energy projects are surrounded by lands being managed by BLM for desert tortoise conservation. Other lands in this part of the Barstow RESA are crossed by one of the two major railroads in the region, SR 58, and the Mojave River. Development of additional utility-scale renewable energy facilities in this area is unlikely to provide a feasible alternative to the proposed project.

Distributed Generation

Overview

Governor Jerry Brown's Clean Energy Jobs Plan identifies a goal of installing 20,000 MWs of new renewable capacity by 2020, including 12,000 MWs of localized electricity generation (i.e., distributed generation [DG])² (Energy Commission 2011b). These targeted renewable capacity goals support California's RPS program goals.

There is no single accepted definition of renewable DG. The *2011 Integrated Energy Policy Report* published by the Energy Commission provides this definition: "For the purposes of the 12,000 MWs of renewable distributed generation by 2020 goal, distributed generation is defined as: (1) fuels and technologies accepted as renewable for purposes of the Renewables Portfolio Standard; (2) sized up to 20 MWs; and (3) located within the low-voltage distribution grid or supplying power directly to a consumer" (Energy Commission 2012c). As of 2011, a total of approximately 3,000 MWs of renewable DG capacity has been installed; another 6,200 MWs is pending or authorized under existing state programs that support DG.

Distributed solar facilities vary in size from kilowatts to tens of megawatts and do not require transmission to get to the areas where the electricity is used. Renewable DG technologies like small PV can be located in industrial areas on previously disturbed land or on existing residential, industrial, or commercial buildings. Standards, codes, and fees vary widely for DG projects, and land use requirements for identical systems can vary significantly from jurisdiction to jurisdiction. Efforts at the national, state, and local levels are underway to identify and provide solutions to barriers to permitting renewable DG facilities (Energy Commission 2011b).

CPUC oversees two incentive programs for customer-side of the meter DG (also called *on-site generation* or *self generation*) for customers in the territories of PG&E, San Diego Gas & Electric (SDG&E), and Southern California Edison Company (SCE) (CPUC 2012). The customer-side DG programs include several existing, new, and emerging distributed energy sources, including solar electric. The Energy Commission oversees related incentive programs.

The programs supporting on-site solar projects include CPUC's California Solar Initiative, the Energy Commission's New Solar Homes Partnership, and a variety of solar programs offered through publicly owned utilities. The overall goal of these programs is to encourage Californians to install 3,000 MWs of solar energy systems on homes and businesses by 2016 (CPUC 2012). Generation from these facilities may or may not be able to produce excess electricity exported to the distribution or transmission system, but all are connected to the electric grid (Energy Commission 2011b).

² The total 20,000 MWs from the Governor's Clean Energy Jobs Plan includes 8,000 MWs of utility-scale renewable capacity from wind, solar, and geothermal projects.

CPUC has implemented policies and programs related to procurement of utility-side DG (also called *wholesale* or *system-side generation*) (CPUC 2012). Under its investor-owned utility (IOU) solar PV programs, CPUC authorized PG&E, SDG&E, and SCE to own and operate PV facilities and to execute solar PV power purchase agreements with independent power producers through a competitive solicitation process. Based on decisions issued by CPUC in 2009 and 2010, these programs will yield up to 1,100 MWs of new solar PV capacity in the next few years. The energy produced under the solar PV programs will contribute to meeting the state's RPS program goals.

CPUC provides incentives for the development of DG through its Self-Generation Incentive Program (SGIP) (CPUC 2012). This program provides financial incentives for installing new, qualifying, self-generation equipment that meets all or a portion of the electric energy needs of a facility. SGIP administrators include PG&E, SCE, Southern California Gas Company, and the California Center for Sustainable Energy. Eligible fuels for eligible SGIP generating technologies include several renewable and non-renewable fuels. In 2009, SB 412 modified SGIP to require identification of distributed energy resources that will contribute to greenhouse gas (GHG) reduction goals. In 2011, SGIP facilities supplied enough electricity to power over 116,000 homes.

CPUC's Renewable Auction Mechanism (RAM) was created for the procurement of renewable DG projects generating from 3 MWs up to 20 MWs of electricity. CPUC adopted RAM in 2010 to encourage development of resources that can use existing transmission and distribution infrastructure and contribute to the state's RPS program in the near term. CPUC initially authorized the large IOUs to procure 1,000 MWs through RAM by holding four competitive auctions over 2 years. Total procurement was expanded in early 2012 to 1,299 MWs. Project eligibility and viability is determined by the IOUs based on the offerer's ability to demonstrate the following:

- *Site Control* – 100 percent site control obtained through direct ownership, lease, or an option to lease or purchase that may be exercised when the RAM contract is awarded.
- *Development Experience* – One member of the development team has completed at least one project of similar technology and capacity or has begun construction of at least one other similar project.
- *Commercialized Technology* – The project is based on a commercialized technology.
- *Interconnection Application* – An interconnection application has been filed.

Other programs in the state are designed to help offset the costs of installing rooftop PV systems on affordable and low-income housing. For example, the Los Angeles Department of Water and Power (LADWP) relaunched its solar incentive program. As part of the program, LADWP staff is investigating options for making solar affordable for lower income households (Energy Commission 2012c).

If existing state programs to support DG, including solar PV, are fully successful, the state could add approximately 6,000 MWs of additional capacity in the next several

years. Additional programs or incentives may be needed to attain the 2020 goal specified in the Governor's Clean Energy Jobs Plan (Energy Commission 2011b).

Decision to Eliminate this Category of Renewable Energy Generation from Detailed Consideration

Comments received during the proceedings for previous siting cases for utility-scale (greater than 20 MWs) renewable energy projects (e.g., ISEGS) have included requests that the review of project alternatives include a distributed generation photovoltaic (DGPV) project. Both *concentrated* and *distributed* types of systems result in production of electricity from renewable sources (i.e., both use solar technologies). However, the characteristics of the DG category of renewable energy generation make it an impracticable alternative in the context of a CEQA alternatives analysis.

As discussed above, CEQA does not require consideration of “every conceivable alternative to a project...” (Cal Code Regs., tit. 14, § 15126.6[a]). CEQA does not require consideration of “an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative” (Cal Code Regs., tit. 14, § 15126.6[f][3]). Staff concludes that a DGPV alternative is unlikely to provide a feasible alternative to the proposed project based on the following discussions and analysis:

- *Lack of Defined Projects with Sites* – Compared to a large project such as HHSEGS that is proposed for construction on a defined site, a *renewable DG alternative* is amorphous and impossible to analyze. Some renewable DG projects are carried out by proponents and agencies at defined sites; however, the existence of renewable DG projects does not mean that a DG alternative as a category of renewable energy generation could be a valid alternative to a larger generation project such as HHSEGS. The feasibility of a renewable DG alternative is extremely speculative. Given that the location and characteristics of such an alternative is unknown, no method is available to verify whether a collection of DGPV projects totaling several hundred MWs of electrical generation has ever been installed as an alternative to the proposed HHSEGS project.
- *No Oversight or Permitting Authority for a DGPV Alternative* – DG projects are generally initiated and installed or constructed under the jurisdiction of local governments by public utilities, private developers or residents and business owners, and others. Potential sites could be distributed across several local municipalities; and widely varying codes, standards, and fees among local governments with jurisdiction over DG projects is one of the challenges identified for developers (Energy Commission 2012c). The general plans and zoning ordinances of local jurisdictions may address environmental screening and review for large-scale renewable projects, but not for DG projects.
- *Voluntary Participation in On-site Generation Programs* – Participation in the state's on-site generation incentive programs (described above) is based on decisions made by individual residents and property and business owners. Participation in the incentive programs is elective; no laws or regulations mandate installation of on-site renewable energy systems; and utilities do not approve or deny DG systems on private property. Although the importance of the state's DG incentive programs

cannot be overstated, it is not possible to treat a conglomeration of DGPV (or other types of DG) projects as a potentially feasible alternative to a utility-scale renewable energy project such as the proposed project.

- *Failure to Meet Critical Project Objectives* – Critical project objectives for HHSEGS include those addressing development of a renewable energy facility that will contribute to meeting the state’s RPS program goals. Based on electricity supply and demand forecast reports prepared by Energy Commission staff, as well as expert witness testimony in prior proceedings (e.g., the ISEGS siting case), renewable DG projects alone would not supply enough electricity to meet the state’s mandated RPS program goals. Energy generation to meet the RPS program goals needs to come from a mix of renewable sources, and not merely one to the exclusion of others. Various agency publications identify the need to increase renewable generating capacity from DG and utility-scale sources; both are essential to successfully meeting RPS program goals. Therefore, rejection of the proposed HHSEGS project on the grounds that some renewable DG projects will be built would be inconsistent with the state’s RPS program objectives. Such a decision would also be inconsistent with the HHSEGS’ project goals of helping to meet such objectives.

Energy Efficiency

In 2003, the principal energy agencies in the state jointly created and adopted the *Energy Action Plan* (EAP), which identifies goals and actions to eliminate energy outages and excessive price spikes in electricity and natural gas (Energy Commission and CPUC 2003). The EAP states the importance of having reasonably priced and environmentally sensitive energy resources to support economic growth and attract new investments that will provide jobs and prosperity for California consumers and taxpayers. The EAP envisions a “loading order” of energy resources to guide agency decisions: (1) the agencies will optimize all strategies for increasing conservation and energy efficiency to minimize increases in electricity and natural gas demand, (2) recognizing that new generation is necessary and desirable, the agencies intend to meet the need first by renewable energy resources and distributed generation, and (3) because the preferred resources require both sufficient investment and adequate time to “get to scale,” the agencies will support additional clean, fossil-fueled, central station generation (Energy Commission and CPUC 2003). Section 454.5(b) of the California Public Utilities Code addresses requirements for an electrical corporation’s proposed procurement plan, including the requirement to “first meet its unmet resource needs through all available energy efficiency and demand reduction resources that are cost effective, reliable, and feasible.”

In 2008, an update to the EAP was published that examines the state’s ongoing actions in the context of global climate change following passage of AB 32. The updated EAP iterates how the EAP represents a collaborative process that is subject to change and updating over time. The EAP does not supersede or replace the extensive efforts of the Energy Commission’s *Integrated Energy Policy Report* (IEPR), which remains the overall guiding document on energy policy. The IEPR addresses a wide range of issues pertaining to the state’s electricity, natural gas, and transportation fuel sectors. The EAP

is intended to capture recent changes in the policy landscape and describe activities to accomplish those policies (Energy Commission and CPUC 2008).

In its discussion on energy efficiency, the 2008 EAP update refers to strategies identified in the 2006 *California Climate Action Team Report*, explaining that “nearly one-quarter of the emission reductions identified from existing or known strategies in 2020 would come from some form of energy efficiency investment, either through improved building codes or appliance standards, utility energy efficiency programs, or smart growth strategies” (Energy Commission and CPUC 2008). The 2008 EAP update and the 2011 IEPR discuss the significance of AB 2021, which was enacted in 2006 to further the goal of achieving all cost-effective energy efficiency. AB 2021 requires the Energy Commission, in consultation with CPUC, to develop statewide energy efficiency potential estimates and targets for California’s investor-owned and publicly owned utilities. Progress toward meeting the targets is reported in the current biennial IEPR (Energy Commission 2012c). In December 2011, Energy Commission staff published the final report, *Achieving Cost-Effective Energy Efficiency for California 2011–2020*, which summarizes utility progress and recommends improvements for publicly owned utility efficiency efforts (Energy Commission 2012c).

The 2008 EAP update also discusses CPUC’s strategic planning process to develop comprehensive, long-term strategies for making energy efficiency a way of life for Californians. CPUC adopted California’s first *Long-Term Efficiency Strategic Plan* in 2008, which was developed through a collaborative process with CPUC’s regulated utilities—PG&E, SCE, SDG&E, and Southern California Gas Company—and many other key stakeholders. The long-term plan provides a statewide roadmap to maximize achievement of cost-effective energy efficiency in California’s electricity and natural gas sectors from 2009 through 2020 and beyond. CPUC’s 2011 update to the *Energy Efficiency Strategic Plan* (CPUC 2011) is a comprehensive plan with goals and strategies covering all major economic sectors in the state.

As described in the 2011 IEPR, California’s energy efficiency policies, programs, and energy standards for buildings and appliances in the last three decades have contributed to keeping the state’s per capita electricity consumption relatively constant while energy use in the rest of the country has increased by approximately 40 percent (Energy Commission 2012c). In addition to achieving all cost-effective energy efficiency, California’s energy efficiency policies include reducing energy use in existing buildings and achieving *zero net energy* building standards. Reducing building energy use to zero net energy is accomplished by combining greater energy efficiency and on-site clean energy production.

In its discussion on reducing energy use in existing buildings, the 2011 IEPR states that more than half of the state’s 13 million residential units and more than 40 percent of commercial buildings were built before building and appliance efficiency standards were implemented (Energy Commission 2012c). AB 758 directed the Energy Commission to develop, adopt, and implement a comprehensive statewide program to reduce energy consumption in existing buildings and report on that effort in the IEPR. The Energy Commission shares responsibility with CPUC, local governments, and utilities to

coordinate residential and commercial building retrofit programs. Completion of needs assessments and development of action plans is continuing. Other joint efforts are planned and intended to achieve improved compliance with building and appliance standards and ensure that energy efficiency measures and equipment are properly installed and delivering savings.

The Energy Commission, CPUC, and the California Air Resources Board have adopted a goal of achieving zero net energy building standards by 2020 for residential buildings and 2030 for commercial buildings (Energy Commission 2012c). In September 2011, CPUC released its *2010–2012 Zero Net Energy Action Plan* for the commercial building sector. The Energy Commission regularly updates its building efficiency standards to reflect new technologies and strategies consistent with the goal of achieving 20 to 30 percent energy savings in each triennial update. Appliance standards are being updated to include electronics and other devices plugged into electrical outlets.

Decision to Eliminate Energy Efficiency Strategies from Detailed Consideration

The loading order specified in the EAP does not bind the Energy Commission to analyze particular project alternatives, and energy efficiency measures alone would not satisfy the project objectives and are not intended to replace all central station renewable energy facilities in the state. Staff’s analysis of a range of potentially feasible alternatives, including the No-Project Alternative (evaluated below), does not reduce or eliminate opportunities for conservation and energy efficiency.

ALTERNATIVES EVALUATED IN DETAIL

CEQA requires consideration of “a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation. An EIR is not required to consider alternatives which are infeasible” (Cal. Code Regs., tit. 14, § 15126.6[a]). Feasible is defined as “capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors” (Cal. Code Regs., tit. 14, § 15364).

Project alternatives were selected based on their potential to satisfy most of the basic project objectives discussed above under, “Alternatives Screening,” and their potential to reduce or avoid the significant impacts identified for the proposed project.

The analysis below evaluates six alternatives to the proposed project:

- No-Project Alternative
- Sandy Valley Off-site Alternative (same technology as the proposed project)
- Solar Power Tower (SPT) with Energy Storage Alternative (at the HHSEGS site)
- Solar Photovoltaic Alternative (at the HHSEGS site)
- Parabolic Trough Alternative (at the HHSEGS site)

- Reduced Acreage Alternative (at the HHSEGS site)

The proposed HHSEGS project would contribute to a net reduction in GHG emissions from power generation. Net GHG emissions for the state's integrated electric system will decline when new renewable power plants are added that: (1) meet eligibility requirements for renewable energy resources in the state; (2) improve the overall efficiency, or GHG emission rate, of the electric system; and (3) serve increasing load (i.e., energy use) or energy capacity needs more efficiently, and with fewer GHG emissions, compared to fossil-fueled generation. Each of the project alternatives would result in a net benefit in reducing GHG emissions. Because solar thermal power plants with energy storage may not require a natural gas supply for project operations, they may displace more fossil fuel use and are more effective at reducing GHG emissions compared to solar thermal power plants without energy storage.

Summary discussions are provided below comparing the environmental effects of the proposed HHSEGS project to the project alternatives and the No-Project Alternative. Environmental impacts that could potentially occur under a project alternative but that would not occur under the proposed project are also discussed. A summary table comparing the potential impacts of the proposed project to the potential impacts of the project alternatives and the No-Project Alternative is provided in **Alternatives Appendix-3**.

The Energy Commission has the exclusive authority to license thermal power plants in the state with a generating capacity of 50 MWs or greater; therefore, state and local land use plans, policies, and regulations that would be applicable to a project alternative discussed below would be covered under the Energy Commission's in lieu permitting authority.

NO-PROJECT ALTERNATIVE

The State CEQA Guidelines require that, among other alternatives, a no-project alternative shall be evaluated in relation to the proposed project. The no-project alternative analysis must "discuss the existing conditions at the time...environmental analysis is commenced, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services" (Cal. Code Regs., tit. 14, § 15126.6[e][2]). As required by CEQA, a No-Project Alternative has been included to allow a comparison of the impacts of approving the proposed HHSEGS project with the impacts of not approving the proposed project.

An EIR was prepared in 1974 by the Inyo County Planning Department for a project to subdivide and develop several thousand acres in Pahrump Valley, an area that includes the present site for the proposed HHSEGS project north of the Old Spanish Trail Highway (referred to as Parcel 86 in the 1974 EIR) (Inyo County 1974). The owner-trustee of the land intended to convert the area that was subdivided and approved for development into 20-acre family farms, and evidence remains showing a dirt road grid system at the site. The proposed HHSEGS site includes approximately 170 lots. However, no significant development occurred, no improvements were implemented,

and no development-related or public services infrastructure was brought to the site or area near the site. It has been close to 40 years since the area was approved for development, and no residences or other occupied structures were ever constructed at the proposed HHSEGS site.

Inyo County officials states that the HHSEGS project site has “significant environmental assets that are just beginning to attract some specialty visitors, such as ecotourists and geologists....While the availability of such a large parcel of privately owned land is unique, the Charleston View area has yet to reach an economic takeoff point” (Inyo County 2012a). Although this statement indicates that Inyo County staff is evaluating ideas for future uses of the area that are consistent with existing zoning at the site, no plan is under consideration that “would be reasonably expected to occur in the foreseeable future if the project were not approved” (Cal. Code Regs., tit. 14, § 15126[e][2]). (Refer to the **Land Use** section of this staff assessment for a discussion of general plan designations and zoning districts for the HHSEGS project site.) The Inyo County letter acknowledges the “uncertainty concerning the availability of sufficient water to support major commercial, recreational or residential developments.” Inyo County staff’s ideas for future uses of the site may not be realized for many years, and the extent to which water supply could limit development potential is not presently known.

Staff states in the PSA for the proposed project that “[t]he proposed HHSEGS site is currently undeveloped, vacant private land” (Energy Commission 2012a). In comments on the PSA, the applicant disagrees that the site is undeveloped and states that “[t]he site is partially developed by graded roads, distribution lines, and existing wells” (Hidden Hills Solar I and II, LLCs 2012a). In August 2011, a Phase I Environmental Site Assessment (Phase I ESA) was prepared for the proposed HHSEGS project (Hidden Hills Solar I and II, LLCs 2011b). The Phase I ESA characterizes the site and vicinity and describes the HHSEGS site as “undeveloped, vacant land.” Site improvements are described to include a fenced weather station on the west-central portion of the site and an abandoned orchard on the south-central margin of the site. It is stated that “[n]o other observable improvements were noted on the subject site.” Land to the north, west, south, and east is described as “generally undeveloped” except for the Charleston View rural residential area south of the project site.

The Phase I ESA describes the six historic groundwater supply wells at the site, four of which are along the Old Spanish Trail Highway. An underground electrical line runs from the wood-pole electrical line along the Old Spanish Trail Highway to a groundwater well and pump box panel in the former orchard area. In the site information questionnaire completed by the major site owners and included in the Phase I ESA, all questions pertaining to structures or buildings at the site are answered as “N/A” or “none.” In answering the question on site history, it states that “[t]here was some cattle grazing on the land years ago, and part of the land (the southern part of Section 28) was used to grow melons and peaches.” Energy Commission staff participated in a site visit to the proposed HHSEGS site on October 27, 2011; based on direct observations during the site visit and other evidence, including site descriptions in the Phase I ESA, staff confirms that the HHSEGS site is undeveloped and vacant. As stated above, no

residential development has occurred in the area covered by the 1974 EIR, including the proposed HHSEGS site. In theory, under the No-Project Alternative, the potential exists for minor land use changes to occur at the site (e.g., construction of a few residences). In comments submitted to the Energy Commission on the No-Project Alternative from the Inyo County Counsel's Office, these facts on the 40-year-old subdivision are presented (Inyo County 2012b):

- Fewer than six residential building permits have been issued for the Charleston View area, including the proposed project site, during the past 10 years.
- No plans have been identified to construct any residential units on any of the lots should the proposed project not proceed.
- The site is located in an area with very limited services.
- The site sits within a short commute to areas with large housing stock, including Pahrump and Las Vegas.
- Current economic predictors suggest residential development of the proposed project site is unlikely in the near future.

Moreover, the overdraft status of the groundwater basin may create further barriers to full development of the lots located on the proposed project site (Inyo County 2012b). Based on available information, the No-Project Alternative is characterized by the continuation of existing conditions at the HHSEGS site. No action would be taken. No renewable energy project would be constructed and operated at the HHSEGS site. No other use is reasonably foreseeable; therefore, it is assumed that existing conditions would persist at the site absent the proposed project. The Phase I ESA for the proposed project describes the site as undeveloped, vacant land. The mere existence of subdivided property does not make development of this relatively isolated area reasonably foreseeable.

Continuation of existing conditions under the No-Project Alternative has the potential to affect certain resource areas to varying degrees. The subsections that follow summarize how minor changes in land use from relatively low intensity uses at the existing HHSEGS site could affect environmental resources at and near the site.

Biological Resources

Under the No-Project Alternative, minor land use changes are reasonably foreseeable. Shadscale scrub, Mojave creosote scrub, and desert washes compose on-site habitat, and these communities would remain primarily intact with minimal losses to development expected. Wildlife inhabit the project area, using it for food, shelter, and breeding; because the site is undeveloped, wildlife are able to move through the area without encountering barriers. Although the area has previously been disturbed by road grading work and agricultural use, extant wildlife abundance and diversity indicate the ongoing biological functionality of the site. This has been well documented by the project applicant, and is evidenced by the presence of rare plants and the *state listed as threatened* desert tortoise.

Even the minor land use changes that could potentially occur on the site would reduce available habitat and could introduce edge effects to the environment such as dust and proliferation of weeds. Continued anthropogenic uses (e.g., off-road vehicle use, camping, or other unauthorized recreational uses) would contribute to degradation of the site and could cause injury or even mortality of wildlife species. Any further site degradation would affect plant and wildlife assemblages by reducing their abundance, distribution, and health. These effects would be minor compared to the proposed HHSEGS project. Impacts on special-status plants, waters of the U.S., and waters of the state under the No-Project Alternative would be **much less compared to the proposed project**. Similarly, impacts on desert tortoise and other special-status wildlife would be **much less compared to the proposed project**. No impacts on avian species would occur from collisions with structures or exposure to concentrated solar flux.

The Pahrump Artesian Aquifer underlying the proposed project site has been in overdraft since the last century (Buqo 2004), with groundwater being pumped at a rate higher than the recharge rate of the aquifer. Groundwater levels are expected to continue to decline, causing adverse impacts on groundwater-dependent vegetation, and subsequently, wildlife that inhabit the area or forage on that vegetation. Without the proposed project, impacts on groundwater dependent plants and wildlife species under the No-Project Alternative would be **somewhat less than the proposed HHSEGS project**.

Cultural Resources

Reasonably foreseeable human activities under the No-Project Alternative would include intermittent use of the site for unauthorized recreational uses. Continued drawdown of local subsurface aquifers due to regional overuse of the resource would also occur. Natural erosion and burial of archaeological deposits would continue as would the degradation of built-environment resources. While the natural and human-induced changes would vary from baseline conditions, staff does not interpret the changes to meet the threshold for consideration as effects in the context of planning for the proposed project. The changes represent the anticipated evolution of the baseline for the project area as well as for many parcels in the vicinity. These effects under the No-Project Alternative would be **much less than HHSEGS**.

Soil and Surface Water

Under the No-Project Alternative, intermittent recreational uses could cause potential soil erosion from occasional vehicle use, and the possibility of litter could cause contamination of storm water runoff. The proposed project would include grading of roughly 440 acres during construction and would add 851 acres of impervious area (equal to about 27 percent of the site) and another 189 acres of graded dirt roads. While the proposed project would require implementation of Best Management Practices and conditions of certification to protect soil and water resources, the No-Project Alternative comparison to the proposed project assumes continuation of existing conditions, which also accounts for the possibility of minor land use changes occurring at the site. Although the site would continue to gradually degrade under the No-Project Alternative,

impacts on soil and surface water would be **much less than the proposed HHSEGS project**.

Water Supply

Under the No-Project Alternative, continued anthropogenic uses, including minor development and use of the site for unauthorized recreational uses, could contribute to overdraft in the Pahrump groundwater basin, if groundwater pumping occurred.

Under the No-Project Alternative, groundwater levels would be expected to continue to decline. The aquifer underlying the project has been in overdraft since the last century, and this trend would likely continue (Buqo 2004). Without the proposed project, impacts from potential drawdown of local wells and impacts on groundwater basin balance would be **somewhat less than HHSEGS**.

SANDY VALLEY OFF-SITE ALTERNATIVE

Overview

This alternative would consist of constructing and operating an approximately 500-MW solar power tower (SPT) project at the Sandy Valley alternative site. The project elements and major facility components of this alternative would be similar to those of the proposed project. The Sandy Valley Off-site Alternative borders the state boundary with Nevada approximately 20 miles southeast (as the crow flies) of the proposed HHSEGS project site. The unincorporated town of Sandy Valley, Nevada, borders the state line. According to 2010 U.S. Census data, a total of 2,051 people were living in Sandy Valley. The community included 811 housing units at an average density of 14.5 units per square mile. USGS topographic maps for the area show a sedimentary basin, Mesquite Valley, straddling the border between Nevada and California in the region encompassing the study area for the Sandy Valley Off-site Alternative.

The project applicant responded to staff's data requests for additional information on a potential off-site alternative in the Sandy Valley area (Hidden Hills Solar I and II, LLCs 2012b). The project applicant provided a map showing a potential 3,119-acre alternative site at the southeast corner of Inyo County. Portions of two parcels included in the project applicant's alternative site overlap with lands managed by BLM in the Pahrump Valley Wilderness to the west. To avoid these particular BLM properties, Energy Commission staff changed the boundary for the Sandy Valley study area. **Alternatives Figure 3** shows the study area for the Sandy Valley Off-site Alternative that has been evaluated by staff.

The altered Sandy Valley study area encompasses approximately 3,354 acres in Inyo and San Bernardino counties. A total of approximately 657 acres in the Sandy Valley study area are federally-owned vacant land; based on available land ownership data, two parcels identified as "government land" are likely managed by BLM. The remaining approximately 2,697 acres are in private ownership. Based on parcel data maintained by Inyo and San Bernardino counties, staff estimates that the properties are owned by 24 individual owners.

The lengths of the linear corridors for the transmission line and the natural gas pipeline for the Sandy Valley Off-site Alternative may be shorter than the linear corridors for the proposed project. The project applicant identified a possible alignment for a generation tie (gen-tie) line to the proposed Valley Electric Association 500-kilovolt (kV) transmission line. The natural gas pipeline to connect the proposed HHSEGS project to the Kern River Gas Transmission (KRG T) pipeline would be approximately 35 miles long. The natural gas pipeline to connect to the KRG T pipeline for the Sandy Valley Off-site Alternative would be either 14½ or 15½ miles long depending on the route. **Alternatives Figures 4 and 5** shows possible alignments for the linear corridors. Like the proposed project, the transmission line and natural gas pipeline would be constructed in Nevada.

Potential to Attain Project Objectives

CEQA requires an alternatives analysis to “describe a range of reasonable alternatives to the project...which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project...” (Cal. Code Regs., tit. 14, § 15126.6[a]).

Development of an approximately 500-MW SPT project at the Sandy Valley alternative site could potentially meet the project objectives related to construction and operation of a utility-scale renewable electrical generation facility, which would lead to the sale of renewable energy and contribute to achieving California’s renewable energy goals; approval of amendments to the PPAs by CPUC could be required. This alternative could potentially satisfy the project objectives addressing the requirement to comply with applicable LORS and avoid or minimize significant impacts to the greatest extent feasible. This alternative would satisfy the project objective to develop a renewable energy facility in an area with high solar value and minimal slope. See the discussions below under, “Environmental Analysis,” for general analyses of the potential environmental effects of this alternative compared to the proposed project.

The project objectives include an objective to develop a renewable energy facility capable of providing grid support by offering power generation that is flexible. In general, a resource’s flexible capacity is based on its operational flexibility, which is the resource’s ability to respond to dispatch instructions from the California Independent System Operator (CAISO). Flexibility is characterized, in part, by a resource’s ability to be dispatched, and ramped up and down to produce or curtail energy production. A resource’s degree of flexibility is largely qualitative, and a resource’s flexibility at any particular time can vary depending on the status of that resource (e.g., whether it’s online or off-line) or other operating parameters (e.g., already at full load, or the operating range of the resource) (CAISO 2012). CAISO is developing detailed policies on flexible capacity procurement to reliably operate the electrical grid as additional variable resources come online to meet the state’s 33 percent renewable energy target. The retirement of aging natural gas-fired resources, including the once-through-cooled resources in the next 10 years is contributing to the need for additional flexible capacity (CAISO 2012).

Integrating variable energy resources such as wind and solar “requires increased operational flexibility, notably the ability to provide services to match real-time upward and downward movements and at *ramp rates* faster than what is generally provided today” (Energy Commission 2011b)³. Ramping capability balances the less predictable energy production patterns of renewable resources such as wind and solar. For natural gas facilities, the degree of flexibility generally relates to engine design. A simple-cycle natural gas-fired power plant is highly flexible based on its ability to start or stop quickly and ramp up and down rapidly. A combined-cycle natural gas-fired power plant has the ability to create additional energy from steam, thereby increasing its efficiency compared to a simple-cycle gas-fired plant. Although a combined-cycle gas-fired plant can provide more efficient capacity and energy, it generally has longer start-up times; therefore, it is less flexible than a simple-cycle gas-fired plant. Newer designs for simple-cycle gas-fired plants have resulted in increased operating efficiencies, and some newer combined cycle plants have shortened start-up times.

Solar PV and wind power are intermittent resources that have no inherent upward ramp capability; these two fuel sources (sunshine and wind) are ineligible to provide flexible ramping capacity (CAISO 2012). Because these energy sources are variable, solar PV and wind power are incapable of responding to dispatch instructions and needs. Solar PV and wind increase the need for other flexible resources to assist in the integration of these variable resources.

Solar thermal technologies that do not include energy storage (e.g., the proposed project) generally have lower ramping capabilities compared to solar thermal with energy storage and are not specifically considered by CAISO to provide flexible capacity. Solar thermal technologies without integral thermal storage (e.g., the Ivanpah Solar Electric Generating System) rely on natural gas-fired steam boilers to provide thermal input in the morning and during periods of cloud cover. The solar thermal characteristics of the proposed project enhance its ability to maintain some stability and consistency in the MWs of electricity produced during periods of cloud cover. The proposed HHSEGS project has some operational flexibility during daylight hours that slightly increase its value to the electrical grid system compared to a solar PV project. For example, the proposed project could be operated to respond to a request from CAISO to curtail energy production, but conversely, the proposed project could not ramp up unless it was operating at less than full load, and the solar fuel was available (i.e., the sun was shining).

Solar thermal technologies with energy storage can store excess energy when on-line generation exceeds load (Energy Commission 2011b). Adding thermal storage to a concentrating solar power plant can result in generation of dispatchable electricity depending on daily resource constraints.

³ Balancing electricity generation to load, while maintaining the voltage and frequency within operational tolerances, is achieved through resource commitment and dispatch. Fitting any particular generating unit into that process, whether conventional or renewable, is called integration. Integration is generally invisible to the consumer and allows generation and load (i.e., use) to be in harmony (Energy Commission 2011b). Ramping capability is typically expressed as MW per minute.

The project objectives also address obtaining site control and use within a reasonable time frame. Defining what is meant by a reasonable amount of time in the context of the time line for the proposed HHSEGS project is debatable. It is possible that the end of a reasonable time period defines the point at which schedule delays could cause the proposed project to become infeasible, but that point is not currently known. Given the number of property owners at the Sandy Valley Off-site Alternative, staff assumes that obtaining site control and use within a reasonable time period would be difficult and achieving this project objective might not be possible.

The Sandy Valley Off-site Alternative could potentially satisfy five of the seven project objectives. Like the proposed project, this alternative would have a limited ability to satisfy the project objective addressing operational flexibility. The objective to obtain site control and use within a reasonable period of time is also relevant to the discussion of potential feasibility of this project alternative (see below), and it is key to the success of the project. It is not known whether this project objective could be attained.

Potential Feasibility Issues

Staff submitted data requests for information on the potential feasibility and viability of constructing and operating a utility-scale renewable energy facility at the Sandy Valley alternative site. The applicant's data responses identify 16 property owners for the smaller site footprint in the Inyo County portion of the Sandy Valley area. In the data responses, the applicant states that "the feasibility of securing site control from this many property owners renders this alternative site infeasible from a transactional, financial, and project development scheduling perspective" (Hidden Hills Solar I and II, LLCs 2012b). In other responses to staff's data requests, the applicant states the following (Hidden Hills Solar I and II, LLCs 2011b):

Sandy Valley may have a sufficient amount of private land to accommodate the HHSEGS project, but many of the private parcels located in Sandy Valley are currently being used for agricultural purposes. Even assuming that the agricultural lands might be available for sale, land consolidation and landowner cooperation is expected to be too time consuming and costly to obtain site control within a reasonable time period and certainly not in time for planned commercial operations, targeted for the first/second quarter of 2015 .

The statement by the applicant regarding the plan to achieve commercial operation of the project by the first or second quarter of 2015 refers to the applicant's project objectives, which are listed in the "Executive Summary" of the application for certification for the HHSEGS project (Hidden Hills Solar I and II, LLCs 2011a).

The issue of land ownership fragmentation is a topic that was generally addressed as part of the Renewable Energy Transmission Initiative (RETI), which is a California stakeholder process involving development of a conceptual plan to expand the state's electric transmission grid (Energy Commission 2009b). Work on the RETI process included identifying, characterizing, and ranking Competitive Renewable Energy Zones (CREZ) in California and neighboring regions. Areas potentially suitable for solar thermal development (referred to as *proxy* solar projects) were represented on RETI

maps as square areas containing 1,280 acres (2 square miles). Some of the extensively parcelized private lands are near existing infrastructure or are disturbed. Although these lands otherwise appear to be suitable for renewable energy development, proxy projects on properties with 20 or more different landowners were removed from the RETI maps or reshaped to conform to the threshold of 20 landowners per 2-square-mile area.

This 20-landowner criterion was chosen by the CREZ Revision Working Group based on the experience of solar and wind project developers. As a practical matter, increased development costs associated with negotiating land lease or purchase agreements with many landowners (e.g., 40 landowners at a theoretical 4-square-mile project site) could cause such projects to become uneconomical (or infeasible). Staff's study area for the Sandy Valley Off-site Alternative includes 3,354 acres; approximately 24 landowners are identified as owning property in the 5.24-square-mile area. This ratio is well under the threshold discussed in the 2009 RETI report. Nevertheless, securing site control at the Sandy Valley site would be challenging. Gaining site control of federally-owned properties could further complicate the work to secure site control.

The applicant responded to staff's data request for information on any private lands potentially for sale in the Sandy Valley area and described a site visit to the Sandy Valley area on February 3, 2011 (Hidden Hills Solar I and II, LLCs 2012b). No signs advertising property for sale were observed during the site visit. Online research conducted by the applicant indicated that, on average, privately owned properties in the Sandy Valley area of the state had not changed ownership for over 10 years. Most had changed ownership no more than once after the original land purchase or construction date, which was generally reported to be the late 1970s to early 1980s. The applicant states that no properties were listed for sale. Of the privately owned properties at the 3,119-acre alternative site delineated by the applicant, one property had been sold since 2008. It is possible that no property owners are considering selling property at the Sandy Valley alternative site; it is also possible that property owners would consider selling to an interested buyer.

In responses to staff's data request on the viability of the Sandy Valley Off-site Alternative, the applicant explains that bilateral negotiations with each landowner would be the only way to secure site control. The applicant describes how the "high number of parcels involved increases the risk that a landowner could choose not to sell, lease or option the parcel to Applicant, and increases the risk that other landowners may 'hold out' from agreeing to terms to obtain a better deal" (Hidden Hills Solar I and II, LLCs 2012b). The potential feasibility of gaining site control cannot be determined without additional research on the potential to secure site control of properties at the alternative site.

A February 2012 article in the Los Angeles Times reported on some of the successes of land brokers who have been purchasing thousands of acres in the Mojave Desert for possible utility-scale solar energy development (Los Angeles Times 2012). Some land brokers work for solar developers to negotiate land purchases from multiple property owners. Strata Equity Group is a real estate investment company that purchased

approximately 11,500 acres in the West Mojave for solar development. The purchase involved 66 land parcels that were owned by 40 landowners. Of the total acreage, approximately 6,000 acres were owned by one landowner. The total land purchase was completed in 4 years (Flodine, pers. comm., 2012). Purchases of properties are sometimes complicated by title exceptions on specific properties (e.g., mineral rights, various easements, road rights). It could take over 2 years to assemble the necessary acreage for a project at the Sandy Valley alternative site (Flodine, pers. comm., 2012). Whether or not site control and use could be obtained within a reasonable period of time would depend substantially on when negotiations were started relative to the overall project schedule.

The feasibility of obtaining site control and use at the Sandy Valley Off-site Alternative is not clear; however, gaining site control and use is essential to the success of the project. Given the greater number of property owners at the alternative site, it is assumed that gaining site control would delay the project schedule. It is not known at what point a project schedule delay would affect the feasibility of the project altogether.

Environmental Analysis

Alternatives Table 3 presents a summary comparison of impacts of the proposed HHSEGS project to the same or similar potential impacts of the Sandy Valley Off-site Alternative. The comparison of impacts to the proposed project is conveyed using these terms in a graded scale:

- Much less than HHSEGS
- Less than HHSEGS
- Somewhat less than HHSEGS
- Similar to HHSEGS
- Same as HHSEGS
- Somewhat greater than HHSEGS
- Greater than HHSEGS
- Much greater than HHSEGS

Impact conclusions for the proposed project and the comparative impacts for the alternatives are shown using these abbreviations:

— = no impact

B = beneficial impact

LS = less-than-significant impact, no mitigation required

SM or PSM = significant or potentially significant impact that can be mitigated to less than significant

SU or PSU = significant and unavoidable or potentially significant and unavoidable impact that cannot be mitigated to less than significant

Comparative discussions for each environmental topic area follow the table. As stated above, **Alternatives Appendix-3** contains a complete summary table comparing the potential impacts of the proposed project to the potential impacts of the project alternatives and the No-Project Alternative.

Alternatives Table 3 Summary Comparison of the Proposed Project's Impacts to the Sandy Valley Off-site Alternative		
Environmental Effect	Proposed Project	Sandy Valley Off-site Alternative
Air Quality		
Construction-related emissions	SM	Similar to HHSEGS (SM)
Project operations emissions	SM	Similar to HHSEGS (SM)
Biological Resources		
Impacts on special-status plant species	SM	Much less than HHSEGS (SM)
Impacts on waters of the U.S. and waters of the state	SM	Much less than HHSEGS (SM)
Impacts on desert tortoise	SM	Much less than HHSEGS (SM)
Impacts on special-status terrestrial wildlife species (other than desert tortoise)	SM	Much less than HHSEGS (SM)
Impacts on avian species from collisions with project features (see biological resources note)	PSU	Similar to or somewhat greater than HHSEGS (PSU)
Impacts on avian species from exposure to concentrated solar flux	PSU	Similar to or somewhat greater than HHSEGS (PSU)
Potential impacts on groundwater dependent ecosystems	PSM	Somewhat less than HHSEGS (PSM)
Biological resources note: Collisions could be secondary to exposure to concentrated solar flux.		
Cultural Resources		
Potential to disturb, destroy, or visually degrade significant prehistoric and historical archaeological sites <i>on</i> the site (see cultural resources note)	LS	Somewhat greater than HHSEGS (PSM)
Potential to disturb, destroy, or visually degrade significant prehistoric and historical archaeological sites <i>beyond</i> the site	SU	Similar to HHSEGS (PSU)

**Alternatives Table 3
Summary Comparison of the Proposed Project's Impacts
to the Sandy Valley Off-site Alternative**

Environmental Effect	Proposed Project	Sandy Valley Off-site Alternative
Potential impacts on significant built-environment cultural resources <i>on</i> the site	SM	Similar to HHSEGS (PSM)
Potential impacts on significant built-environment cultural resources <i>beyond</i> the site	SU	Similar to HHSEGS (PSU)
Potential to disturb, destroy, or visually degrade significant ethnographic resources <i>on</i> the site	SU	Similar to HHSEGS (SU)
Potential to disturb, destroy, or visually degrade significant ethnographic resources <i>beyond</i> the site	SU	Similar to HHSEGS (SU)
Cultural resources note: "Site" means the facility site proper and does not include linear or ancillary infrastructure away from the facility site.		
Fire Protection		
Potential impacts on local fire protection resources	PSM	Similar to HHSEGS (PSM)
Potential impacts on emergency response services	PSM	Similar to HHSEGS (PSM)
Geology and Paleontology		
Potential impacts from strong seismic shaking	SM	Similar to HHSEGS (PSM)
Potential impacts from soil failure caused by liquefaction, hydrocollapse, formation of soil fissures, and/or dynamic compaction	SM	Similar to HHSEGS (PSM)
Potential impacts on paleontological resources	SM	Similar to HHSEGS (PSM)
Potential impacts on geological or mineralogical resources	LS	Similar to HHSEGS (LS)
Hazardous Materials		
Potential for release of hazardous materials to occur on-site	SM	Similar to HHSEGS (PSM)
Potential for release of hazardous materials to occur off-site	SM	Similar to HHSEGS (PSM)
Land Use		
Conflicts or inconsistencies with general plan land use designations and zoning	SU	Similar to HHSEGS (SU)
Conversion of agricultural land	—	Much greater than HHSEGS (SM)
Noise and Vibration		
Potential for noise to impact noise-sensitive receptors	PSM	Somewhat greater than HHSEGS (PSM)

Alternatives Table 3 Summary Comparison of the Proposed Project's Impacts to the Sandy Valley Off-site Alternative		
Environmental Effect	Proposed Project	Sandy Valley Off-site Alternative
Public Health		
Potential for project construction to cause air toxics-related impacts that could affect public health	LS	Similar to HHSEGS (LS)
Potential for project operations to cause air toxics-related impacts that could affect public health	LS	Similar to HHSEGS (LS)
Socioeconomic Resources		
Construction employment and increased taxes and fees	B	Similar to HHSEGS (B)
Displacement of existing rural residences	—	Greater than HHSEGS (LS)
Potential impacts on emergency medical and law enforcement services	PSM	Similar to HHSEGS (PSM)
Traffic and Transportation		
Potential impacts on roadway infrastructure	SM	Similar to HHSEGS (SM)
Potential for glint and glare to cause safety hazards or a distinct visual distraction effect from an operator control perspective (i.e., vehicle drivers and aircraft pilots)	PSM	Similar to HHSEGS (PSM)
Potential for construction equipment and/or permanent structures to exceed 200 feet in height above ground level	SM	Similar to HHSEGS (SM)
Transmission Line Safety and Nuisance		
Potential for impacts related to aviation safety, hazardous shocks, nuisance shocks, and electric and magnetic field exposure	SM	Similar to HHSEGS (SM)
Visual Resources		
Construction-Related Impacts		
Potential to substantially degrade the existing visual character or quality of the site and its surroundings	SU	Similar to HHSEGS (SU)
Potential to create a new source of substantial light or glare which would adversely affect day or nighttime views in the area	SU	Similar to HHSEGS (SU)
Project Operations Impacts		
Potential to substantially degrade the existing visual character or quality of the site and its surroundings	SU	Similar to HHSEGS (SU)
Potential to create a new source of substantial light or glare which would adversely affect day or nighttime views in the area	SU	Similar to HHSEGS (SU)
Waste Management		

Alternatives Table 3 Summary Comparison of the Proposed Project's Impacts to the Sandy Valley Off-site Alternative		
Environmental Effect	Proposed Project	Sandy Valley Off-site Alternative
Potential for disposal or diversion of project materials to cause impacts on existing waste disposal or diversion facilities	SM	Similar to HHSEGS (PSM)
Potential for impacts on human health and the environment related to past or present soil or water contamination	PSM	Somewhat greater than HHSEGS (PSM)
Soil and Surface Water		
Soil erosion by wind and water during project construction	SM	Similar to HHSEGS (SM)
Soil erosion by wind and water during project operations	PSM	Similar to HHSEGS (PSM)
Water quality impacts from contaminated storm water runoff	SM	Same as HHSEGS (SM)
Water quality impacts from storm damage	PSM	Similar to HHSEGS (PSM)
Water quality impacts from power plant operations	SM	Same as HHSEGS (SM)
Water quality impacts from sanitary waste	SM	Same as HHSEGS (SM)
Potential impacts from on-site and off-site flooding	SM	Similar to HHSEGS (SM)
Potential to impede or redirect 100-year flood flows, as shown on Federal Emergency Management Agency maps	LS	Similar to HHSEGS (LS)
Water Supply		
Potential impacts on local wells	PSM	Similar to HHSEGS (PSM)
Potential impacts on groundwater basin balance	PSM	Similar to HHSEGS (PSM)

Air Quality

Environmental Setting

The study area for the Sandy Valley Off-site Alternative is located in two of the state's air pollution control districts (APCDs). The jurisdictional boundary for the two APCDs in the Sandy Valley study area coincides with the boundary between Inyo and San Bernardino counties. Like the proposed project, the northern half of the study area for this alternative is in the Great Basin Unified Air Pollution Control District (GBUAPCD), which covers the state's Great Basin Valleys Air Basin. The southeastern portion of this air basin exceeds the state 1-hour ozone standard and the state 24-hour particulate

matter standard for particles with a size of less than 10 microns in diameter (PM10). The air basin is in attainment or unclassifiable for all of the federal standards and the state standards for carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), and particulate matter with a particle size less than 2.5 microns (PM2.5). Refer to the **Air Quality** section of this staff assessment for additional information on the Great Basin Valleys Air Basin and the GBUAPCD.

The southern half of the study area for this alternative is in the Mojave Desert Air Quality Management District (MDAQMD). The Mojave Desert Air Basin covers an area that includes the MDAQMD. The portion of the study area for the Sandy Valley Off-site Alternative that is in the Mojave Desert Air Basin is designated unclassified for the federal 8-hour ozone ambient air quality standard and for the federal PM10 ambient air quality standard. The area is in attainment or unclassified for all other federal standards and averaging times. The portion of the alternative site that is in the Mojave Desert Air Basin has been designated moderate nonattainment for the state ozone ambient air quality standard and is also designated nonattainment for the state PM10 ambient air quality standard. The area is in attainment or unclassified for all other state standards. Local rules of the MDAQMD would apply to a project located in its jurisdiction. An entirely new Determination of Compliance from MDAQMD would also be required.

Environmental Impacts Pertaining to Both Air Basins

Exhaust emissions from heavy-duty, diesel construction equipment and fugitive particulate matter (dust) emissions would occur during project construction phases for the Sandy Valley Off-site Alternative. Exhaust emissions would also be caused during worker commute trips, hauling of equipment and supplies to the site, and operation of crew trucks (e.g., derrick trucks, bucket trucks, pickups). Workers and trucks hauling equipment and supplies would have to commute approximately 46 miles southwest to the alternative site, which is comparable to the driving distance to the proposed project site from the Las Vegas area. Approximately 50 percent of the workforce from California of the total employed workforce would be lodging in the Las Vegas area. Approximately 15 percent of the workforce would lodge and commute approximately 40 miles southeast to the alternative site from the city of Pahrump area, which is about 15 miles further compared to the distance between the proposed project site and the city of Pahrump. The remaining of those would presumably be lodging and commuting from Tecopa and Shoshone (Inyo County) and the distance would be about the same from the proposed project.

The proposed HHSEGS site is 20 miles northwest of the Sandy Valley Off-site Alternative site (as the crow flies). Under this alternative, appropriate conditions of certification for potential impacts on air quality at the Sandy Valley alternative site would likely involve similar, locally-oriented recommendations such as the conditions of certification presented in the **Air Quality** section of this staff assessment.

The preliminary staff assessment for HHSEGS was prepared with input from the GBUAPCD preliminary determination of compliance (PDOC) document for the proposed HHSEGS project. The HHSEGS project would comply with GBUAPCD rules and regulations.

Construction and operation of the energy facility at the Sandy Valley Off-site Alternative site would likely achieve compliance with GBUAPCD rules and regulations, for the emitting sources located in the area under the jurisdiction of GBUAPCD.

Like the proposed HHSEGS project, this alternative would emit some greenhouse gases (GHGs). However, construction and operation of a renewable energy facility at the Sandy Valley alternative site would contribute to meeting the state's RPS program goals, and it would result in a net cumulative reduction of GHG emissions as new and existing fossil fuel-fired electricity resources would be displaced.

Electricity is produced by operation of interconnected generation resources. Operation of one renewable energy power plant at the proposed project site or the Sandy Valley alternative site would affect all other power plants in the interconnected system. Operation of a renewable energy power plant at the Sandy Valley alternative site would generally affect the overall electricity system and GHG emissions levels.

These system impacts would result in a net reduction in GHG emissions across the electricity system providing energy and capacity to California. Like the proposed project, the Sandy Valley Off-site Alternative would result in a cumulative overall reduction in GHG emissions from power plants. This alternative would not worsen current conditions or make a cumulatively considerable contribution to any significant cumulative impact associated with GHGs.

Conclusion for Air Quality Impacts

Exhaust emissions from heavy-duty, diesel construction equipment and fugitive particulate matter (dust) emissions would be essentially the same for the Sandy Valley Off-site Alternative compared to the proposed HHSEGS project.

Construction and operational emissions at the Sandy Valley alternative site would be **similar to HHSEGS** for emitting sources.

Biological Resources

Biological resources staff toured the Sandy Valley Off-site Alternative study area on January 19, 2012. The California Natural Diversity Database (CNDDB) for the Sandy Valley study area (DFG 2012) was reviewed before the site visit, along with aerial imagery. The dominant land use is agriculture, with a network of irrigation drainages and pivots, and wind rows between crop fields. Agricultural uses have fragmented and degraded native habitat in the area. Goodding's phacelia (*Phacelia pulchella* var. *gooddingii*), a special-status plant, is recorded in the study area. Staff notes that the area has probably not been subject to biological surveys; therefore, negative CNDDB results are inconclusive as to the presence of special-status plants, wildlife, and habitat. Mesquite bosques are mapped south of the Sandy Valley Off-site Alternative site (DFG 2012), and as a phreatophytic vegetation type, could be impacted by declines in groundwater supply. All mesquite-dominant communities are rare in California and Nevada (Crampton et al. 2006; Sawyer et al. 2009). Given the widespread agricultural uses and resultant degradation of natural habitat and drainage patterns in the study

area, impacts on special-status plants, habitats, waters of the U.S., and waters of the state would be **much less than at the proposed HHSEGS site**.

No threatened or endangered wildlife are known to inhabit the area, and remaining native vegetation would likely not support threatened or endangered wildlife species such as the desert tortoise (*Gopherus agassizii*), which is *state and federally listed as threatened*. Impacts on special-status wildlife species would be **much less than at the HHSEGS site**. Under this alternative, potential impacts on terrestrial biological species and habitats at the Sandy Valley Off-site Alternative site could be reduced to less than significant with implementation of mitigation measures.

Avian impacts would stem from loss of habitat, collisions with project features, and injury or mortality from exposure to concentrated solar flux in the airspace over the heliostat field. Operational impacts of the proposed project would mainly affect avian species, including raptors, through exposure to concentrated solar flux. While little research-based data exists regarding the effects of power tower technology on avian species, it has been noted that agriculture can attract certain species of birds and bats. A scientific study in the *Journal of Field Ornithology* (McCrary et al. 1986) includes a recommendation that power tower projects “should not be sited in close proximity to open water or agricultural fields.” Therefore, impacts on avian species from exposure to concentrated solar flux would **similar to or somewhat greater than HHSEGS**. Feasible mitigation measures to reduce operational impacts on avian species to below a level of significance have not been identified; therefore, this impact would remain significant and unavoidable.

The same authors (McCrary et al. 1986) also noted collisions of birds with heliostats. It is not known if these collisions were secondary to exposure to concentrated solar flux, and it is possible that either retinal damage or damage to flight feathers resulted in collisions. It is also known that anthropogenic structures can polarize light. Polarization occurs when light reflects off the surfaces of built structures, altering the property of the light waves. Polarized light pollution can alter the ability of wildlife to seek out suitable habitat, elude or detect predators, and detect natural polarized light patterns, which can affect navigation and ultimately, dispersal and reproduction (Horváth et al. 2009). Polarized light pollution has been demonstrated to significantly disrupt insect breeding behavior (Horváth et al. 2010). With the potential attractive qualities of the nearby agricultural fields, avian impacts from collisions with project features such as the power towers, heliostats, and other elevated buildings and power lines would be **similar to or somewhat greater than HHSEGS**. Feasible mitigation measures to reduce operational impacts on avian species to below a level of significance have not been identified for the proposed project. Like the proposed project, this impact would remain significant and unavoidable under the Sandy Valley Off-site Alternative.

Groundwater levels in the aquifer underlying the Mesquite Valley have been declining since the latter part of the 1900s (California Department of Water Resources 2004), yet not to as great an extent as the decline in Pahrump Valley. Declines in groundwater levels primarily impact phreatophytes, or plants with deep roots that draw upon groundwater. Degradation of those types of plants may cause further degradation of the

environment and could impact associated special-status plants and wildlife. DFG has mapped mesquite bosques approximately 3 miles southeast of the Sandy Valley alternative site (DFG 2012). Mesquite is a phreatophyte. Staff has determined that impacts on the groundwater basin under this alternative would be “similar to HHSEGS” and could be mitigated to below a level of significance (see the subsection below, “Water Supply,” for this alternative). Agricultural use has likely limited the presence of unmapped phreatophytes in the Sandy Valley study area; therefore, the effect of declining groundwater levels on groundwater dependent species is **somewhat less than HHSEGS** under this alternative. For the proposed HHSEGS project, conditions of certification are recommended to reduce the level of significance for potential impacts on water resources. (Refer to the **Water Supply** section of this staff assessment for a discussion of groundwater resources.) The same or similar conditions of certification could also be implemented at the Sandy Valley site, which would reduce potentially significant impacts on groundwater-dependent species (e.g., mesquite bosques) to less than significant.

Cultural Resources

This analysis is based on information from records searches conducted on behalf of staff by the San Bernardino Archaeological Information Center and the Eastern Information Center of the California Historical Resources Information System, and the Harry Reid Center for Environmental Studies at the University of Nevada, Las Vegas. Staff also relied on draft results of primary ethnographic research conducted by staff for the proposed project. Staff’s analysis of available maps and remote imagery contributed key information. Absent more intensive research on the Sandy Valley Off-site Alternative site, the conclusions of this analysis have a significant margin of error.

Based on the discussions below of the environmental contexts and potential effects of the Sandy Valley Off-site Alternative on cultural resources, impacts under this alternative would be **somewhat greater than those of the proposed HHSEGS project**.

Environmental Setting

Natural Setting

The present climate in the proposed project region represents a moderately dry and harsh period relative to the last 12,000 years, the minimum timeframe for a human presence in the Mojave Desert. Since the late Pleistocene epoch (prior to 10,000 years ago), Mojave Desert climate can be split into three broad phases:

- *Pleistocene* – This geological epoch was much more moist or mesic relative to the present climate, which led to the development of a number of large permanent lakes on the floors of the region’s valleys.
- *Early Holocene* – The lakes slowly evaporated during the early Holocene epoch (10,000 years ago to present) as the climate progressively became more arid.

- *Mid-Holocene Altithermal* – The period from approximately 5000 to 3000 B.C. marks a time of extreme aridity, often referred to as the mid-Holocene Altithermal (Antevs 1948), and the final desiccation of the lakes in the region.

The climate since approximately 3000 B.C. has typically been more mesic relative to conditions during the Altithermal, and evidence indicates particularly wet periods from approximately 1000 B.C. to A.D. 1, and again from approximately A.D. 500 to 1400 (Bamforth 1990, p. 72).

Cultural Setting

Prehistory

A more comprehensive discussion of the prehistory of the eastern Mojave Desert and the vicinity of the Pahrump and Mesquite valleys is in the **Cultural Resources** section of this staff assessment. The background information providing the broader prehistoric context for the proposed project site also applies to the alternative site.

The prehistory of the eastern Mojave Desert is the narrative of how human populations have adapted to marked fluctuations in the local environment over at least the last 12,000 years. The archaeological remains of the region's prehistory are relatively scarce. Sparse scatters of stone tools and chipped stone tool manufacturing debris, and isolated artifacts, resources that typically yield information of marginal value, account for 40 to 60 percent of the archaeological remains found in the Mojave and Colorado Deserts. A relative paucity of intact buried archaeological deposits contributes further to the dearth of information on the prehistory of the region (Lyneis and Macko 1986, p. 52). The availability of water and the location of high-value resource patches in otherwise unproductive habitats appear to influence the distribution of the archaeological sites on the desert landscape (Lyneis and Macko 1986, p. 57; Sutton et al. 2007, p. 230). The broad trajectory of cultural development in the Mojave Desert may be characterized by the steady decline in residential mobility as local populations began to occupy increasingly larger valley or basin bottom base camps, in a few preferred locations and over longer periods of time, rather than working out of temporary camps in particularly productive environmental zones (Bamforth 1990, p. 74).

Ethnography

A broader ethnographic context for the Pahrump Paiute, the Native American community with the most direct apparent connection to the Sandy Valley Off-site Alternative study area, is in the **Cultural Resources** section of this staff assessment. Most, if not all of the background information provided as the broader ethnographic context for the proposed project site also applies to the alternative site.

The Sandy Valley study area is in the Pahrump Paiute Tribe's ancestral territory. The valley rests between two tribal districts. The Potosi District east of the study area is traditionally represented by Chief To-ko'-pur, who was widely referred to as Chief Tecopa. He was also the head Chief for the larger seven-district ancestral territory of the Pahrump Paiute tribe. Chief Tecopa passed away in 1904. The Mo-quats District west of the study area was represented by Chief Hu-nu'na-wa. The Sandy Valley study

area was part of a commonly used area between the two districts. The Potosi District's center is Potosi Mountain, and the Mo-quats District's center is Kingston Peak. Several springs exist around the flanks of each mountain, which were centers for family units that seasonally traversed the districts' mountains, lower flanks, valley floors and the washes that drain the mountain slopes and eventually lead to Mesquite Dry Lake. Some of the significant springs that anchored family units in the vicinity of the Sandy Valley alternative study area are Potosi Spring, Cave Spring, Horsethief Spring, and Cave Spring. Although Pahrump tribal families have since moved away from the springs to Pahrump or Las Vegas or other areas, the Sandy Valley area and the mountains to the east and west of the valley are still used by Pahrump Paiute for traditional purposes.

History

Various historic-era transportation corridors/roads traverse the valley, and late-19th century homesteads and mines and mining-related features dot the region. The Sandy Valley Off-site Alternative site is between the Goodsprings and Ivanpah mining districts and in the Old Spanish Trail-Mormon Road corridor. Goodsprings Mine and Ivanpah Mine are approximately 15 miles east and 40 miles south of the Sandy Valley alternative site, respectively.

Extant Alternative Site Information

Cultural Resource Inventory

Results of the records searches conducted for the Sandy Valley Off-site Alternative indicate a relative dearth of cultural resources on the alternative site; however, one previous investigation is recorded for the alternative site (Knight and Leavitt 2003). An intensive pedestrian survey was done together with a land exchange between the American Gear Reduction Company, BLM's Barstow Field Office, and Death Valley National Park. A total of approximately 3,747 acres was surveyed on six discontinuous parcels. Parcels 2 and 3 (Knight and Leavitt 2003, Survey Area Maps 2 and 3 of 4, respectively) of the survey area cover a total of approximately 573 acres of the Sandy Valley Off-site Alternative site, which represents approximately 17.1 percent of the 3,354-acre site. The survey of parcels 2 and 3 resulted in the discovery of one prehistoric archaeological deposit (CA-SBR-12121) of groundstone fragments, chipped stone debris, and fire-affected rock; one complete prehistoric sandstone metate (CHRIS Primary No. 36-020480); one historical archaeological site (CA-SBR-12124H), a probable former homestead that includes a grave from 1940, a wellhead, and two historic refuse scatters; two complete glass condiment jars dating to the 1940s and recorded as one historical archaeological isolate (CHRIS Primary No. 36-020488); and the remains of what may be an historic irrigation ditch (CA-SBR-12123H). Study of available maps and remote imagery reveal a few scattered homes and farming operations on some properties in the study area. (See the "Land Use" subsection below for a description of land uses on the alternative site.) The buildings on the site appear to consist of non-historic age single-family homes and associated structures (e.g., sheds, detached garages, etc). Historic aerial photographs show the circular patterns of the sprinkler systems in use after 1958. The 1989 aerial photograph shows only one of the six irrigated crop circles from the earlier photograph.

The prehistory and history of the Sandy Valley area are generally known, and this investigation shows a cultural resources inventory that is broadly consistent with expectations. Prehistoric materials largely include sparse, isolate chipped stone debris, and rarely, small, more diverse deposits of chipped stone, groundstone, and fire-affected rock. These artifacts represent a light, transitory prehistoric use of the Mesquite Valley floor approximately 8 miles northwest of the center of Mesquite Lake playa. The character of the known archaeological deposits along the valley margins and the zone of relict former shorelines around Mesquite Lake indicate, at least, a later, more intensive prehistoric use of those areas. Most of the known historical archaeological materials on the alternative site represent the cycle of homesteading that General Land Office records indicate took place from approximately 1925 through 1936. Built-environment resources, including buildings, structures, and linear infrastructure elements, show evidence of the mid- to late-20th century farming operations and rural residential uses in the area. A segment of an apparent wagon road that has been identified as the 1880s Hay Road terminates outside of the alternative site's south-central boundary. No further evidence of the road has been identified on the alternative site.

A complete analysis of the potential effects of the Sandy Valley Off-site Alternative on cultural resources would require an assessment of the uses of the known inventory of archaeological and built-environment resources on the site. Extant data limitations would be identified and also considered. The prior archaeological data represents a small portion of the floor of the Mesquite Valley that did not include the valley margins where prehistoric archaeological deposits are more likely to be found. Therefore, the sample surveyed area may underrepresent the actual number of archaeological resources on the alternative site. Conversely, the mid- to late-20th century farming uses have probably disturbed or obliterated surface prehistoric and historical archaeological deposits in the area, which could also indicate potential losses of archaeological deposits in the valley margins. Farming uses might have obliterated the segment of the Hay Road that may have traversed the Sandy Valley study area. A pedestrian survey of the rest of the alternative site would be necessary to verify the extent of farming uses and note the locations and condition of disturbed archaeological deposits in those areas. This information would help establish the original frequency of surface archaeological deposits across the alternative site and also function as a potential index of the distribution of subsurface archaeological resources. The lack of information on the geoarchaeology of the alternative site and the limitations of the one extant pedestrian survey sample make it difficult to assess the potential presence of subsurface archaeological deposits and the effects of this alternative on any such deposits, if they are present. A built-environment reconnaissance or survey of the site would be necessary to verify the results of staff's analysis of available maps and remote imagery.

Complete studies have also not been conducted to identify all ethnographic resources in and around Sandy Valley. However, several resources were identified in the broader ethnographic studies for the proposed HHSEGS project, approximately 15 miles northwest of the Sandy Valley study area. These are the known ethnographic resources near the alternative site:

- *Potosi Mountain* – A vision questing place.
- *Sandy Valley* – The Coyote Trail Song goes through Sandy Valley. The valley is also the locale featured in a Pahrump Paiute legend concerning a large prehistoric bird, its large egg, and a Pahrump Paiute man that survives an encounter with the bird. The bird preyed upon humans.
- *Kingston Mountains* – A legend concerns Owl, who made his home in the Kingston Mountains. One of Owl's many feats was the creation of the Kingston Mountains as a way to turn the Colorado River towards its current course. The mountains continue to be a place where pinyon nuts are gathered, and bighorn sheep and deer are hunted.

Potential for Significant Cultural Resources and Character of Resource Values

Absent complete archaeological and built-environment surveys, a geoarchaeological analysis, and an ethnographic study, it is difficult to evaluate the likelihood of occurrence or character of any relatively intact, historically significant cultural resources that may be present on the alternative site or in its vicinity. Cultural resources may be on the alternative site or nearby that could potentially be historically significant for their informational and associative values. In general terms, resources could include relatively well-preserved transient prehistoric camps on the valley floor; larger, more long-term camps toward the valley margin; and archaeological remains of early-20th century homesteads. Based on this initial investigation, built-environment resources on the alternative site appear unlikely to be determined historically significant.

A number of linear cultural resources probably traverse and extend beyond the alternative site. Linear resources such as prehistoric trails or historic wagon roads, which have the potential to be historically significant for their informational and associative values, have probably been subject to significant degradation on the alternative site as a result of relatively recent farming activities, while the off-site portions of those resources, depending on the nuances of local land use history, may be largely intact. Any on-site trail and road segments may not have retained enough integrity to contribute to the potential historic significance of the whole linear resource(s). Intact off-site segments may retain their integrity. The alternative site and its vicinity are in the broader area of the Old Spanish National Historic Trail corridor. Intact segments of the Old Spanish Trail and the Mormon Road that relate to the broader management corridor and that could contribute to the historic significance of this National Historic Trail may exist within sight of the Sandy Valley Off-site Alternative study area. If that assumption is correct, those segments would be considered in a detailed analysis of this alternative.

The Sandy Valley Off-site Alternative could potentially degrade the visual integrity of archaeological, built-environment, and ethnographic resources both on the alternative site and in its vicinity. Off-site archaeological deposits and built-environment resources that may be historically significant for their associative values could potentially be subject to this visual degradation. Based on this initial investigation, off-site archaeological resources vulnerable to a substantive loss of integrity due to visual degradation would include clusters of the same types of transient prehistoric camps on

the valley floor that were found on the alternative site, and the larger, more long-term camps that could be present toward the valley margin. Without further analysis, it is difficult to envision how individual resources like these would be found to be historically significant for their associative values. It is possible that a multiple-deposit district of such resources, were such a district to be present in the vicinity of the alternative site, could have the potential to be historically significant for its associative values, and as a consequence, any potential loss of visual integrity would need to be considered.

Staff's review of satellite imagery and interpretation of visual vegetation association signatures indicate the potential presence of a mesquite bosque-coppice dune landscape component approximately 3.3 miles southeast of the alternative site. This vegetation association is along apparent former shorelines north of the Mesquite Lake playa that may be analogous in structure, integrity, and historic significance to the Pahrump Metapatch Mesquite Woodland-Coppice Dune Archaeological Landscape identified immediately northeast of the proposed project site. Both resources overlie the Pahrump Valley fault zone, which is a segment of the Stateline fault zone discussed in the **Geology and Paleontology** section of this staff assessment. The cultural resources analysis for the proposed HHSEGS project addresses the influence of the fault zone on creation and sustenance of the vegetation association of the archaeological landscape. Additional research would be needed to verify the presence of an analogous resource near the Sandy Valley alternative site.

Based on records search data that encompass a substantial portion of the unincorporated community of Sandy Valley, Nevada, it is unlikely that historically significant built-environment resources are present in the area that could be visually impacted by this alternative.

Environmental Effects and Mitigation Measures

Construction and operation of a renewable energy facility at the Sandy Valley alternative site could potentially physically disturb and visually degrade historically significant cultural resources both on and near the alternative site. Disturbance or destruction of prehistoric and historical archaeological sites that may be on the alternative site could also alter or destroy the integrity of the information for which individual sites may be of value. Mitigation measures would be required to compensate for the loss of those data sets for which each individual archaeological deposit had been found to be significant. Such mitigation measures typically include data recovery excavations.

The potential exists for this alternative to visually impact historically significant prehistoric or historical archaeological districts that may be identified in the vicinity of the alternative site. If further study confirmed the Pahrump Metapatch Mesquite Woodland-Coppice Dune Archaeological Landscape analog southeast of the site, mitigation measures would be required for the potential degradation of the setting, feeling, and association for any of these resources and the consequent inability of each respective resource to convey the associative values for which it had been found to be significant. Mitigation measures would specifically address the unique associative values for each impacted resource. Mitigation measures could include higher resolution resource

recordation, sharing of knowledge about subject resources through dissemination of public outreach materials, and implementation of compensatory mitigation.

Based on staff's analysis, any effects that construction and operation of the alternative facility could have on built-environment resources would primarily occur in the vicinity of the alternative site rather than *on* the alternative site. The one known built-environment resource on the alternative site is described above. The only remnants of historic era activity remaining on the site include fences, agricultural equipment, and cleared areas that have not yet been fully reclaimed by the desert. The presence and historic significance of the trail and road segments on and adjacent to the alternative site are unconfirmed; however, if any such resources are present, they may not have retained enough integrity to contribute to the potential historic significance of the whole linear resources. Segments adjacent to or near the alternative site may, in theory, retain such integrity, and could require mitigation measures similar to what is described above for the potential degradation or loss of archaeological resources and their respective associative values.

The potential for construction and operation of the alternative facility to significantly impact ethnographic resources is difficult to assess. Further focused study would contribute to a more substantive analysis of these resources, and as already noted, more comprehensive ethnographic work would be necessary to identify and evaluate a relatively complete inventory of local ethnographic resources. Based on this initial investigation, the alternative facility would constitute an intrusive visual element in Sandy Valley. This alternative would degrade views both from and toward Potosi Mountain and the Kingston Mountains. A more comprehensive analysis would be necessary to assess whether the alternative facility's visual effect on local ethnographic resources would qualify as a substantial adverse change in the significance of those resources determined to be eligible for listing in the California Register of Historical Resources. The Sandy Valley Off-site Alternative could potentially introduce intrusive visual elements into Sandy Valley at a scale that would exceed that of any other built visual elements in the valley. Mitigation measures would be required for the potential degradation of the integrity, setting, feeling, and association for significant ethnographic resources. Mitigation measures could include completing thorough ethnographic investigations to contextualize, document, and interpret the subject resources; and other measures to facilitate the preservation of Pahrump Valley Paiute culture. No feasible mitigation measures would resolve the significant visual effects of the alternative facility on the local ethnographic resources, and the impact would remain significant and unavoidable. A group of views in the valley and beyond that are critical to the fabric of Pahrump Valley Paiute culture would be irreparably compromised.

Comparison to the Proposed Project

Archaeological Resources

Construction and operation of the Sandy Valley Off-site Alternative could cause impacts on prehistoric and historical archaeological resources that would be **somewhat greater than the proposed project**. This off-site alternative may have a more diverse and potentially significant suite of both prehistoric and historical archaeological resources

that would most likely be subject to physical disturbance or destruction. No significant archaeological deposits are known to be located on the proposed project site. The potential effects of this alternative on archaeological resources beyond the alternative site would be comparable to the effects of the proposed project on such resources. The visual effects of this alternative on the potential Pahrump Metapatch Mesquite Woodland-Coppice Dune Archaeological Landscape analog southeast of the alternative site would, in theory, be roughly equivalent to the proposed project's visual effects on the identified Pahrump Metapatch Mesquite Woodland-Coppice Dune Archaeological Landscape. The net on-site effects of this alternative on archaeological resources would be **somewhat greater than those of the proposed project**, and off-site effects would be **similar to HHSEGS**.

Built-environment Resources

Regarding the built-environment cultural resources, development of a solar facility on the Sandy Valley Off-site Alternative site would most likely have a **similar level of effect compared to the proposed project**. A utility-scale renewable energy facility at either location has the potential to significantly impact different portions of the same resource—the Old Spanish Trail-Mormon Road. More site-specific information about the cultural resources on the Sandy Valley alternative site would better qualify this comparison.

Ethnographic Resources

Based on this initial investigation, the potential effect of this alternative on ethnographic resources in Sandy Valley would be **similar to the effects of the proposed project on analogous resources in the Pahrump Valley**. Like the proposed project, no feasible mitigation measures would reduce the significant visual effects of this alternative on local ethnographic resources to a less-than-significant level, and the impact would remain significant and unavoidable. Two groups of views critical to the fabric of Pahrump Valley Paiute culture would be irreparably compromised.

Fire Protection

Under the Sandy Valley Off-site Alternative, potential impacts on local fire protection resources would be similar to the impacts that would occur at the proposed HHSEGS project site. Similar to the proposed project, fire protection resources to serve the local communities are limited in the region that includes the study area for this alternative. Staff concludes that the impacts on local services would be **similar to the proposed HHSEGS project** for this off-site alternative. Impacts on fire protection from construction and operation of the proposed project are evaluated in the **Worker Safety / Fire Protection** section of this staff assessment. Like the proposed HHSEGS project, staff concludes that impacts on the local fire department would be significant under this alternative due to the predicted increase in emergency response calls during project construction and operation. Mitigation measures for these impacts would likely require payment of as yet undetermined project-specific fees to the local fire protection service to enable augmentation of resources such as staff, equipment, and facilities. With implementation of appropriate mitigation measures, impacts on local emergency services would be reduced to less than significant.

Geology and Paleontology

The Sandy Valley Off-site Alternative is located in the Mesquite Valley, approximately 17 miles southeast of the proposed HHSEGS site. Mesquite Valley is in an active geologic area along the border between southern California and southern Nevada, approximately 35 miles southwest of Las Vegas, Nevada, and 80 miles southeast of Death Valley. The alternative site could be subject to strong levels of earthquake-related ground shaking. The closest known active fault is a segment of the Stateline fault zone, which is immediately adjacent to the site's eastern boundary along the border between California and Nevada. Additional active faults in the vicinity are the Garlock fault (30 miles southwest of the alternative site) and the Southern Death Valley fault zone (33 miles southwest).

Mitigation measures would be required to reduce the effects of strong ground shaking on structures at the Sandy Valley Off-site Alternative site to the extent practicable. Mitigation measures would address structural design requirements consistent with requirements of the most recent edition of the California Building Code (CBC) (California Building Standards Commission 2010), which requires that structures be designed to resist seismic stresses from ground acceleration. Implementation of feasible mitigation measures would reduce potential impacts on structures that could be affected by strong ground shaking to less than significant.

The alternative site could also be subject to soil failure caused by liquefaction, hydrocollapse, formation of soil fissures, and/or dynamic compaction. A design-level geotechnical investigation would be required for this alternative consistent with CBC requirements (California Building Standards Commission 2010), and conditions of certification would be recommended, including implementation of standard engineering design requirements to reduce the effects of strong seismic shaking and potential excessive settlement due to collapsible soils, formation of soil fissures, and/or dynamic compaction. With implementation of mitigation measures, these impacts would be reduced to less than significant.

No known viable geologic or mineralogical resources are present at the proposed Sandy Valley Off-site Alternative site. Unique geological features (paleosprings) that exist east of the site are associated with fault scarps belonging to segments of the Stateline fault zone. There is no evidence of paleosprings on the site. However, channels and associated deposits formed by flows from these springs may traverse the site. Potential impacts on paleontological resources due to construction activities would be mitigated to less than significant through worker training and monitoring by qualified paleontologists.

Environmental Impacts Pertaining to Both Sites

Like the proposed project, the potential for geologic hazards to cause significant adverse impacts on this alternative's project facilities during its design life would be low. Similarly, the potential for construction, operation, and closure of either the proposed project or this alternative to cause significant adverse impacts on geological, mineralogical, and paleontological resources would be low. Like the proposed project,

design and construction of the Sandy Valley Off-site Alternative would be completed in accordance with all applicable LORS, and in a manner that protects environmental quality and assures public safety, to the extent practicable.

Environmental Impacts Compared to the Proposed Project

Due to the documented occurrence of fissure development in the Pahrump Valley, the proposed project has some susceptibility to soil failure caused by earth fissuring. Conversely, documentation of ground fissuring in the Mesquite Valley was not found. Therefore, the Sandy Valley Off-site Alternative has a lower susceptibility to ground fissuring than does the proposed project. Overall, potential impacts on geological and paleontological resources under this alternative would be **similar to HHSEGS**. As discussed above, implementation of all feasible mitigation measures would reduce potential impact on geological and paleontological resources to less than significant.

Hazardous Materials

Under the Sandy Valley Off-site Alternative, the project elements and major facility components would be similar to those associated with the proposed HHSEGS project. As discussed in the **Hazardous Materials** section of this staff assessment, conditions of certification requiring conformance with applicable LORS would reduce potentially significant impacts to less than significant. Staff did not identify any new or more severe significant off-site impacts posed by hazardous materials use at the alternative site. The potentially significant impacts under this alternative would be **similar to HHSEGS**.

Land Use

Environmental Setting

The study area for the Sandy Valley Off-site Alternative includes land in Inyo and San Bernardino counties. The Sandy Valley study area is sparsely developed with agricultural uses on some properties. Based on a review of Google Earth aerial images, several structures, including a few residences, are located in the study area near farmed properties. Parcels at the Sandy Valley study area are shown in **Alternatives Figure 3**. The subsections that follow describe the land use effects of a renewable energy facility at the Sandy Valley alternative site. Refer to the subsection, "Socioeconomic Resources," (below) for a discussion of the potential effects of this alternative on landowners.

Inyo County General Plan

The northern portion of the area identified as the Sandy Valley Off-site Alternative is designated Agriculture (A) in the Inyo County General Plan (Inyo County 2001). The Agriculture land use designation provides for agricultural uses on land that is suited for the production of food and fiber on a regular and sustained basis, limited agricultural support services, agriculturally-oriented services, agricultural processing facilities, public and quasi-public uses, and certain compatible nonagricultural activities (Inyo County 2001). The Agricultural Resources Element includes a goal to "provide and maintain a viable and diverse agricultural industry in Inyo County." Related Policies AG-1.2 and AG-1.3 address supporting continuance of agricultural production activities in the county

and discouraging the conversion of productive agricultural lands for urban development. The Land Use Element includes Policy LU-1.6, "Sandy Valley," which states that "[t]he County shall preserve agricultural and related open space uses on private lands in Sandy Valley and will not designate additional land for rural residential development." The Inyo County General Plan applies to all parts of the county, including lands that are managed by the federal government (Hart, pers. comm., 2012).

A February 23, 2012, letter from Inyo County to BrightSource Energy, Inc. describes Inyo County requirements to ensure consistency of the proposed project with the Inyo County General Plan (Inyo County 2012c). Inyo County staff lists options to bring the proposed project into consistency with the Land Use Element; these options also apply to the Sandy Valley Off-site Alternative (Hart, pers. comm., 2012). The applicant's first option is to submit a general plan amendment (GPA) to change the site's land use designation to General Industrial (GI). The second option is to process a GPA for a solar energy development land use designation or overlay that would be applied to the site.

The Sandy Valley Off-site Alternative is in the Open Space (OS) zoning district with a minimum parcel size of 40 acres; the same zoning district applies to the proposed HHSEGS site. Inyo County staff states that power plants are conditionally permitted only in the General Industrial and Extractive (M-1) zoning district (Inyo County 2012c).

Use of the northern portion of the Sandy Valley alternative site for construction and operation of the project would require local land use approvals from Inyo County, including a general plan amendment to ensure consistency of a utility-scale energy facility at the Sandy Valley alternative site with the Land Use Element. A zoning district change or zone text amendment (e.g., creation of a *solar energy zone* or similar overlay) would also be required. Other options to changing the zoning district include applying for a *planned unit development*, *renewable energy development agreement*, and/or a *renewable energy permit*. Each of these agreements would allow a waiver of zoning standards. Construction and operation of an approximately 500-MW renewable energy facility at the Sandy Valley Off-site Alternative site would be inconsistent with Inyo County's general plan land use designation and zoning district for the study area; without a general plan amendment and accompanying zoning change, this impact would be significant and unavoidable.

For the land use impact pertaining to potential conflicts with applicable land use plans, the impact would be **similar to HHSEGS** for the portion of the alternative project site that is in Inyo County. This conclusion is based primarily on discussions with Inyo County staff and planning issues outlined in the February 23, 2012, letter from Inyo County staff.

San Bernardino County General Plan

The southern portion of the area identified as the Sandy Valley Off-site Alternative is designated Resource Conservation (RC) in the San Bernardino County General Plan. This land use designation does not apply to two parcels in the Sandy Valley study area

that are managed by BLM (**Alternatives Figure 3**). The Resource Conservation land use zoning district⁴ is intended to encourage limited rural development while maximizing preservation of open space, watershed, and wildlife habitat areas; identify areas where rural residences may be established on lands with limited grazing potential; prevent inappropriate urban population densities in remote and/or hazardous areas of the county; and establish areas where open space and nonagricultural activities are the primary land uses, but where agriculture and compatible uses may coexist. Lands designated as Resource Conservation include “[a]reas with limited or no infrastructure facilities and where none are planned within the next twenty years” (San Bernardino County 2011).

The Sandy Valley Off-site Alternative is located in the Resource Management zoning district, which allows for electrical power generation with approval of a conditional use permit (San Bernardino County 2012). Chapter 84.29 of the San Bernardino County Development Code addresses specific use regulations that apply to the establishment, maintenance, and decommissioning of renewable energy generation facilities. The Resource Conservation land use zoning district is one of several identified in Subsection 84.29.040 as allowing development of renewable energy facilities (San Bernardino County 2012).

Use of the southern portion of the Sandy Valley alternative site for construction and operation of a renewable energy project requires local land use approvals from San Bernardino County, including a conditional use permit for construction of an electrical power generation facility in the Resource Management zoning district. Compliance with the standards and permit procedures of Chapter 84.29 of the San Bernardino County Development Code would be required.

For the land use impact pertaining to potential conflicts with applicable land use plans, the impact would be **less than HHSEGS** for the portion of the alternative project site that is in San Bernardino County. This conclusion is based primarily on the fact that a renewable energy facility is an allowable use in the Resource Conservation land use zoning district.

Conclusion Regarding Potential Inconsistencies with General Plan Land Use Designations and Zoning

For the Sandy Valley Off-site Alternative study area as a whole, the impact pertaining to consistency with applicable plans and policies is **similar to HHSEGS**, and the impact is significant and unavoidable without a general plan amendment and zoning district change.

⁴ San Bernardino County uses the term *land use zoning district* instead of *land use designation*; the latter term is more commonly used by local jurisdictions to identify designated land uses referenced in general plans.

Northern and Eastern Mojave Desert Management Plan

The study area for the Sandy Valley Off-site Alternative includes three noncontiguous parcels under federal management totaling approximately 657 acres (**Alternatives Figure 3**). These vacant, undeveloped parcels are presumed to be within the planning area of the Northern and Eastern Mojave Desert Management Plan (NEMO Plan), which was adopted in 2002 as an amendment to the CDCA Plan. The Record of Decision (ROD) approving the NEMO Plan describes several plan amendment decisions (BLM 2002). A partial list of topics addressed in the NEMO Plan includes the following:

- Establishment of regional standards for public land health and guidelines for grazing management.
- Establishment and management of areas for protection of sensitive species (e.g., desert tortoise).
- Management of areas for wild horses and burros.
- Identification of several river segments for potential inclusion in the National Wild and Scenic Rivers System.
- Establishment of the Amargosa River and Carson Slough Areas of Critical Environmental Concern in the Amargosa watershed.
- Identification of priorities for potential acquisition of private lands and disposal of public lands.

The Pahrump Valley Wilderness encompasses approximately 73,725 acres and is adjacent to the west side of the Sandy Valley Off-site Alternative. None of the properties composing the Sandy Valley study area are inside the Pahrump Valley Wilderness.

The final environmental impact statement for the NEMO Plan includes a land tenure strategy, which identifies public lands in identified disposal areas for potential conveyance out of federal ownership for future private sector use and development and for necessary public purposes (BLM 2002). A few hundred acres of public lands in the Mesquite Valley are identified as unclassified and available for future disposal; parcels identified in this manner include the two BLM properties on the east side of the Sandy Valley Off-site Alternative site (see **Alternatives Figure 3**). The larger BLM parcel at the southwest corner of the alternative site is not identified in the land tenure strategy for the NEMO Plan.

All actions on public lands must be in conformance with applicable BLM land use plans (43 Code of Federal Regulations § 1610.5-3). Any proposals or actions determined not to be in conformance with these plans would require the analysis of a land use plan amendment. It is stated in the CDCA plan that “[s]ites associated with power generation or transmission not identified in the Plan will be considered through the Plan Amendment process” (BLM 1980). Construction and operation of a renewable energy facility at the Sandy Valley Off-site Alternative could require amending the CDCA plan prior to approving a proposed right-of-way grant for lands that are managed by BLM. Initial steps to coordinate with BLM would include filing Standard Form SF-299,

“Application for Transportation and Utility Systems and Facilities on Federal Lands.” For the two parcels at the alternative site that are identified by BLM as unclassified and available for disposal, it is unknown if filing of Standard Form SF-299 would be required. If these properties remain under federal management, some type of agreement for their use or purchase could be required.

Potential Conversion of Agricultural Land

The Farmland Mapping and Monitoring Program does not maintain Important Farmland data for most of the state east of the Central Valley and the Sierra Nevada. However, several properties in the area of the Sandy Valley Off-site Alternative are in agricultural use. Alfalfa for hay, garlic, and potatoes are currently grown on the site or in the surrounding area, and three new groundwater wells were recently constructed to provide water for irrigation (Milovich and Cleland, pers. comms., 2012). The crops being grown in the Mesquite Valley are generally water intensive. Although sod used in landscaping has been grown at the site, the housing downturn in Las Vegas decreased the demand for sod to such an extent that production has practically ceased. Relatively low land values, an available groundwater supply, and a potential market for the crops that are produced have generally contributed to the success of farming operations in the Mesquite Valley (Cleland, pers. comm., 2012). For example, alfalfa for hay feeds dairy cattle in the Central Valley (Miller, pers. comm., 2012). A total of approximately 2,050 acres of land are irrigated for agricultural uses in the Mesquite Valley area of the two California counties (Milovich and Cleland, pers. comms., 2012). Based on staff’s review of aerial photographs for 2008 and 2009, a total of approximately 750 acres of land may be cultivated and irrigated in the study area.

Construction and operation of a project at the site would convert approximately 750 acres of existing farmland to a nonagricultural use. Of the total acreage, approximately 325 acres are designated Agriculture (A) in the Inyo County General Plan. No agricultural land is present at the proposed HHSEGS project site. The impact related to conversion of agricultural land would be **much greater than HHSEGS** at the Sandy Valley Off-site Alternative site, and this impact is considered significant. As discussed above, construction and operation of a utility-scale renewable energy facility at the Sandy Valley alternative site would require a GPA for the portion of the site that is in Inyo County. A zoning district change or other type of agreement with Inyo County would also be required.

Implementation of one or more conditions of certification would be required to reduce the impact of converting the total approximately 750 acres of existing agricultural land to nonagricultural use. The project applicant could be required to coordinate with the Agricultural Commissioner’s Offices for the two counties to determine appropriate compensation for the conversion of agricultural land. Implementation of conditions of certification would reduce the impact of conversion of agricultural land to less than significant.

Noise and Vibration

This site is located approximately 20 miles southeast of the proposed HHSEGS site and has a similar topography as the HHSEGS site. The surrounding area is populated with

slightly more noise-sensitive receptors than the proposed HHSEGS site. The noise impact is estimated to be **somewhat greater than HHSEGS** due to the higher number of receptors near the site, including a community center with recreational and administrative uses and sparsely developed residential uses. Like the proposed project, conditions of certification would be required to ensure that potentially significant noise impacts were reduced to less than significant during project construction and operation.

Public Health

Under the Sandy Valley Off-site Alternative, the project elements and major facility components would be similar to those associated with the proposed HHSEGS project; therefore, toxic air emission levels under this alternative would be **similar to HHSEGS** for construction and operations emissions. Existing land uses at this alternative site include agricultural and rural residential uses. Residential development in the unincorporated town of Sandy Valley, Nevada, is somewhat greater than at the proposed HHSEGS site in the Charleston View area. Given the somewhat greater density of housing development in the Sandy Valley area, air toxics-related health risks could be slightly greater under this alternative. As discussed in the **Public Health** section of this staff assessment, potential air toxics-related impacts from operation of the proposed HHSEGS project would be below significant levels within the 6-mile radius of typical concern to staff; therefore, potential impacts within the same 6-mile radius from the Sandy Valley Off-site Alternative would also be less than significant, and no conditions of certification would be required. This impact would be **similar to HHSEGS**.

Socioeconomic Resources

The Sandy Valley Off-site Alternative includes land in Inyo and San Bernardino counties. Due to the remote location of the study area and the fact that it would be situated in both counties, providing emergency medical and law enforcement services to the study area would be similarly challenging as the proposed HHSEGS site. This impact would be **similar to HHSEGS**.

The Inyo County portion of the study area is in the service areas of the Southern Inyo Fire Protection District (SIFPD) and Inyo County Sheriff's Department. There is no paved access to the study area from Inyo County. If the Inyo County Sheriff and SIFPD were to provide service, they would have to travel through Clark County, Nevada, or San Bernardino County to access the study area (Hidden Hills Solar I and II, LLCs 2012b).

The San Bernardino County Sheriff's Department and San Bernardino County Fire Department (SBCFD) have jurisdiction in San Bernardino County. Station #53 of the SBCFD in Baker, California, would be the closest fire station in San Bernardino County that could provide fire protection services. The nearest San Bernardino County Sheriff's office to the Sandy Valley Off-site Alternative site is the Barstow Station at 225 East Mountain View Road. The station is approximately 120 miles (a 3-hour drive) from the study area. The Inyo County Sheriff's substation in Shoshone is about the same distance to the study area.

Due to the proximity to Clark County, Nevada, the first responders for fire, medical, or law enforcement emergencies would likely come from Nevada (Hidden Hills Solar I and II, LLCs 2012b). The Clark County (Nevada) Fire Department would be called upon if needed, and as available, through a Mutual Aid Agreement with SBCFD. Within Clark County, police protection services are provided by the Las Vegas Metropolitan Police Department (LVMPD). The LVMPD is a joint city/county police force providing law enforcement services for all of Clark County, including the City of Las Vegas, with over 2,800 sworn officers (LVMPD 2010).

There are several structures near the farmed properties in the Sandy Valley study area, and a few of them are residences (Hidden Hills Solar I and II, LLCs 2012b). Although zoned Rural and Open Space, no residences are located at the proposed HHSEGS site. The impact of displacing existing rural residences would be **greater than HHSEGS** under this alternative; however, the impact would be less than significant because acquisition of properties would include appropriate compensation to the landowners displaced by this alternative.

Section 17620 of the Education Code (school impact fees) would apply to this alternative. Fees would be payable to either the Death Valley Unified School District in Inyo County, or the Baker Valley Unified School District in San Bernardino County, or both, depending on the locations of project buildings relative to the district boundaries.

The beneficial impact through construction employment and increased taxes and fees would be **similar to the proposed HHSEGS project**.

Traffic and Transportation

The transportation network in the vicinity of the Sandy Valley Off-site Alternative study area consists primarily of local roadways with limited access and state-maintained freeways. Due to the remote location of the study area and the possibility that local roadways are not designed to withstand frequent and heavy construction traffic, use of the existing roadway network during construction phases would be similarly challenging as the proposed HHSEGS site.

Access to the site is provided from two directions. The first is Sandy Valley Road, originating from Goodsprings, Nevada, northwest of Jean, Nevada, at I-15. The second access is from Nevada SR 160 to Pahrump Road, and then south to Sandy Valley. Pahrump Road is a 12-mile unpaved road. In addition to state, federal and county-maintained roads, there are numerous dirt roads throughout the area located along section lines and along the California/Nevada border (Hidden Hills Solar I and II, LLCs 2012b).

Construction workers would most likely use I-15 to commute to the alternative site from Primm, Nevada, approximately 33 miles south of the Sandy Valley study area. Workers could also commute from Las Vegas, which is approximately 45 miles east of the study area.

The addition of a similar number of daily trips as those identified for the proposed HHSEGS project (4,000 daily trips [3,820 automobile trips and 180 truck trips] are predicted for *peak month 19* under the proposed project) would have a significant impact on the structural integrity of Sandy Valley Road and Pahrump Road due to the current and future conditions of the roadway pavement. Under the proposed project, the access roads are not designed to current public works standards for the amount of the proposed construction traffic. Conditions of certification would be required to ensure that impacts on roadways from increased use for construction traffic were avoided or reduced. This impact would be **similar to HHSEGS**. With implementation of conditions of certification, impacts related to traffic and transportation would be reduced to less than significant.

Airport

The closest public-use operational airport to the study area is the Sky Ranch Airport, located in Nevada, approximately 2 miles southeast of the Sandy Valley Off-site Alternative study area. Sky Ranch Airport averages 57 aircraft flights a week (AirNav 2012). Similar sized solar towers at the Sandy Valley site could pose an obstruction hazard to aircraft. Because of the solar tower height, the applicant would be required to notify the Federal Aviation Administration (FAA) of construction pursuant to the Code of Federal Regulations, Title 14, Aeronautics and Space, Part 77. These regulations require FAA notification for any proposed structure over 200 feet in height above ground level (AGL), regardless of the distance from an airport. The impacts would likely be similar to those of the proposed project as both projects would require review and approval by the FAA. This impact would be **similar to HHSEGS**.

Glint and Glare

Similar to the proposed project, glare and/or excessive perceived brightness from the heliostat mirrors and the glowing solar receiver steam generators (SRSGs) at the tops of the power towers could impact motorists in the vicinity of the alternative site and potentially compromise driver performance. Glare can cause difficulty seeing in the presence of bright light such as direct or reflected sunlight or artificial light such as car headlamps at night. Glint can cause difficulty seeing in the presence of a transient bright light source and is generally considered to be intermittent.

Staff concludes that the proposed HHSEGS project would pose no risk for photothermal retinal damage, and the potential for photochemical damage to residents and motorists is less than significant (see **Appendix TT 1, Glint and Glare Safety Impact Assessment**). Glint and glare can also affect aircraft pilots in the area. Staff concludes that the glint and glare effects from the heliostats would be mildly discomforting to pilots with the potential to be significantly discomforting under certain low probability conditions. Based on the analysis for the proposed project (see the **Traffic and Transportation** section and **Appendix TT 1** in this staff assessment), the glare effects from the SRSGs are unavoidable and would produce a distinct visual distraction effect. However, these glare effects are not considered to be sufficient to be visually debilitating and thus would not cause a safety hazard from an operator control perspective, such as operating a vehicle or flying an airplane. A condition of certification

is proposed in the **Traffic and Transportation** section requiring preparation and implementation of a “Heliostat Operations Positioning and Monitoring Plan.” (See Condition of Certification **TRANS-8** in this staff assessment.)

The project elements and major facility components of this alternative would be the same as those of the proposed HHSEGS project. It is assumed that potential impacts related to glint and glare would be **similar to the proposed HHSEGS project**.

Transmission Line Safety and Nuisance

Under the Sandy Valley Off-site Alternative, the project’s elements and major facility components would be similar to those that would be constructed at the proposed project site.

The project applicant provided a data response showing a potential transmission line alignment for the Sandy Valley Off-site Alternative (see **Alternatives Figure 4**) (Hidden Hills Solar I and II, LLCs 2012b). The potential alignment for the transmission line would exit the east side of the alternative site study area in California to generally parallel Quartz Avenue through Sandy Valley, Nevada, before turning northeast to parallel Kingston Road east of Sandy Valley.

Based on a review of Google Earth aerial images, the Sandy Valley Library, several single-family residences, and Peace Park are adjacent to Quartz Avenue where the transmission line associated with this alternative could be sited. Staff observes that no studies have been done on the potential feasibility of constructing a 230-kV transmission line along the described route. If it was determined that further work was needed to evaluate this alternative, it would include an analysis of the potential effects of the transmission line on the Sandy Valley community. Like the proposed project, this alternative transmission line would be subject to applicable design and operational plans and requirements and regulations of CPUC.

Sky Ranch Airport is a small, public-use airport in Sandy Valley, Nevada, near the southeast corner of the Sandy Valley alternative study area. The airport has two runways, including a 3,340-foot asphalt runway and a 3,300-foot dirt runway (AirNav 2012). As discussed in the **Transmission Line Safety and Nuisance** section of this staff assessment, notification of the FAA is required for structures that could cause obstruction hazards in navigable space. The transmission line associated with this alternative could be less than 1 mile from the two runways at Sky Ranch Airport; therefore, notification of FAA would be required if this transmission line was proposed for construction along Quartz Avenue. Compliance with applicable regulations and standards would be required to ensure that the transmission line for this alternative would not cause aviation hazards.

The magnitude of these transmission line-related impacts would be similarly less than significant under the Sandy Valley Off-Site Alternative as for the proposed project at the HHSEGS site. This impact would be **similar to HHSEGS**.

Visual Resources

Environmental Setting

The Sandy Valley Off-site Alternative site is best accessed from Sandy Valley Road, leading from Goodsprings, Nevada to the valley. Goodsprings is northwest of Jean, Nevada, at I-15. Sandy Valley Road passes through a small mountain range that includes Table Mountain. The road is narrow and windy as it climbs through the range, and views are enclosed. The road straightens as it descends to the valley floor.

Panoramic views from the Sandy Valley area include Black Butte to the northwest, in the southern portion of the Pahrump Valley Wilderness, and the Kingston Range to the west. An alternate route into Sandy Valley is from Nevada SR 160 and Pahrump Road, a 12-mile, unpaved road. There is no route through the valley for most motorists.

Alternatives Figure 6 shows views of the Sandy Valley area.

The study area for the Sandy Valley Off-site Alternative is partly enclosed by the Pahrump Valley Wilderness to the northwest, the North Mesquite Mountains Wilderness to the southwest, and the Mesquite Wilderness to the south, all located in California.

BLM wilderness areas by their very nature are of high scenic quality.

Staff conducted a site visit to the study area in January 2012 and observed sparse rural development near farmed properties, including a few residences. Roughly 750 acres in the study area are potentially farmed, using a circular irrigation technique that is distinct from aerial views and, to some degree, on the ground because of the unique equipment in use. Residences and associated outbuildings have low-profiles, and no structures appear to exceed two stories in height. The streets are unpaved, and some existing transmission poles are visible along an unnamed north-south oriented street that intersects with Stateline Road. Another transmission line runs east-west along West Nickel Avenue north of and parallel to Quartz Avenue. Quartz Avenue coincides with the county line between Inyo and San Bernardino counties.

Sandy Valley is a residential community. As discussed above, 2010 U.S. Census data records 811 housing units at an average density of 14.5 units per square mile. A community center with a library, ball field, park, and administrative services is located at the intersection of Quartz Avenue and Osage Street in Sandy Valley; these community facilities are adjacent to the east side of the Sandy Valley Off-site Alternative study area. Staff observed a café, store, and post office in Sandy Valley. The Sky Ranch Airport is in Nevada near the southeast corner of the study area. Refer to the subsections, "Traffic and Transportation," and "Transmission Line Safety and Nuisance," for discussions of this airport.

The Sandy Valley area generally has a higher number of permanent viewers (residents) and a lower number of transient viewers (motorists) than the proposed HHSEGS project in Charleston View. The Sandy Valley alternative site has scenic backdrops in the form of wilderness areas, although the scale of landscape features and visual drama is somewhat lower than in the Charleston View area. Like Charleston View, the landscape is disturbed at ground level, but no tall structures pierce the horizon line of the surrounding ranges. The topography and vegetation are more variable than in

Charleston View, with some thickets of desert trees and some rise and fall of the ground plane partially obscuring some of the distant views.

Views from the community of Sandy Valley toward this alternative site are unimpeded by major obstacles, but visual clutter in the foreground at ground level (e.g., structures and minor topography changes) interrupt the panoramic views of the mountain ranges in the background (**Alternatives Figure 6**). The few trees that are noticeable in foreground views partially block middle ground and background views.

Environmental Impacts

Construction-related visual impacts would be **similar to the proposed HHSEGS project**. Views during project construction phases would include views of equipment, stored materials, and the rise of the towers and cranes. At ground level, much of the construction activity would be screened, and conditions of certification would be implemented to screen views and reduce the impacts of construction area lighting. No feasible mitigation measures would screen views of the towers and cranes during construction. These structures would be visible from the Sandy Valley community, the Pahrump Valley Wilderness Area, and possibly from portions of the North Mesquite Wilderness Area and Kingston Range.

Project operations impacts would be **similar to the proposed HHSEGS project**, and similar conditions of certification would be implemented to reduce impacts on visual resources. With part of the alternative site located in San Bernardino County, this alternative may not be consistent with the San Bernardino County General Plan goal and related policies for the desert region. The Conservation Element includes a goal to “[p]reserve the unique environmental features and natural resources of the Desert Region, including native wildlife, vegetation, water and scenic vistas” (San Bernardino County 2011). Many of the project structures would not be consistent with the height restriction (35 feet maximum) for the Resource Conservation land use zoning district. No scenic routes are located in the vicinity of the Sandy Valley alternative site. The Conservation Element includes a goal to “[p]reserve the dark night sky as a natural resource in the Desert Region communities” (San Bernardino County 2011). With implementation of conditions of certification, this alternative would likely be consistent with the San Bernardino General Plan goal and related policies for all lighting to be in accordance with the Night Sky Protection Ordinance.

Similar to the proposed project, for the portion of the alternative site that is in Inyo County, the Sandy Valley Off-site Alternative could be inconsistent with height restrictions that apply to development in the Open Space (OS) zoning district. This alternative could also be inconsistent with the Inyo County Renewable Energy Ordinance (Title 21) in that it could affect scenic views of the wilderness areas and from the wilderness areas. The Sandy Valley Off-site Alternative would otherwise conform to applicable LORS with implementation of conditions of certification to reduce the visual effects of this alternative.

As discussed above under the subsection, “Land Use,” Inyo County would require processing of a GPA and zoning district change or zone text amendment to ensure

consistency of a renewable energy project at the Sandy Valley Off-site Alternative site with the Inyo County General Plan.

In general, renewable energy projects that involve use of the SPT technology would cause significant and unavoidable impacts on visual resources. Like the proposed project, this alternative would include a brightly glowing SRSG at the top of each 750-foot-tall (total height) tower. Views of these structures would dominate the landscape at the alternative site. Views of the wilderness areas would be partially blocked and certainly impeded. The number of resident viewers in the Sandy Valley area is considerably higher than in the Charleston View area. These residents would have long-term views of the alternative site. Based on the high numbers of viewers, long duration of views, moderate to high visibility of the alternative site, and high viewer concern (residential), overall visual sensitivity is considered high for this alternative. The introduction of the project components into the landscape, particularly the SPTs, would impede views of the wilderness areas, dominate views of the background mountain ranges, and introduce the stark visual contrast of very large and bright industrialized structures into existing open space views. Therefore, the degree of visual change would be high at the Sandy Valley site. **Similar to the proposed HHSEGS project**, the magnitude of the visual change would cause significant and unavoidable visual impacts at the alternative site.

Conclusion for Impacts on Visual Resources

Like the proposed HHSEGS project, implementation of conditions of certification would reduce potential impacts on visual resources for views at the ground plane. Potential impacts of structural lighting could be reduced to less than significant with implementation of standard conditions of certification to control lighting. No feasible mitigation measures would reduce the visual impacts of the SPTs, brightness of the SRSGs, and potential visual effects of FAA night safety lighting. **Similar to the proposed HHSEGS project**, these impacts would remain significant and unavoidable.

Waste Management

Construction and operation of a renewable energy facility at the Sandy Valley Off-site Alternative site would produce approximately the same amount of waste as the proposed HHSEGS project. There is available Class III landfill capacity in San Bernardino County and Nevada landfills. Similar to the proposed project, staff considers project compliance with LORS and staff's conditions of certification to be sufficient to ensure that no significant impacts would occur as a result of waste management associated with the Sandy Valley Off-site Alternative. Impacts related to waste management would be **similar to the proposed HHSEGS project**.

The term, recognized environmental condition (REC), refers to 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 in the ground, groundwater, or surface water of the property. The Sandy Valley study area has a higher concentration of agricultural land uses compared to the

HHSEGS project site. Therefore, there is a chance that various parcels could be contaminated with herbicides or pesticides that would require remediation. There was limited agricultural use at the proposed HHSEGS site.

Construction and operation of a renewable energy facility at the Sandy Valley Off-site Alternative site would require preparation of a Phase I Environmental Site Assessment (ESA). Depending on the analysis and conclusions in a Phase I ESA, RECs could potentially be identified in the agricultural area that would require remediation. Impacts related to the potential presence of RECs at the alternative site could be **somewhat greater than HHSEGS**. Mitigation measures would be required to reduce any potentially significant impacts to less than significant.

Soil and Surface Water

Water resources staff participated in a site visit to the Sandy Valley Off-site Alternative study area on January 19, 2012. Average annual precipitation ranges from about 4 to 6 inches, which is similar to the proposed HHSEGS site. Surface runoff from the bordering mountains drains toward Mesquite Lake (California Department of Water Resources 2004), which is an internal drainage lake located approximately 10 miles southeast of the Sandy Valley Off-site Alternative site.

Lahontan Regional Water Quality Control Board identifies the portion of Mesquite Valley located within California as the Mesquite Hydrologic Unit (HU). The Lahontan Basin Plan recognizes “all minor surface waters” and Mesquite Lake as resources of the Mesquite HU. The beneficial use designations, both existing and potential, are the same as those listed for the Pahrump HU’s “all minor surface waters” with the following exceptions:

- Pahrump HU’s minor surface waters potentially supports habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened, or endangered. (This beneficial use is not listed within Mesquite HU.)
- Mesquite Lake is an inland saline water habitat (supporting inland saline water ecosystems) and it supports natural enhancement or improvement of water quality of other surface waters.

Because the water resources of both HUs have similar beneficial uses, similar conditions of certification could be used to ensure water quality protection at either location. Therefore, impacts from contaminated storm water and discharge of process wastewater would be the same for either location. A septic system for proper disposal of domestic sanitary waste would not change, so these impacts would also remain the same. These water quality impacts would be the **same as HHSEGS** for the Sandy Valley Off-site Alternative.

NRCS soils data is incomplete for the Mojave Desert area on the California side of the state boundary. Based on data extrapolated from the NRCS soil survey, the map unit for an extensive region encompassing the Sandy Valley study area is the Hypoint-Vegastorm association, which has somewhat similar hydrologic properties as the soils

mapped on the proposed HHSEGS site. However, agricultural activity in the study area for the Sandy Valley Off-site Alternative has likely altered much of the area's native soils. With this in mind, staff estimates moderate soil characteristics equivalent to Hydrologic Group C (relatively slow infiltration rates with moderately fine to fine texture). With this assumption, soil erosion impacts during project construction and operations would be **similar to the proposed HHSEGS site**.

The portion of this alternative site that is located within Inyo County is not within the 100-year floodplain (as shown on Federal Emergency Management Agency [FEMA] maps). Maps for the portion of the alternative site located within San Bernardino County are not readily available on FEMA's website. A review of the USGS quadrangle topographic map of the area shows potential ephemeral flows originating from the Spring Mountains in Nevada and traveling through the community of Sandy Valley before entering the Sandy Valley study area and on to Mesquite Lake to the south. Although the site appears relatively flat on the USGS map, ephemeral flows are difficult to predict. Without a comprehensive hydrology analysis, and based on the January 2012 site visit, staff estimates that the hydrology of the Sandy Valley Off-site Alternative site is similar to the proposed HHSEGS site. Therefore, impacts from 100-year flood flows are estimated to be **similar to the proposed HHSEGS project** as well as the potential for on-site/off-site flooding or storm damage.

Water Supply

Groundwater levels in the aquifer underlying the Mesquite Valley have been in decline since the latter part of the 1900s (California Department of Water Resources 2004). Impacts on water supply include potential drawdown of local wells and impacts on groundwater basin balance; these impacts would be **similar to HHSEGS** for the Sandy Valley Off-site Alternative.

For the proposed HHSEGS project, staff developed conditions of certification to reduce these types of impacts to a level that is less than significant. Under this alternative, the same or similar conditions of certification could also be implemented at the Sandy Valley Off-site Alternative site, which would reduce potentially significant impacts on water supply to less than significant.

See the discussion on the potential effects of this alternative on groundwater dependent ecosystems under the subsection, "Biological Resources," above.

SOLAR POWER TOWER (SPT) WITH ENERGY STORAGE ALTERNATIVE

Overview

This alternative would use BrightSource Energy's solar thermal technology with added molten-salt storage at the proposed project site. Thermal energy storage (TES) allows solar energy to be captured during the day and retained in a liquid salt heat transfer fluid (HTF). Liquid salt has inherent TES properties. In its liquid state, salt has a viscosity similar to water. Salt remains in a liquid state at very high temperatures whereas water turns to steam (Energy Commission 2010a). A significant quantity of liquified petroleum

gas (propane) would be used prior to plant start-up for the initial melting, heating, and conditioning of the salt thermal storage medium. No other fossil fuel supply would be required for plant operations.

Like the proposed HHSEGS project, heliostats would concentrate the sun's rays on the water-filled solar boiler at the top of the central receiver tower in each solar field. The resulting high-temperature, pressurized steam would be piped through a conventional steam turbine generator to produce electricity. To store the heat, some of the steam produced during the day would be used to superheat molten salts held in a tank (Press-Enterprise 2012). The heat retained in the molten salts would be available to convert water to steam, which would be used to run the plant's steam turbine generators to produce electricity during solar transients (e.g., cloud cover), and on the *shoulders* later in the evening and earlier in the morning.

This technology offers some additional stability and flexibility of generator operation inherent with liquid salt solar systems that is similar to that associated with supplemental natural gas firing (Hidden Hills Solar I and II, LLCs 2011a). Because this technology uses liquid salt, a medium that can be heated to a very high temperature, the steam cycle is efficient. Because the liquid salt can be stored with very little heat loss, this system allows power to be generated on demand during the day or night regardless of short-term weather fluctuations.

The storage capacity for a BrightSource Energy solar plant with integral thermal storage could be from 3 to 6 hours, which would allow more flexible electricity production (Press-Enterprise 2012). **Alternatives Figure 7** shows an artist's rendering of a power tower project with molten-salt storage.

According to recent CPUC documents, BrightSource Energy proposed adding energy storage to three of the five power purchase agreements (PPAs) with SCE. Of those five PPAs, two applied to the Siberia 1 and 2 solar thermal power plants, which were planned in the Mojave Desert in San Bernardino County. The third solar thermal project, Sonoran West, is being planned for siting in Riverside County approximately 13 miles southwest of Blythe. On October 25, 2012, CPUC rejected the PPAs for one of BrightSource Energy's Rio Mesa Solar Electric Generating Facility (SEGF) projects (proposed without storage) and both of the Siberia projects, which had been planned to include storage. The PPA for the Sonoran West solar thermal project was approved with the proviso that it would include molten-salt storage, and it is currently the only BrightSource Energy project that would incorporate thermal energy storage.

Descriptions of two projects under development that include molten-salt storage are provided below.

Rice Solar Energy Project (RSEP)

RSEP is a 150-MW SPT project that was approved for construction and operation by the Energy Commission in December 2010. SolarReserve will develop RSEP on approximately 1,500 acres of private land in the Colorado Desert in eastern Riverside County.

Similar to BrightSource Energy's solar thermal technology with added molten-salt storage, SolarReserve's projects include a central receiver tower surrounded by heliostats. Instead of super heating water in the solar boiler at the top of the tower, the sun's rays directly heat molten salt that can be stored to generate electricity late at night (Press-Enterprise 2012). The technology used by SolarReserve allows large quantities of thermal energy to be captured and retained for several days and extracted on demand (Energy Commission 2010a). SolarReserve expects RSEP to generate stable, predictable, and controllable electricity.

The Commission Decision for RSEP describes the project technology, stating that RSEP will use liquid salt as the HTF (Energy Commission 2010a). A total of seventy million pounds (4.4 million gallons) of liquid salt will be stored in insulated hot (1,050°F) and cold (550°F) above-ground tanks to retain solar energy. The thermal storage component allows generation of electricity after dark and during periods of cloud cover, for an average of 8.4 hours per day. To produce electricity, the salt circulates through the receiver and steam generation system where superheated steam is used in a steam turbine generator. Steam turbine exhaust will be condensed in a 20-cell air-cooled condenser.

Based on the summary of structural dimensions in the AFC for RSEP, the hot salt tank was planned with a diameter of 167 feet, wall height of 42 feet, and domed top height of 64.5 feet (SolarReserve 2009). The cold salt tank was planned to be slightly smaller with a diameter of 159 feet and a domed top height of 63.5 feet.

The liquid salt solar generating system for RSEP is proprietary technology of United Technologies Corporation. The technology was successfully used in the 1990s in a 10-MW project located in Barstow, California.

Propane will be used prior to plant start-up in two small boilers for the initial melting, heating, and conditioning of the salt thermal storage medium (Energy Commission 2010a). The salt conditioning process will take place once during plant commissioning, resulting in a closed loop system of liquid salt storage and circulation that will remain heated and contained for the life of the project. RSEP requires no other fossil fuel supply for plant operations.

Crescent Dunes Solar Energy Project (Crescent Dunes SEP)

Crescent Dunes SEP is a 110-MW SPT project with integral thermal storage. SolarReserve is developing Crescent Dunes SEP on approximately 1,600 acres of BLM land near Tonopah, Nevada. Construction began in September 2011 and is expected to be completed in late 2013. Construction was recently completed on the approximately 540-foot SPT for the project. Crescent Dunes SEP is planned for 10 hours of energy storage (Press-Enterprise 2012). Like RSEP, Crescent Dunes SEP will not require a natural gas supply to maintain project operations. **Alternatives Figure 7** shows the completed solar power tower for the Crescent Dunes SEP.

Potential to Attain Project Objectives

Development of an approximately 500-MW SPT project with energy storage at the proposed project site could potentially meet the project objectives related to construction and operation of a utility-scale renewable electrical generation facility, leading to the sale of renewable energy and contributing to achieving California's renewable energy goals; approval of amendments to the PPAs by CPUC could be required. This alternative could potentially satisfy the project objectives addressing the requirement to comply with applicable LORS and avoid or minimize significant impacts to the greatest extent feasible. This alternative would satisfy the project objective to develop a renewable energy facility in an area with high solar value and minimal slope. See the discussions below under, "Environmental Analysis," for analyses of the environmental effects of this alternative compared to the proposed project.

The project objectives include an objective to develop a renewable energy facility capable of providing grid support by offering power generation that is flexible. Adding energy storage capabilities would increase this alternative's operational flexibility to some degree relative to the proposed HHSEGS project.

The proposed project would be located on approximately 3,277 acres, including the 180-acre construction staging and laydown area. To accomplish an approximate electrical capacity of 500 MWs, this alternative could require additional measurable acreage to add energy storage components to the proposed project. The additional acreage would be needed to accommodate the molten-salt storage tanks and additional heliostats that would be required to generate heat for the thermal storage component. The heat stored in the molten salts would be used to generate steam to run the turbines later in the day than would be possible under the proposed project. The project applicant has stated that adding thermal storage requires the addition of at least 18 percent more heliostats to the solar field (Rio Mesa Solar I, II, and III, LLCs 2012).

For BrightSource Energy's two proposed SPT projects without energy storage—HHSEGS and the Rio Mesa SEGF—land use efficiency is approximately 6.6 and 7.6 acres per MW, respectively⁵. (Land use efficiency for the proposed project with the construction laydown area removed from the total project acreage would be approximately 6.2 acres per MW.) Land use efficiency would be reduced under this alternative. In other words, the SPT with Energy Storage Alternative would likely require more acres per MW of capacity. If this alternative was limited to the existing 3,277-acre site, total plant capacity would likely be reduced.

The SPT with Energy Storage Alternative with an increased site boundary could potentially satisfy five or six of the seven project objectives. This alternative would partially satisfy the project objective addressing operational flexibility, and it would go further toward satisfying this project objective compared to the proposed project. Changing the technology and expanding the 3,277-acre project site could result in a project schedule delay, potentially affecting project viability.

⁵ The Rio Mesa SEGF project is proposed as a 500-MW facility on approximately 3,805 acres.

Construction of the SPT with Energy Storage Alternative at the proposed project site with no site expansion would probably reduce the total proposed electrical capacity of 500 MWs. Construction and operation of this alternative with no site expansion could potentially satisfy five or six of the seven project objectives, and it would partially satisfy the first project objective to construct and operate a renewable electrical generation facility resulting in sales of competitively priced renewable energy consistent with the needs of California utility companies; however, the total proposed 500-MW capacity would not necessarily be achieved.

Potential Feasibility Issues

Staff submitted data requests for information on the potential feasibility of adding energy storage to the proposed HHSEGS project. In the corresponding data responses, the applicant states that adding energy storage capabilities to the proposed HHSEGS project would be infeasible because of contractual obligations, site limitations, and economics (Hidden Hills Solar I and II, LLCs 2012b). The site limitations discussed by the applicant include the need to redesign the heliostat field and project layout if energy storage was added to the project. The applicant states that the site footprint would have to be expanded. The applicant refers to the signed and approved PPAs, stating that “it would not be feasible to complete the development and engineering of an energy storage system for HHSEGS on a timeline that would allow [the] Applicant to meet its contractual obligations under the PPAs.” The applicant states that the addition of energy storage would be extremely costly “and would jeopardize the project’s schedule and financial viability.”

The power generated by the proposed HHSEGS project would be sold to PG&E under two PPAs approved by CPUC in 2010, which demonstrates that CPUC deems HHSEGS appropriate for helping to meet the state’s RPS program goals. As stated above, the applicant has targeted the first or second quarter of 2015 for commercial operation of the proposed project. Staff contacted the CPUC to inquire about the overall process involving CPUC’s approval of PPAs for renewable energy projects. CPUC staff stated that filing of amended advice letters requesting amendments to PPAs is not an uncommon occurrence during the 5-year development process for renewable energy projects (Simon, pers. comm., 2012). Once a PPA is approved, submittal of an amended advice letter to CPUC requesting an amended PPA is required unless the change to the project was accounted for in the original PPA for the project (e.g., a PPA that allows a project site change). CPUC’s review of requests for amended PPAs considers resultant changes to the pricing structure of the PPA, project viability, and value compared to cost. For example, in considering a hypothetical amendment to a PPA to add energy storage to a solar thermal project, CPUC would assess the net economic benefit of the added storage.

In October 2011, the project applicant filed an AFC with the Energy Commission for development of three 250-MW solar power plants for the Rio Mesa SEGF, which would use the same technology as the proposed HHSEGS project. Since filing the AFC for the Rio Mesa SEGF project, the applicant filed an amended AFC to eliminate one of the three power plants for that project. The planned development schedules for the proposed HHSEGS project and Rio Mesa SEGF overlap with the Sonoran West project

that is being planned under a PPA with SCE. Given the immensity and complexity of these renewable energy projects, and CPUC’s strong encouragement of storage for such projects, it is reasonable to conclude that BrightSource Energy management is fully aware of the potential for project changes to affect project scheduling and financing.

Altering the proposed HHSEGS project and expanding the site to include TES would delay the project schedule and increase project costs. It is unknown what other circumstances could affect the potential for site expansion (e.g., site topography, the potential presence of biological or cultural resources, etc.).

The work required to alter the project to include storage would delay the project schedule. It is not known at what point a project schedule delay and increased project costs would affect project viability.

Environmental Analysis

Alternatives Table 4 presents a summary comparison of impacts of the proposed HHSEGS project to the same or similar potential impacts of the SPT with Energy Storage Alternative. Comparative discussions for each environmental topic area follow the table.

Alternatives Table 4 Summary Comparison of the Proposed Project’s Impacts to the Solar Power Tower with Energy Storage Alternative		
Environmental Effect	Proposed Project	SPT with Energy Storage Alternative
Air Quality		
Construction-related emissions	SM	Similar to HHSEGS (SM)
Project operations emissions	SM	Similar to HHSEGS (SM)
Biological Resources		
Impacts on special-status plant species	SM	Similar to or somewhat greater than HHSEGS (SM)
Impacts on waters of the U.S. and waters of the state	SM	Similar to or somewhat greater than HHSEGS (SM)
Impacts on desert tortoise	SM	Similar to or somewhat greater than HHSEGS (SM)
Impacts on special-status terrestrial wildlife species (other than desert tortoise)	SM	Similar to or somewhat greater than HHSEGS (SM)
Impacts on avian species from collisions with project	PSU	Similar to or

Alternatives Table 4 Summary Comparison of the Proposed Project's Impacts to the Solar Power Tower with Energy Storage Alternative		
Environmental Effect	Proposed Project	SPT with Energy Storage Alternative
features (see biological resources note)		somewhat greater than HHSEGS (PSU)
Impacts on avian species from exposure to concentrated solar flux	PSU	Similar to or somewhat greater than HHSEGS (PSU)
Potential impacts on groundwater dependent ecosystems	PSM	Somewhat greater than HHSEGS (PSM)
Biological resources note: Collisions could be secondary to exposure to concentrated solar flux.		
Cultural Resources		
Potential to disturb, destroy, or visually degrade significant prehistoric and historical archaeological sites <i>on</i> the site (see cultural resources note)	LS	Similar to HHSEGS (LS)
Potential to disturb, destroy, or visually degrade significant prehistoric and historical archaeological sites <i>beyond</i> the site	SU	Similar to HHSEGS (SU)
Potential impacts on significant built-environment cultural resources (Old Spanish Trail – Mormon Road Northern Corridor) <i>on</i> the site	SM	Similar to HHSEGS (SM)
Potential impacts on significant built-environment cultural resources (Old Spanish Trail – Mormon Road Northern Corridor) <i>beyond</i> the site	SU	Similar to HHSEGS (SU)
Potential to disturb, destroy, or visually degrade significant ethnographic resources <i>on</i> the site	SU	Similar to HHSEGS (SU)
Potential to disturb, destroy, or visually degrade significant ethnographic resources <i>beyond</i> the site	SU	Similar to HHSEGS (SU)
Cultural resources note: "Site" means the facility site proper and does not include linear or ancillary infrastructure away from the facility site.		
Fire Protection		
Potential impacts on local fire protection resources	PSM	Similar to HHSEGS (PSM)
Potential impacts on emergency response services	PSM	Similar to HHSEGS (PSM)
Geology and Paleontology		
Potential impacts from strong seismic shaking	SM	Same as HHSEGS (SM)

Alternatives Table 4 Summary Comparison of the Proposed Project's Impacts to the Solar Power Tower with Energy Storage Alternative		
Environmental Effect	Proposed Project	SPT with Energy Storage Alternative
Potential impacts from soil failure caused by liquefaction, hydrocollapse, formation of soil fissures, and/or dynamic compaction	SM	Same as HHSEGS (SM)
Potential impacts on paleontological resources	SM	Same as HHSEGS (SM)
Potential impacts on geological or mineralogical resources	LS	Same as HHSEGS (LS)
Hazardous Materials		
Potential for release of hazardous materials to occur on-site	SM	Similar to HHSEGS (SM)
Potential for release of hazardous materials to occur off-site	SM	Similar to HHSEGS (SM)
Land Use		
Conflicts or inconsistencies with general plan land use designations and zoning	SU	Same as HHSEGS (SU)
Conversion of agricultural land	—	—
Noise and Vibration		
Potential for noise to impact noise-sensitive receptors	PSM	Somewhat greater than HHSEGS (PSM)
Public Health		
Potential for project construction to cause air toxics-related impacts that could affect public health	LS	Similar to HHSEGS (LS)
Potential for project operations to cause air toxics-related impacts that could affect public health	LS	Similar to HHSEGS (LS)
Socioeconomic Resources		
Construction employment and increased taxes and fees	B	Similar to HHSEGS (B)
Displacement of existing rural residences	—	—
Potential impacts on emergency medical and law enforcement services	PSM	Similar to HHSEGS (PSM)
Traffic and Transportation		
Potential impacts on roadway infrastructure	SM	Same as HHSEGS (SM)
Potential for glint and glare to cause safety hazards or a distinct visual distraction effect from an operator control perspective (i.e., vehicle drivers and aircraft pilots)	PSM	Same as HHSEGS (PSM)

Alternatives Table 4 Summary Comparison of the Proposed Project's Impacts to the Solar Power Tower with Energy Storage Alternative		
Environmental Effect	Proposed Project	SPT with Energy Storage Alternative
Potential for construction equipment and/or permanent structures to exceed 200 feet in height above ground level	SM	Same as HHSEGS (SM)
Transmission Line Safety and Nuisance		
Potential for impacts related to aviation safety, hazardous shocks, nuisance shocks, and electric and magnetic field exposure	SM	Similar to HHSEGS (SM)
Visual Resources		
Construction-Related Impacts		
Potential to substantially degrade the existing visual character or quality of the site and its surroundings	SU	Similar to HHSEGS (SU)
Potential to create a new source of substantial light or glare which would adversely affect day or nighttime views in the area	SU	Similar to HHSEGS (SU)
Project Operations Impacts		
Potential to substantially degrade the existing visual character or quality of the site and its surroundings	SU	Same as HHSEGS (SU)
Potential to create a new source of substantial light or glare which would adversely affect day or nighttime views in the area	SU	Same as HHSEGS (SU)
Waste Management		
Potential for disposal or diversion of project materials to cause impacts on existing waste disposal or diversion facilities	SM	Similar to HHSEGS (PSM)
Potential for impacts on human health and the environment related to past or present soil or water contamination	PSM	Similar to HHSEGS (PSM)
Soil and Surface Water		
Soil erosion by wind and water during project construction	SM	Greater than HHSEGS (SM)
Soil erosion by wind and water during project operations	PSM	Somewhat greater than HHSEGS (PSM)
Water quality impacts from contaminated storm water runoff	SM	Somewhat greater than HHSEGS (SM)
Water quality impacts from storm damage	PSM	Similar to HHSEGS (PSM)

Alternatives Table 4 Summary Comparison of the Proposed Project's Impacts to the Solar Power Tower with Energy Storage Alternative		
Environmental Effect	Proposed Project	SPT with Energy Storage Alternative
Water quality impacts from power plant operations	SM	Somewhat greater than HHSEGS (SM)
Water quality impacts from sanitary waste	SM	Same as HHSEGS (SM)
Potential impacts from on-site and off-site flooding	SM	Similar to HHSEGS (SM)
Potential to impede or redirect 100-year flood flows, as shown on Federal Emergency Management Agency maps	LS	Similar to HHSEGS (LS)
Water Supply		
Potential impacts on local wells	PSM	Somewhat greater than HHSEGS (PSM)
Potential impacts on groundwater basin balance	PSM	Somewhat greater than HHSEGS (PSM)

Air Quality

Staff reviewed the air quality staff assessment of RSEP as a basis to compare the potential air quality effects of this alternative to those of the proposed project. Staff assumes that a project constructed and operated to include molten-salt energy storage would be generally comparable to the proposed HHSEGS project regardless of the specific technology that would be used to facilitate the energy storage.

Under the SPT with Energy Storage Alternative, power plant start-up would require combustion of propane to heat two small boilers for the initial melting, heating, and conditioning of the salt thermal storage medium (Energy Commission 2010a). As discussed above, RSEP requires no other fossil fuel supply for plant operations. The SPT with Energy Storage Alternative would not require other project operations emitting sources during regular plant operations. Net air quality emissions impacts would be **similar to HHSEGS** for this alternative technology. No auxiliary boilers would be required for project operations of this alternative, and much less fuel would be used at the beginning of project operations to liquefy the salt compared to the fuel use that would be required to operate the auxiliary boilers for the proposed project. However, use of the small boilers during power plant start-up could generate air emissions equating to a higher level of emissions than would occur during the initial commissioning phase for a natural gas-fired power plant. The potential for this temporary increase in emissions cannot be quantified, but it could be incrementally greater under this alternative. Mitigation measures similar to those recommended under

the proposed project would reduce impacts to less than significant. Construction-related emissions and impacts would be **similar to HHSEGS** for this alternative.

Incorporating molten-salt storage would require a portion of the area containing the heliostat array to be used to heat the molten salt for energy storage, and thus more land would be required for the same electrical capacity of 250 MWs. This would not cause any significant change in air emissions during project operations. Refer to the discussion below under, "Engineering Assessment of the Alternatives," for an analysis of power plant efficiency and reliability.

The SPT with Energy Storage Alternative would result in a greater overall cumulative reduction in GHG emissions from power plants compared to the proposed HHSEGS project. This alternative would not worsen current conditions or make a cumulatively considerable contribution to any significant cumulative impact associated with air quality.

Biological Resources

Engineering staff has determined that this alternative technology, compared to the proposed HHSEGS project, would require more land to achieve the same approximate electrical capacity as the proposed project. As discussed above, this alternative would require additional, measurable acreage. (See also the discussion of the SPT with Energy Storage Alternative below under, "Engineering Assessment of the Alternatives.") The exact size or configuration of a power tower project with added thermal storage is unknown; therefore, comparisons to the proposed HHSEGS project are somewhat speculative. Because recorded locations of special-status plants, animals, and habitats are distributed across the project site and adjacent areas, a reconfigured project could encompass more special-status resources compared to the proposed project. Under this alternative, impacts on special-status plant species would be **similar to or somewhat greater than HHSEGS**.

All surface waters on the project site are ephemeral (flow during storm events) and are presumed to be supported by precipitation (not groundwater) due to their ephemeral hydrology. The washes enter the site from the east and southeast, and trend northwest towards the playa. The channels increase in number and density but decrease in size as they flow down the alluvial fan. Flow volume decreases due to seepage into the unconsolidated sediments of the fan, and transition into unconfined sheet flood areas in the western half of the project site. The size or configuration of a power tower project with added energy storage is unknown and would influence the extent and nature of impacts; for example, an expansion of the project boundary to the east would likely encompass more jurisdictional drainages. Based on staff's field visit and review of maps showing blue line streams, impacts would likely be **similar to or somewhat greater than HHSEGS** for potential impacts on waters of the U.S. and waters of the state. Under this alternative, conditions of certification would be implemented to reduce potentially significant impacts on waters of the U.S. and waters of the state to less than significant.

With a potentially larger project site, impacts on desert tortoise and other special-status terrestrial species would be **similar to or somewhat greater than HHSEGS**, as impacts on individuals in regional populations are generally directly correlated to a project's size. Under this alternative, conditions of certification could be implemented to reduce potentially significant effects to less than significant.

Water use at solar farms is influenced in part by how many heliostats are installed and how often heliostats are washed. For this analysis, it is assumed that operational water use would be somewhat greater than what is proposed for the HHSEGS project because of the increased number of heliostats that would be required to generate heat for the thermal storage component. The incremental increase in groundwater consumption would result in somewhat greater impacts on groundwater resources and, therefore, also **somewhat greater impacts on local groundwater dependent plants**, and the many unique assemblages of plants and wildlife that they support. For the proposed HHSEGS project, feasible mitigation measures exist to reduce potentially significant groundwater impacts to less than significant. Similar conditions of certification would reduce impacts on groundwater dependent ecosystems to below a level of significance.

Impacts on special-status avian species under this alternative would stem from exposure to concentrated solar flux, collisions with project features, and loss of habitat. A somewhat larger project site with more buildings could pose a greater collision risk. If this alternative incorporated more heliostats, the risk of collision with those structures could increase. The impact of collision with project features on avian species would be **similar to or somewhat greater than HHSEGS**. Similarly, additional heliostats would increase the volume and influence the location of airspace containing concentrated solar flux. Impacts on avian species from exposure to concentrated solar flux would be **similar to or somewhat greater than HHSEGS**.

Cultural Resources

Construction and operation of the SPT with Energy Storage Alternative at the proposed project site would most likely require additional measureable acreage and increased physical ground disturbance on the project site compared to the proposed project. Under this alternative, a **similar degree of visual intrusion** on off-site resources would occur relative to the proposed project because the vertical profile of HHSEGS would remain largely unchanged. A similar degree of physical disturbance of resources at the facility site would occur relative to the proposed project because the portions of the resources on the facility site, which are small relative to the broad scales of the subject landscapes, would be roughly comparable to the disturbance anticipated under the proposed project. The discussion of archaeological resources under, "Comparison to the Proposed Project," (above) for the Sandy Valley Off-site Alternative states that "[n]o significant archaeological deposits are known to be located on the proposed project site." Therefore, the net effect of this alternative on historical resources would most likely be **similar to that of HHSEGS**. Because the extent and location of additional acreage for this alternative is unknown, no more definitive conclusion is possible.

Fire Protection

Enhancement of the SPT technology with several hours of TES would not cause an increase in the need for or level of fire protection services compared to the proposed project. Staff concludes that this alternative would not change fire risk or the potential for impacts on local fire protection resources. This impact would be **similar to the proposed HHSEGS project**. Like the proposed HHSEGS project, staff has determined that impacts on the local fire department would be significant under this alternative due to the predicted increase in emergency response calls during project construction and operation. Mitigation measures would likely require payment of as yet undetermined project-specific fees to the local fire protection service to enable augmentation of resources such as staff, equipment, and facilities. With implementation of appropriate mitigation measures, impacts on local emergency services would be reduced to less than significant.

Geology and Paleontology

The SPT with Energy Storage Alternative would require construction of additional equipment not included in the proposed HHSEGS project. The additional equipment and structures required for this alternative would not cause any new or more severe impacts on geological and paleontological resources; therefore, these impacts would be the **same as HHSEGS**.

As discussed above under the subsection, "Overview," for this alternative, additional measureable acreage would be required to generate the same electrical capacity of the two 250-MW solar power plants. The construction techniques and methods used for the alternative technology would be similar to the proposed HHSEGS project. The impacts of constructing and operating the additional equipment associated with this alternative would be the **same as HHSEGS**.

Hazardous Materials

Enhancement of the SPT technology with several hours of TES would not cause an increase in potential risks associated with the release of hazardous materials. Staff concludes that this alternative would not change staff's determination that with implementation of conditions of certification requiring conformance with applicable LORS, no significant impacts would occur off-site related to the potential release of hazardous materials. This impact is **similar to HHSEGS**.

Land Use

Construction and operation of the SPT with Energy Storage Alternative at the proposed project site would be inconsistent with Inyo County's designated land uses of Open Space and Recreation, and Recreation (OSR and REC, respectively), and zoning for the Charleston View area (Open Space 40-acre minimum – OSR). An amendment to the Inyo County General Plan would be required to ensure consistency of this alternative with the Land Use Element. Land use impacts would be the **same as HHSEGS** for the SPT with Energy Storage Alternative.

Noise and Vibration

Enhancement of the SPT technology with several hours of TES would increase the noise impact mainly due to the project's potential for the extension of operation before and after sunset. For this analysis, staff assumes that the impact would be **somewhat greater than HHSEGS**. Like the proposed project, conditions of certification would be required to ensure that potentially significant noise impacts were reduced to less than significant during project construction and operation.

Public Health

Enhancement of the SPT technology with several hours of TES would extend this alternative's operations beyond the hours of available sunlight. Staff concludes that use of this alternative technology would result in toxic air emissions and health impacts that would be **similar to those identified under the proposed HHSEGS project** for construction and operations emissions. No significant impacts would occur, and no conditions of certification would be required.

Socioeconomic Resources

Under the SPT with Energy Storage Alternative, the beneficial impact through construction employment and increased taxes and fees would be **similar to HHSEGS**. Potential impacts on emergency medical and law enforcement services would be **similar to HHSEGS**. Like the proposed HHSEGS project, this alternative would increase demand for these public services; however, similar mitigation measures would reduce these impacts to less than significant.

Traffic and Transportation

As discussed in the **Traffic and Transportation** section of this staff assessment, SR 160 is located approximately 10 miles east of the proposed project site, and it provides access to the site via the Old Spanish Trail Highway.

Like the proposed project, daily trips under this alternative would have a significant impact on the structural integrity of the Old Spanish Trail Highway in Nevada and California. Use of Old Spanish Trail Highway for heavy construction traffic and hauling of equipment and materials could cause a significant impact on the structural integrity of the road due to the current and predicted future conditions of the roadway pavement. Old Spanish Trail Highway in Inyo County is approximately 22 feet wide. It lacks shoulders and designed drainage, and is not built or designed for the proposed level of construction traffic that would occur under this alternative. This impact would be the **same as HHSEGS**.

Many of the project elements and major facility components that could produce glint and glare effects under this alternative would be the same as those of the proposed HHSEGS project. It is assumed that the potential impact related to glint and glare would be the **same as the proposed HHSEGS project**. Because of the solar tower height, the applicant would be required to notify the FAA of construction pursuant to the Code of Federal Regulations, Title 14, Aeronautics and Space, Part 77. These regulations

require FAA notification for any proposed structure over 200 feet in height AGL regardless of the distance from an airport. This impact would be the same as the proposed project because both projects would require review and approval by the FAA. This impact would be **the same as HHSEGS**.

Transmission Line Safety and Nuisance

Under the SPT with Energy Storage Alternative, staff concludes that use of this alternative technology would require the use of transmission lines of the same voltage and carrying-capacity as is proposed for HHSEGS. This means that the magnitude of these transmission line-related impacts would be similarly less than significant. This impact would be **similar to HHSEGS**.

Visual Resources

Under the SPT with Energy Storage Alternative, the addition of structures for energy storage, while substantial in size, would be lower in height than the air-cooled condenser and auxiliary boiler stack, which are 120 and 135 feet tall, respectively. As discussed above under, "Rice Solar Energy Project (RSEP)," the summary of structural dimensions lists the domed top heights of the above-ground salt tanks as 64.5 feet and 63.5 feet (SolarReserve 2009). Like the proposed HHSEGS project, implementation of conditions of certification would reduce potential impacts on visual resources for views at the ground plane. Potential impacts of structural lighting could be partially mitigated with implementation of standard conditions of certification to control lighting and screen views. No feasible mitigation measures would reduce the visual impacts of the SPTs, brightness of the SRSs, and potential visual effects of FAA night safety lighting. Similar to the proposed HHSEGS project, these impacts would remain significant and unavoidable. The potential visual effects of the SPT with Energy Storage Alternative would be **similar to HHSEGS** for construction-related impacts and the **same as the proposed HHSEGS project** for project operations impacts.

This alternative would not worsen impacts of the proposed project nor make a cumulatively considerable contribution to any significant cumulative impact associated with visual resources.

Waste Management

The location of the SPT with Energy Storage Alternative would be the same as the proposed project, and it would be no closer to any unidentified recognized environmental conditions. Similar to the proposed project, staff would require investigation and remediation of soil and groundwater contamination if it was encountered during construction and operation of this alternative. Site characterization and remediation requirements would remain the same as for the proposed project.

The SPT with Energy Storage Alternative would require additional measureable acreage to provide the same energy generation capacity. Construction of additional facilities and equipment installation would be required. Staff anticipates this would also increase the volume of the waste stream by some amount. Although the waste volume would increase somewhat, there is adequate available Class III landfill capacity in

Nevada landfills. Similar to the proposed project, staff considers project compliance with LORS and staff's condition of certification to be sufficient to ensure that no significant impacts would occur as a result of waste management associated with the SPT with Energy Storage Alternative. Potential impacts on existing waste disposal facilities and human health and the environment would be **similar to HHSEGS**.

Soil and Surface Water

Staff assumes that the energy capacity of the SPT with Energy Storage Alternative would be similar to the 500-MW capacity of the proposed project, with the ability to also produce power for extended amounts of time (i.e., during cloudy days, beyond the hours of available sunlight). This alternative would require additional measurable acreage. However, the amount of additional land needed is difficult to estimate, because energy storage introduces several sizing options for balancing the size of the thermal storage tank(s) with the required number of additional heliostats.

Depending on the amount of additional land needed, the impacts could range from **somewhat greater up to much greater than the proposed HHSEGS project**. Although a larger solar field is needed for this alternative, installation of the supports for the heliostats does not require significant grading of the heliostat array fields. Assuming additional dirt roads would be created throughout the larger area for access and maintenance of the heliostats, and the footprint for each solar plant would increase to accommodate additional facilities for energy storage, impacts related to soil erosion during construction would be **greater than the proposed HHSEGS project**. Impacts related to soil erosion during project operations would be **somewhat greater than HHSEGS** because of vehicle travel on the dirt roads to clean the additional heliostats.

The additional facilities required for thermal storage could slightly increase the impacts of process wastewater and contamination of storm water runoff; therefore, these impacts are **somewhat greater than HHSEGS**. A septic system for proper disposal of domestic sanitary waste would not change, so these impacts would be the **same as HHSEGS**.

Because of the HHSEGS fixed borders to the east (Nevada state line) and to the south (Old Spanish Trail Highway), it is assumed that the additional acres needed for an energy storage alternative would be obtained by extending the western border of the project site. This larger footprint would extend further into the 100-year flood flows (as shown on FEMA maps). Because of the low impact flow-through layout of the heliostat supports, impacts from 100-year flood flows are **similar to the proposed HHSEGS project** as well as the potential for on-site/off-site flooding or storm damage.

Water Supply

As discussed above, engineering staff has determined that this alternative technology, compared to the proposed HHSEGS project, would require more land to produce the same electrical output. For this discussion, staff assumes that adding energy storage components to the project would require additional, measurable acreage.

Water use at solar farms is influenced in part by how many heliostats are installed, and how often heliostats are washed. Adding thermal storage would require the addition of at least 18 percent more heliostats to the solar field (Rio Mesa Solar I, II, and III, LLCs 2012). Staff assumes water use would also likely be somewhat greater than currently proposed at the HHSEGS site in order to service longer hours of operation. Increased groundwater consumption would result in somewhat greater impacts on groundwater resources. Staff lacks specific information on a potential footprint for this alternative and the exact water needs of a project with energy storage. Staff assumes the level of impacts on water supply could increase proportionally with increased water usage. Impacts related to groundwater depletion would be **somewhat greater than HHSEGS** for the SPT with Energy Storage Alternative. The same conditions of certification proposed by staff for the proposed HHSEGS project would be recommended for this alternative. With implementation of conditions of certification, potential impacts on water supply and groundwater resources would be reduced to less than significant.

SOLAR PHOTOVOLTAIC (PV) ALTERNATIVE

Overview

This alternative would involve constructing and operating a utility-scale PV project at the proposed project site. Solar PV technology involves the direct conversion of photons (i.e., sunlight) into electricity. PV modules (also called solar panels) absorb solar radiation and convert it into direct current electricity (Hidden Hills Solar I and II, LLCs 2011a). This direct current power is then converted into alternating current electricity for delivery to the electrical grid system. This conversion occurs when direct current (DC) flows through a device called an *inverter*, which converts the electrical characteristics to alternating current (AC) that can be tied to the power distribution system for power delivery. The electrical current produced is directly dependent on how much light strikes the module. Multiple PV panels are wired together to form an array, an arrangement that increases the total system output. PV technology does not involve thermal energy or the production of steam to power turbines. PV systems are relatively simple to operate and maintain and require little water for project operations compared to solar thermal energy systems.

A traditional fixed-tilt PV system is composed of flat-plate collectors (i.e., PV solar panels or modules) installed in arrays at a fixed tilt facing south. Maximum yearly solar radiation can be achieved using a tilt angle approximately equal to a site's latitude. Larger, more complex installations use tracking flat-plate collectors that tilt the panels toward the sun for maximum efficiency. PV trackers use either single-axis (east-west) tracking or dual-axis (east-west and north-south) tracking in order to maximize the panels' absorption of sunlight during the day and throughout the year (Hidden Hills Solar I and II, LLCs 2011a). Tracking PV modules produce more electricity annually compared to fixed-tilt modules. **Alternatives Figure 8** includes photographs showing fixed-tilt and tracking PV modules.

Staff requested additional information to compare the proposed HHSEGS project to an alternative using PV technology. In its responses, the applicant questions "whether a PV project could be developed that would generate a net 500 MWs and be capable of

selling competitively priced renewable energy, consistent with the procurement obligations of California's publicly owned and privately owned utilities" (Hidden Hills Solar I and II, LLCs 2012b). Examples of PV projects provided by the applicant include a 21-MW project on 200 acres in Blythe and a 48-MW project on 350 acres in Boulder City, Nevada (Copper Mountain Solar 1) that was completed in late 2010. (Conflicting online news sources report the total capacity of Copper Mountain Solar 1 as either 48 MWs or 58 MWs.) **Alternatives Figure 8** includes a photograph of the Copper Mountain Solar 1 project. Expansion of the Copper Mountain PV complex is underway; when construction of Copper Mountain Solar 2 is completed, it will include an additional 150 MWs of generating capacity (Sempra U.S. Gas & Power 2012). Based on staff's review of various online news sources, at least four utility-scale PV projects are approved and in development in California, including the Topaz Solar Farm Project (further described below); **Alternatives Table 5** summarizes the four approved projects. Based on data in the final, approved environmental documents for these PV projects, average land use efficiency is approximately 7 acres per MW. Based on a total acreage of approximately 3,277 acres, land use efficiency is approximately 6.6 acres per MW for the proposed project and 7.6 acres per MW for the proposed Rio Mesa SEGF project.

The Draft Solar Programmatic Environmental Impact Statement (Draft Solar PEIS) prepared by BLM in 2010 summarizes "utility-scale PV facilities" that were scheduled for completion in several countries in 2008 and beyond. Many of these facilities had capacities (expressed as megawatt peak [MWp]) in the range of 10–25 MWp (BLM 2010). The Draft Solar PEIS listed average land use efficiency for PV facilities as 9 acres per MW (BLM 2010). The largest of the PV facilities listed in Table F.3.2-2 of the Draft Solar PEIS is the 550-MW Topaz Solar Farm Project (see below), and the total plant acreage is shown as 6,200 acres. When San Luis Obispo County approved the Topaz Solar Farm Project in March 2011, the selected alternative reduced the facility's fence line to encompass approximately 3,500 acres (see **Alternatives Table 5**). The project was reconfigured to reduce impacts on biological resources and avoid Williamson Act lands, and the 550-MW generating capacity was maintained.

The April 2012 DRECP Stakeholder Committee Meeting included a review of an update to the renewable energy calculator that was developed by Energy Commission staff to use as a tool for framing an understanding of renewable energy supply and demand for the 2040 planning horizon. Partly in response to comments on an earlier version of the 2040 planning scenario, the acreage requirement for all central station solar projects, including solar thermal and PV project types, was reduced from 9.1 acres per MW to 7 acres per MW. Although it was acknowledged at the meeting that scenarios will vary depending partly on the portfolio⁶, the modified efficiency ratio is considered to be plausible and reasonable. Adjustments to the portfolio will be made every 5 years during the planning horizon. Of the four PV projects summarized by staff in **Alternatives Table 5**, the two 550-MW projects show land use efficiencies that are slightly below 7 acres per MW. (The proposed HHSEGS and Rio Mesa SEGF projects are also close to that

⁶ The portfolio includes central station solar thermal, central station PV, wind, biomass/fuels, geothermal, utility-side distributed generation, and small rooftop solar.

land use efficiency ratio). For this alternatives analysis, staff assumes that the Solar PV Alternative could be implemented at the proposed project site with no site expansion.

Site disturbance or grading for the PV projects shown in **Alternatives Table 5** is generally described in the environmental review documents for the projects. For the California Valley Solar Ranch Project, the final EIR states that “[l]imited grading is expected to be required because of the relatively flat terrain and because the arms of the solar arrays would be adjustable and would therefore not need to be located on completely leveled ground” (San Luis Obispo County 2011a). The siting criteria for the California Valley Solar Ranch Project includes a criterion to deploy the project in a “minimally invasive manner, including minimal landform alteration (low or no grading) to minimize impacts to biology, ecology, and air quality, among other resources.” The final EIS for the Desert Sunlight Solar Farm Project describes site preparation techniques to reduce the required volume of earth movement. A process of *micrograding* or *isolated cut and fill and roll* is described to trim off high spots and use the material to fill in low spots for areas that make up more than half of the solar field; standard cut and fill techniques are intended for use in specific arrays to limit slope to within 3 percent (BLM 2011). It is stated in the final EIS for the Topaz Solar Farm Project that “[g]rading would not be required under most PV arrays” (San Luis Obispo County 2011b).

Operational water use for the PV projects shown in **Alternatives Table 5** varies from less than 0.3 acre-feet per year (afy) for the Desert Sunlight Solar Farm Project to approximately 12 afy for the AV Solar Ranch One Project. The proposed HHSEGS project would require approximately 140 afy for project operations.

Alternatives Table 5 Summary Descriptions of Four Approved Utility-Scale Solar Photovoltaic Projects in California			
Project Name and Location	PV Technology	Capacity, Land Use Efficiency, and Energy Production	Schedule
AV Solar Ranch One Project, Antelope Valley area of northern Los Angeles County	First Solar thin-film PV technology with cadmium telluride (CdTe) as the semiconductor material enclosed in two sheets of glass; of the total 230 MWs, 52 MWs are horizontal trackers and 178 MWs are fixed-tilt panels; about 3 million panels total	230 MWs; total of 1,955 acres will be subject to direct ground disturbance; about 8.5 acres per MW; 592 gigawatt hours per year (GWh/yr)	Project approved December 2010; will be fully operational at the end of 2013

**Alternatives Table 5
Summary Descriptions of Four Approved Utility-Scale
Solar Photovoltaic Projects in California**

Project Name and Location	PV Technology	Capacity, Land Use Efficiency, and Energy Production	Schedule
Desert Sunlight Solar Farm Project, Chuckwalla Valley of the Sonoran Desert in eastern Riverside County	First Solar thin-film PV technology with CdTe as the semiconductor material; all fixed-tilt panels; about 9 million panels total	550 MWs; total of 3,761 acres, as stated in the Record of Decision; about 6.9 acres per MW; 1,190 GWh/yr	Project approved August 2011 and will be fully operational by the first quarter of 2015
Topaz Solar Farm Project, Carrizo Plain, eastern San Luis Obispo County	First Solar thin-film PV technology with CdTe as the semiconductor material enclosed in two sheets of glass; all fixed-tilt panels; about 9 million panels total	550 MWs; total of 3,500 acres; about 6.4 acres per MW; 1,096 GWh/yr	Project approved summer 2011; construction began in late 2011 and will be finished in 2015
California Valley Solar Ranch Project, northeastern edge of the Carrizo Plain in southeastern San Luis Obispo County	Crystalline silicon PV panels attached to the SunPower T0 Tracker® system (1,032 tracker units in ten arrays); single-axis tracking; about 757,320 panels	250 MWs; total of 1,500 acres; about 6 acres per MW; 688 GWh/yr	Project approved April 2011 and will be fully operational by 2013
<p>Sources: AV Solar Ranch One Project: <http://planning.lacounty.gov/case/view/project_no._r2009-02239_tract_map_no._tr071035_av_solar_ranch_one_project> Desert Sunlight Solar Farm Project: <http://www.blm.gov/ca/st/en/fo/palmsprings/Solar_Projects/Desert_Sunlight.html> Topaz Solar Farm Project: <http://www.slocounty.ca.gov/planning/environmental/EnvironmentalNotices/optisolar.htm> California Valley Solar Ranch Project: <http://www.slocounty.ca.gov/planning/environmental/EnvironmentalNotices/sunpower.htm> (Bernheimer and Ekstrom, pers. comms., 2012)</p>			

Potential to Attain Project Objectives

Recent approvals and ongoing construction of utility-scale PV projects in California and Nevada indicates the suitability of using PV technology for development of a large, renewable energy power plant with a capacity of several hundred MWs. Development of an approximately 500-MW solar PV project at the proposed project site could potentially meet the project objectives related to construction and operation of a utility-scale renewable electrical generation facility, which would lead to the sale of renewable energy and contribute to achieving California’s renewable energy goals. It is unknown whether approval of amendments to the PPAs by CPUC would be required. This

alternative could potentially satisfy the project objectives addressing the requirement to comply with applicable LORS and avoid or minimize significant impacts to the greatest extent feasible. This alternative would satisfy the project objective to develop a renewable energy facility in an area with high solar value and minimal slope. See the discussions below under, “Environmental Analysis,” for general analyses of the potential environmental effects of this alternative.

The Solar PV Alternative could potentially satisfy five or six of the seven project objectives. This alternative would not satisfy the project objective addressing operational flexibility. It is not known whether the proposed 3,277-acre project site could be used for construction of a PV project that would achieve close to the 500-MW capacity of the proposed project. Although based on staff’s review of the four utility-scale PV projects discussed above, land use efficiencies of less than 7 acres per MW are being achieved at other sites in the state. Because this alternative would use the proposed project site, the objective to obtain site control and use within a reasonable period of time would be attained.

Potential Feasibility Issues

The applicant’s data responses on the feasibility of a PV alternative describe how this alternative would not comply with provisions of the PPAs for the proposed project. The applicant states that “[f]ailure to satisfy this contractual obligation means that such an alternative is infeasible taking into account economic factors and it could not be accomplished successfully in a reasonable time period, given the long-lead time for the utility [request for offer] process and CPUC contract approval” (Hidden Hills Solar I and II, LLCs 2012b). The applicant states that this alternative may be infeasible because “it could not be accomplished in a reasonable time frame, given the lead time to negotiate for the use of another proprietary technology and the follow-on development process.”

The work required to redesign the project to use a PV technology would delay the project schedule, and it is not known at what point a project schedule delay would affect project viability.

Environmental Analysis

Alternatives Table 6 presents a summary comparison of impacts of the proposed HHSEGS project to the same or similar potential impacts of the Solar PV Alternative. Comparative discussions for each environmental topic area follow the table.

Alternatives Table 6 Summary Comparison of the Proposed Project’s Impacts to the Solar Photovoltaic Alternative		
Environmental Effect	Proposed Project	Solar PV Alternative
Air Quality		
Construction-related emissions	SM	Similar to HHSEGS (SM)

**Alternatives Table 6
Summary Comparison of the Proposed Project's Impacts
to the Solar Photovoltaic Alternative**

Environmental Effect	Proposed Project	Solar PV Alternative
Project operations emissions	SM	Less than HHSEGS (SM)
Biological Resources		
Impacts on special-status plant species	SM	Same as HHSEGS (SM)
Impacts on waters of the U.S. and waters of the state	SM	Same as HHSEGS (SM)
Impacts on desert tortoise	SM	Same as HHSEGS (SM)
Impacts on special-status terrestrial wildlife species (other than desert tortoise)	SM	Same as HHSEGS (SM)
Impacts on avian species from collisions with project features	PSU	Unknown (PSU)
Impacts on avian species from exposure to concentrated solar flux	PSU	—
Potential impacts on groundwater dependent ecosystems	PSM	Somewhat less than HHSEGS (PSM)
Cultural Resources		
Potential to disturb, destroy, or visually degrade significant prehistoric and historical archaeological sites <i>on</i> the site (see cultural resources note)	LS	Similar to HHSEGS (LS)
Potential to disturb, destroy, or visually degrade significant prehistoric and historical archaeological sites <i>beyond</i> the site	SU	Much less than HHSEGS (PSM)
Potential impacts on significant built-environment cultural resources (Old Spanish Trail – Mormon Road Northern Corridor) <i>on</i> the site	SM	Similar to HHSEGS (SM)
Potential impacts on significant built-environment cultural resources (Old Spanish Trail – Mormon Road Northern Corridor) <i>beyond</i> the site	SU	Much less than HHSEGS (PSM)
Potential to disturb, destroy, or visually degrade significant ethnographic resources <i>on</i> the site	SU	Similar to HHSEGS (PSU)
Potential to disturb, destroy, or visually degrade significant ethnographic resources <i>beyond</i> the site	SU	Somewhat less than HHSEGS (PSU)
Cultural resources note: "Site" means the facility site proper and does not include linear or ancillary infrastructure away from the facility site.		
Fire Protection		
Potential impacts on local fire protection resources	PSM	Less than HHSEGS (PSM)
Potential impacts on emergency response services	PSM	Less than HHSEGS (PSM)

**Alternatives Table 6
Summary Comparison of the Proposed Project's Impacts
to the Solar Photovoltaic Alternative**

Environmental Effect	Proposed Project	Solar PV Alternative
Geology and Paleontology		
Potential impacts from strong seismic shaking	SM	Much less than HHSEGS (PSM)
Potential impacts from soil failure caused by liquefaction, hydrocollapse, formation of soil fissures, and/or dynamic compaction	SM	Much less than HHSEGS (PSM)
Potential impacts on paleontological resources	SM	Less than HHSEGS (PSM)
Potential impacts on geological or mineralogical resources	LS	Same as HHSEGS (LS)
Hazardous Materials		
Potential for release of hazardous materials to occur on-site	SM	Similar to HHSEGS (SM)
Potential for release of hazardous materials to occur off-site	SM	Similar to HHSEGS (SM)
Land Use		
Conflicts or inconsistencies with general plan land use designations and zoning	SU	Same as HHSEGS (SU)
Conversion of agricultural land	—	—
Noise and Vibration		
Potential for noise to impact noise-sensitive receptors	PSM	Much less than HHSEGS (PSM)
Public Health		
Potential for project construction to cause air toxics-related impacts that could affect public health	LS	Similar to HHSEGS (LS)
Potential for project operations to cause air toxics-related impacts that could affect public health	LS	Less than HHSEGS (LS)
Socioeconomic Resources		
Construction employment and increased taxes and fees	B	Similar to HHSEGS (B)
Displacement of existing rural residences	—	—
Potential impacts on emergency medical and law enforcement services	PSM	Similar to HHSEGS (PSM)
Traffic and Transportation		
Potential impacts on roadway infrastructure	SM	Same as HHSEGS (SM)
Potential for glint and glare to cause safety hazards or a distinct visual distraction effect from an operator control perspective (i.e., vehicle drivers and aircraft pilots)	PSM	Much less than HHSEGS (LS)
Potential for construction equipment and/or permanent	SM	—

**Alternatives Table 6
Summary Comparison of the Proposed Project's Impacts
to the Solar Photovoltaic Alternative**

Environmental Effect	Proposed Project	Solar PV Alternative
structures to exceed 200 feet in height above ground level		
Transmission Line Safety and Nuisance		
Potential for impacts related to aviation safety, hazardous shocks, nuisance shocks, and electric and magnetic field exposure	SM	Similar to HHSEGS (SM)
Visual Resources		
Construction-Related Impacts		
Potential to substantially degrade the existing visual character or quality of the site and its surroundings	SU	Less than HHSEGS (SM)
Potential to create a new source of substantial light or glare which would adversely affect day or nighttime views in the area	SU	Less than HHSEGS (SM)
Project Operations Impacts		
Potential to substantially degrade the existing visual character or quality of the site and its surroundings	SU	Much less than HHSEGS (PSM)
Potential to create a new source of substantial light or glare which would adversely affect day or nighttime views in the area	SU	Much less than HHSEGS (PSM)
Waste Management		
Potential for disposal or diversion of project materials to cause impacts on existing waste disposal or diversion facilities	SM	Similar to HHSEGS (PSM)
Potential for impacts on human health and the environment related to past or present soil or water contamination	PSM	Somewhat greater than HHSEGS (PSM)
Soil and Surface Water		
Soil erosion by wind and water during project construction	SM	Somewhat less than HHSEGS (SM)
Soil erosion by wind and water during project operations	PSM	Less than HHSEGS (PSM)
Water quality impacts from contaminated storm water runoff	SM	Much less than HHSEGS (LS)
Water quality impacts from storm damage	PSM	Somewhat greater than HHSEGS (PSM)
Water quality impacts from power plant operations	SM	Much less than HHSEGS (LS)

Alternatives Table 6 Summary Comparison of the Proposed Project's Impacts to the Solar Photovoltaic Alternative		
Environmental Effect	Proposed Project	Solar PV Alternative
Water quality impacts from sanitary waste	SM	Similar to HHSEGS (SM)
Potential impacts from on-site and off-site flooding	SM	Similar to HHSEGS (SM)
Potential to impede or redirect 100-year flood flows, as shown on Federal Emergency Management Agency maps	LS	Similar to HHSEGS (LS)
Water Supply		
Potential impacts on local wells	PSM	Somewhat less than HHSEGS (PSM)
Potential impacts on groundwater basin balance	PSM	Somewhat less than HHSEGS (PSM)

Air Quality

The number of permitted fuel-consuming and air pollutant emitting sources would be significantly fewer under the Solar Photovoltaic Alternative. This alternative would not be subject to Energy Commission jurisdiction and would be permitted locally, including the air permits from the air district. Construction-related emissions and impacts would be **similar to HHSEGS** for this alternative. Staff reviewed the air quality analyses for the four approved utility-scale PV projects summarized above under the subsection, "Overview." Operational impacts related to criteria pollutant emissions for those projects were described to include normal maintenance truck activity, periodic fire water pump engine testing, and use of water trucks coinciding with the infrequent work to wash the PV modules. Operational emissions are described as "limited" or "minimal." Of the four reviewed PV projects, two required preparation and implementation of an operational dust control plan. Use of fossil fuel-fired energy generation is not required under this alternative.

Impacts on air quality from operation of the Solar Photovoltaic Alternative would be **less than HHSEGS**. This alternative would result in a greater overall cumulative reduction in GHG emissions from power plants compared to the proposed HHSEGS project. The Solar Photovoltaic Alternative would not worsen current conditions or make a cumulatively considerable contribution to any significant cumulative impact associated with air quality.

Biological Resources

Solar PV technology employs either fixed-tilt or tracking solar panels to collect incident radiation. Between these two options, slight differences in potential impacts are identified related to the amount of site grading and preparation that could be required. This discussion of potential impacts on biological resources from the Solar PV

Alternative presents a general analysis of PV solar collectors without choosing a particular type of technology. It is assumed that the Solar PV Alternative would use a low-impact design that would minimize on-site grading and manage remaining native vegetation under the solar panels by mowing. It is possible that no grading would be necessary under most of the solar panels for the Solar PV Alternative. Assuming the same project boundary under this alternative, impacts on special-status plant species, waters of the state, and waters of the U.S., would be the **same as HHSEGS**.

The PV Alternative would remove habitat occupied by desert tortoise and other special-status terrestrial wildlife species; this alternative would cause other direct and indirect impacts such as weed proliferation and increased dust. These impacts would be the **same as HHSEGS**.

Impacts on avian species would occur through conversion of the project site from native habitat to a solar farm and potential collisions with project features such as PV panels and transmission lines. This technology does not require central collector towers (e.g., an SPT at the center of a heliostat array) or concentrate solar energy over a heliostat field; therefore, **no impacts** on avian species would occur from exposure to solar flux. The Solar PV Alternative would cause **no impact** on avian species from exposure to solar flux.

Little research-based data is available to determine the extent of collision impacts on avian species from either the photovoltaic or solar power tower technologies. Similar to concentrating solar power technology, the PV Alternative would have the potential to cause a “mirage” effect from the appearance of the sky reflected off the solar panels when viewed from a distance (see **Alternatives Figure 8**). Properties of the smooth, glass surfaces of the PV panels are known to cause polarized light pollution (Horváth et al. 2009 and 2010). The final EIS for the Topaz Solar Farm Project (San Luis Obispo County 2011b) identified solar modules, or panels, as posing a possible risk of collision for birds, including golden eagle. The analysis discussed the possibility of birds colliding with the PV panels depending on the potential effects of “glare or polarized light” from the panels. Both of these potential effects (i.e., the mirage effect or the effects of polarized light) could attract birds or bats to the facility, where they could be susceptible to mortality or injury by collision.

While little data is available addressing how reflectivity of different solar collector surfaces may influence avian collisions, a 2009 technical memorandum on a review of potential impacts of solar array developments on biological resources states that “non-reflective flat plate panels are preferred over reflective technologies, such as CSP, for sites with burrowing owls. It is recommended that the impact of solar panel reflective properties be part of the procurement selection criteria to minimize impacts on avian wildlife” (City of San Jose 2009). Burrowing owl are present at the proposed project site, and although the owls would be evicted from the site during construction, owls could potentially reenter the site during or following construction. Impacts on burrowing owl from installation of solar panels under this alternative would cause similar effects on other bird species and not be limited to burrowing owl. The 2009 technical memorandum does not address the potential effects of polarized light from PV panels.

The extent and severity of potential collision impacts on avian species under the Solar PV Alternative is unquantifiable and cannot be reasonably compared to the proposed project. Impacts on avian species from collisions with solar panels and other structures are **unknown compared to HHSEGS**. Impacts on avian species stemming from habitat loss could be mitigated to below a level of significance. However, no evidence exists demonstrating that impacts related to collisions with project structures could be reduced to below a level of significance, and these impacts could remain significant and unavoidable.

Photovoltaic solar plants require less operational water use, and less groundwater pumping, compared to the proposed project. Therefore, potential impacts on groundwater dependent plants and wildlife species would be **somewhat less than HHSEGS**.

Cultural Resources

Construction and operation of the Solar PV Alternative at the proposed project site would require roughly the same extent of physical ground disturbance on the project site. The extent of the visual intrusion on off-site resources relative to the proposed project would be **much less than HHSEGS**, while the extent of physical disturbance of resources at the facility site relative to the proposed project would be **similar to that of HHSEGS**.

The overall scale of this alternative and the vertical profile would be substantially reduced with elimination of the proposed project's power towers. Compared to the solar power towers and heliostats for the proposed project, the PV structures would not be visible from some portions of the broad, landscape-scale resources that are the subjects of concern; and where the terrain would allow views of portions of the PV arrays, the level of the visual intrusion in the landscape would be much less than HHSEGS. In addition to the dramatically reduced vertical scale of the Solar PV Alternative, the much less reflective surfaces of the PV modules would be less intrusive compared to the mirrored heliostats. The overall physical disturbance of the portions of the resources on the facility site, although small relative to the broad scales of the subject landscapes, would nonetheless be roughly comparable to the site disturbance that would occur under the proposed project. Staff characterizes the net effect of this alternative on historical resources as **much less than HHSEGS**. Of the impacts identified by cultural resources staff, two impacts addressing archaeological and built-environment resources *beyond* the site that are considered "significant and unavoidable" under the proposed project would be reduced to "potentially significant" under this alternative (see **Alternatives Table 6**). These two impacts could be reduced to less than significant with implementation of appropriate compensatory mitigation measures.

Impacts addressing two ethnographic resources *on* and *beyond* the site that are considered "significant" under the proposed project are considered "potentially significant" under this alternative. These two impacts are considered, **similar to HHSEGS**, and, **somewhat less than HHSEGS**, respectively. Because no feasible means of compensation are available to reduce these impacts on aboriginal ancestral

territory, staff concludes that these two impacts would remain significant and unavoidable under the Solar PV Alternative.

Fire Protection

The Solar PV Alternative would use photovoltaic cells to convert solar radiation directly into electrical current. This alternative would pose reduced fire risks and impacts on local fire protection resources compared to those associated with the proposed project, and the corresponding mitigation measures needed by the authority having jurisdiction for emergency response would also be reduced. This impact would be **less than the proposed HHSEGS project**. Compared to the SPT technology of the proposed HHSEGS project, staff expects that this alternative could require smaller work crews during construction and operation. This alternative would require far less flammable and hazardous materials use. Due to the simpler construction and operational requirements and the less complex equipment set associated with the PV technology, the potential for this alternative to place significant extra demands on local emergency response services (due to the predicted fewer worker accidents, fires, and hazardous materials spills) would be **less than the proposed HHSEGS project**. Staff concludes that impacts would be potentially significant; mitigation measures would likely require payment of as yet undetermined project-specific fees to the local fire protection service determined to be necessary to enable augmentation of resources such as staff, equipment, and facilities. With implementation of appropriate mitigation measures, impacts on local emergency services would be reduced to less than significant.

Geology and Paleontology

Construction and operation of the Solar PV Alternative at the proposed project site could have fewer impacts compared to the proposed HHSEGS project. Primarily, the Solar PV Alternative would not require the deep or otherwise specialized foundations that would be required for the SPTs and the numerous heliostat foundations of the proposed project. The elimination of deep foundations would decrease the potential for encountering fossil-bearing strata, and due to elimination of tall tower structures, this alternative as a whole would be much less susceptible to the effects of strong seismic shaking. Depending on the type of embedded foundation that would support tracker or fixed-tilt PV units (e.g., drilled concrete piers, driven piers, or screw-type foundations), the potential impact on fossil-bearing strata could be somewhat less than or similar to the proposed project. The net effect of this alternative on geological and paleontological resources would be **less than HHSEGS**.

Hazardous Materials

The Solar PV Alternative would use photovoltaic cells to create electrical power at the proposed HHSEGS site instead of the proposed SPT project. This alternative would pose no potential for new or more severe off-site impacts from required use of hazardous materials at the site. Thus, this alternative would be similar to the proposed project regarding the potential risk for an accidental release of hazardous materials to occur at the site. This impact would be **similar to HHSEGS**.

Land Use

Construction and operation of the Solar PV Alternative at the proposed project site would be inconsistent with Inyo County's designated land uses (OSR and REC) and zoning for the Charleston View area (OS-40). An amendment to the Inyo County General Plan would be required to ensure consistency of this alternative with the Land Use Element. Land use impacts would be the **same as HHSEGS** for the Solar Photovoltaic Alternative.

Noise and Vibration

Photovoltaic cells convert solar radiation directly into electrical current. No mechanical equipment (which is the major source of noise) is used for this technology. The only source of noise would be the inverters, which are generally quiet at relatively short distances. Impacts related to noise would be **much less than HHSEGS** under this alternative. Depending on the location of sensitive noise receptors relative to the inverters, conditions of certification could be required to reduce potentially significant impacts to less than significant.

Public Health

The Solar PV Alternative would not cause minor combustion-related boiler emissions. Based on staff's review of the operational water use for the four PV projects described above, washing of the PV panels under this alternative could be necessary once or twice per year. Staff assumes that infrequent washings of the panels could include the use of diesel-fueled water trucks, which would cause some toxic air emissions (i.e., diesel particulate matter). Due to the infrequent washings of PV panels, toxic air emissions under this alternative from the use of diesel-fueled vehicles could be substantially less compared to the proposed project. Some high-performance solar PV cells are known to contain small amounts of cadmium, selenium, and arsenic, and these substances could be emitted if any solar cells were broken. However, staff does not consider any such emission hazards to be significant because under normal project operations, the PV panels would remain intact. Staff thus considers potential public health risks from this alternative technology to be **less than the proposed HHSEGS project** for project operations emissions. For project construction emissions, the impact on public health would be **similar to HHSEGS**.

Socioeconomic Resources

Under the Solar PV Alternative, the beneficial impact through construction employment and increased taxes and fees would be **similar to HHSEGS**. Potential impacts on emergency medical and law enforcement services would be **similar to HHSEGS**. Like the proposed HHSEGS project, this alternative would increase demand for these public services; however, similar mitigation measures would reduce these impacts to less than significant.

Traffic and Transportation

Similar to the proposed project, the Solar PV Alternative would require use of SR 160 and the Old Spanish Trail Highway for hauling of equipment and materials to the project

site, which could cause a significant impact on the structural integrity of the road due to the current and predicted future conditions of the roadway pavement. This impact would be the **same as HHSEGS**.

Because solar PV panels absorb sunlight, impacts related to glint and glare would be **much less than HHSEGS**. The Solar PV Alternative would not have the potential to cause safety hazards from an operator control perspective (i.e., vehicle drivers and aircraft pilots). See the discussion below under the subsection, "Visual Resources," for an analysis of glint and glare impacts for the Solar PV Alternative.

Staff reviewed the traffic and transportation analyses for the four approved utility-scale PV projects summarized above under the subsection, "Overview." No construction equipment or permanent structures were identified for those projects that would be taller than the projects' transmission lines, which are less than 200 feet tall. As discussed in the **Traffic and Transportation** section of this staff assessment, McCarran International Airport in Las Vegas, Nevada, is approximately 45 miles east of the proposed HHSEGS site. The proposed Pahrump Valley General Aviation airport would be approximately 10 miles northwest of the proposed project site. No structures associated with the proposed project would penetrate the navigable airspace of these airports. The Department of Defense determined that the proposed project would cause no military mission impacts. Under the Solar PV Alternative, no structures would necessarily require review and approval by FAA, and **no impact** would occur under the Solar PV Alternative.

Transmission Line Safety and Nuisance

Under the Solar PV Alternative, photovoltaic cells would be used at the proposed HHSEGS site instead of the proposed technology. (The proposed project would result in minor combustion-related boiler emissions.) Since this alternative would be located at the proposed HHSEGS site, staff expects the utilized transmission lines and related impacts to be similar, conferring no benefit regarding the field and nonfield impacts of concern in staff's **Transmission Line Safety and Nuisance** testimony in this staff assessment. This means that the magnitude of these transmission line-related impacts would be similarly less than significant. This impact would be **similar to HHSEGS**.

Visual Resources

Comparison of the Proposed HHSEGS Project to the Solar PV Alternative

The Solar PV Alternative would not use heliostats or any other type of mirrored-surface solar collector. Although the acreage requirement for this alternative would not change compared to the proposed HHSEGS project, the most notable difference between the proposed project and the Solar PV Alternative is the lack of the visually dominant power towers, brightly glowing SRSGs, and FAA safety lighting. The Solar PV Alternative would not use boilers, turbines, steam, and cooling equipment. The number and complexity of structures associated with this alternative would be reduced compared to the proposed HHSEGS project. Elimination of the 135-foot air-cooled condenser and 120-foot stack and other structures from the base of the power tower would potentially lower the profile of the Solar PV Alternative to that of 2–3 story buildings.

Although a potential configuration for this alternative is unknown, the PV arrays could resemble those of the 550-MW Topaz Solar Farm Project that is under construction in eastern San Luis Obispo County. The PV solar modules for that project are being installed in approximately 460 arrays (San Luis Obispo County 2011b). Each array will consist of up to approximately 20,000 modules. The fixed-tilt PV modules will be mounted on steel support structures called tables, each holding about 16 modules. Once mounted, the front of each table will be about 1½ feet above grade and the rear will be about 5½ feet above grade. The total distance from the ground to the top of the PV module table may vary depending on the topography. (The above-grade maximum module height for a tracking PV system would be a few feet higher.) Each array will require approximately 7 acres and be equipped with a power conversion station, including two inverters and one transformer. For the Topaz Solar Farm Project, drawings showing a typical array configuration show modules grouped in rows that are approximately 240 feet long. This general layout will be repeated to cover the site uniformly. Permanent building heights will not exceed 30 feet and on-site electrical collection system poles will not exceed 43 feet, except within one-half mile of the project substation, where the pole height will not exceed 52 feet.

The visual simulations of PV solar arrays in Section C.2, “Aesthetics,” in the final EIR for the Topaz Solar Farm Project depict a near-continuous surface area covering visible portions of the project site. The PV modules would likely cast shadows on the ground. The collector side of the panels is variably seen as dark to lighter in color. The visual effect of what appears to be a continuous surface area may sometimes resemble a lake. As stated in the final EIR for the Topaz Solar Farm Project, “[t]he dark-colored, glass-surfaced PV fields would exhibit strong color and texture contrast against the light-colored and non-reflective grassland...” (San Luis Obispo County 2011b). The visual effects of the heliostat mirrors associated with the proposed project would be very different. The tops of the heliostat units would be more than 13 feet above the ground surface, and would move constantly to keep the reflective angle targeted on the SRSGs at the tops of the power towers. The site design for the Solar PV Alternative would include expanses of relatively uniform rows of PV modules that would absorb solar radiation. The overall visual effect of the proposed HHSEGS project would be greater with the heliostats arranged in a circular pattern around the base of the SPT to constantly reflect the sun’s rays to the top of the tower.

Environmental Impacts

Construction-related visual impacts of the Solar PV Alternative would be **less than the proposed HHSEGS project**. Views during project construction phases would include views of equipment and stored materials. The lack of extremely tall structures and cranes with FAA safety lighting under this alternative would reduce the severity of construction-related impacts on visual resources. At ground level, much of the construction activity would be screened, and conditions of certification would be implemented to screen views and reduce the impacts of construction area lighting.

PV solar modules would be less visually dominant than the heliostats and 750-foot SPTs and related structures. The Solar PV Alternative would not include structures that

would contrast with the scenic backdrops of the Nopah Wilderness Area, Pahrump Valley Wilderness Area, and the Spring Mountains and overwhelm the views. The Solar PV alternative would present similar challenges to screening the structures from view at key observation point (KOP) 3, but the potential impacts on the more distant views toward the site from KOPs 4, 5, and 7 would be lower without the visually dominant SPTs. In fact, it might be that this alternative would not be visible at all from KOPs 4 and 7. The view from KOP 5 would be of an array that could resemble a lake surface. This view could slightly mimic views of the Pahrump dry lake bed north of Charleston View. (Refer to the **Visual Resources** section of this staff assessment for detailed assessments of the KOPs for the proposed project.)

The proposed HHSEGS site is relatively flat, and the heights of the PV modules for this alternative, mounted on their support posts, would be relatively consistent across the site. The visual impacts of the Solar PV Alternative in Charleston View could potentially be reduced to less than significant, assuming the impacts of this alternative would be much lower for views of wilderness and recreation areas. The extent and severity of glint and glare effects would be lower compared to the proposed project. Views from the wilderness and recreation areas, including the Old Spanish National Historic Trail alignment, would be impacted but to a lesser degree. Overall, the visual impacts of this alternative would be **much less than the proposed HHSEGS project**.

Waste Management

The location of the Solar PV Alternative would be the same as the proposed project, and it would be no closer to any unidentified recognized environmental conditions. Similar to the proposed project, staff would require investigation and remediation of soil and groundwater contamination if it was encountered during construction and operation of this alternative.

A solar panel (PV module or PV panel) is a packaged, connected assembly of PV cells. The materials presently used in PV modules include, but are not limited to, mono-crystalline silicon, poly-crystalline silicon, and thin-film/amorphous silicon. The crystalline silicon is not considered hazardous. The thin-film PV modules can be fabricated from amorphous silicon, cadmium telluride (CdTe), or copper indium gallium (di) selenide. CdTe is a commonly used solar cell material for the manufacture of thin-film PV panels. The disposal and long term safety of cadmium telluride as a potentially hazardous waste is a known concern in the large-scale commercialization of cadmium telluride solar panels.

Construction and operation of the Solar PV Alternative could produce more hazardous wastes compared to the proposed HHSEGS project, depending on the chosen PV module technology. **Alternatives Table 5** describes four PV projects, including three projects that will use CdTe PV panels. Regardless of whether wastes from this alternative were determined to be hazardous, hazardous landfill capacity is available in Nevada, which is similar to the proposed project. Staff considers project compliance with LORS and staff's conditions of certification to be sufficient to ensure that no significant impacts would occur as a result of waste management associated with the

Solar PV Alternative. Impacts related to waste management would be **similar to the proposed HHSEGS project**.

If hazardous wastes were inadvertently discharged on the site, site characterization and remediation requirements would remain the same as for the proposed project. Staff concludes that compliance with applicable LORS and implementation of appropriate conditions of certification would be sufficient to ensure that no significant impacts would occur; however, there is an increased risk of potential impacts from PV cells that could contain potentially hazardous substances, which could be discharged to the environment. Depending on the type of PV module selected, the potential impact on human health and the environment would be **somewhat greater than the proposed HHSEGS project**.

Soil and Surface Water

Staff has not identified significant differences regarding the amount of grading needed for installation of PV panels that are either the fixed-tilt or tracking type. The same is true for the potential effects of this alternative on flood flows during project operations. This discussion of the potential impacts of the Solar PV Alternative on water quality applies to both types of PV panels.

PV systems do not use steam generators because receiver units directly generate electricity and thus do not require the steam boilers, generators, steam condensers, and/or auxiliary heat rejection equipment generally associated with a traditional power plant. As a result, characteristic impacts on water quality caused by the presence of power plant facilities would be **much less than HHSEGS** for a PV alternative, namely the disposal of industrial wastewater and the risk of storm water exposure to industrial chemicals. Domestic sanitary waste would still need a septic system for proper disposal, and impacts related to sanitary waste would be **similar to HHSEGS**.

As discussed above under, "Waste Management," depending on the PV module technology, use of PV panels could cause the release of hazardous CdTe waste if panels were damaged. The inadvertent discharge of hazardous waste during a large storm event would increase the potential for water quality impacts from storm damage to **somewhat greater than HHSEGS**.

As discussed above, information in the final project approval documents for four solar PV projects in California indicate an average land use efficiency of approximately 7 acres per MW. Land use efficiencies of less than 7 acres per MW are being achieved at some utility-scale PV installations in the state (**Alternatives Table 5**). Assuming that PV module supports would involve similar low impact flow-through installation with similar land use efficiency as the proposed project, impacts from 100-year flood flows would be **similar to the proposed HHSEGS project** as well as the potential for on-site/off-site flooding.

The possible need to reconfigure the proposed HHSEGS site for installation of either fixed-tilt or tracking PV modules could change the site layout, including the dirt roads that would be constructed for access and maintenance of PV panels. Because of the

decrease in frequency for washing of PV panels compared to what would be required to maintain the heliostats under the proposed project, this alternative would create less dust overall from washer vehicles driving on the dirt roads. Impacts related to soil erosion during project operations would be **less than HHSEGS**.

Much like installation of heliostats for the proposed project, installation of the PV panels would not necessarily require significant site grading, and the Solar PV Alternative and the proposed project would need similar areas for construction laydown and temporary parking. The Solar PV alternative would not require the same level of construction activities needed to build traditional power plant facilities. Compared to the proposed project, this alternative would not require a temporary concrete batch plant for the solar tower or large foundations, or a temporary assembly building to construct heliostats. These construction activities for the proposed project would require more excavation, heavy equipment, personnel, and truck traffic, resulting in a higher erosion potential than the Solar PV Alternative. Based on these factors, the impacts from the PV Alternative related to soil erosion during construction would be **somewhat less than HHSEGS**.

Water Supply

Solar PV technology employs either fixed-tilt or tracking solar panels to collect incident radiation. Between these two options, staff has not identified significant differences in the potential impacts on groundwater resources.

The Solar PV Alternative would require less water for project operations, given the less frequent washings required for PV solar panels. Operational water use is estimated up to approximately 12 afy under the Solar PV Alternative. Impacts on the Pahrump groundwater basin and local well owners would be reduced relative to the proposed HHSEGS project. Given the lower water use for this alternative, potential impacts on water supply would be **somewhat less than HHSEGS**.

The groundwater basin is already in overdraft; therefore, any additional water use, no matter how little, could result in a cumulatively significant impact. If significant impacts were identified on water supply, the same conditions of certification proposed for the HHSEGS project would be recommended for this alternative, which would mitigate the impacts to a level that is less than significant.

PARABOLIC TROUGH ALTERNATIVE

Overview

This alternative would involve constructing and operating a utility-scale parabolic trough project at the proposed project site. A parabolic trough system converts solar radiation into electricity using sunlight to heat a thermal fluid, typically synthetic oil (i.e., the HTF). Parabolic trough power plants consist of horizontal, trough-shaped solar collectors that are arranged in parallel rows and aligned on a north-south horizontal axis. Each parabolic trough collector has a linear parabolic-shaped reflector that focuses the sun's rays on a linear receiver tube (i.e., heat collection element) suspended at the focal point of the curve-shaped collector. The trough rotates east to west to track the sun during

the day, heating the HTF circulating in the collection element. The heated HTF is then piped through a series of heat exchangers where it releases its stored heat to generate high pressure steam. The steam is then fed to a traditional steam turbine generator where electricity is produced. **Alternatives Figure 9** shows photographs of existing parabolic trough project facilities.

Beginning in 1984, nine solar power plants using parabolic trough technology were constructed in the Mojave Desert in San Bernardino County. Solar Electric Generating Systems (SEGS) III through VII are at Kramer Junction (**Alternatives Figure 9**), SEGS VIII and IX are at Harper Lake, and SEGS I and II are at Daggett near Barstow. The nine SEGS projects have a combined total capacity of 354 MWs. Natural gas-fired facilities provide additional operational flexibility for each of the SEGS projects. These power plants cover a combined total of more than 1,600 acres. Several online sources report that SEGS VIII and IX have operated successfully and without interruption from the beginning (i.e., since they began operating in 1990 and 1991, respectively).

In February 1999, a 900,000-gallon storage tank containing the HTF, therminol, exploded at the SEGS II solar power plant, sending flames and smoke into the sky. As reported at the time, “[f]irefighters ‘tried to put water on it and said it was like putting out a house fire with a garden hose’” (Los Angeles Times 1999). At the time of the accident, authorities worked to keep flames away from two adjacent containers that held sulfuric acid and caustic soda, both toxic substances. Police and fire officials evacuated a half-square-mile area around the facility; no injuries were reported.

In 2008 and 2009, the Energy Commission received AFCs for several renewable energy projects that were proposed to use parabolic trough technology. Staff is monitoring construction of two of the projects that were licensed by the Energy Commission in September 2010—the Abengoa Mojave Solar Project (AMSP) and the Genesis Solar Energy Project (GSEP). Neither of these projects includes energy storage.

AMSP is near Harper Lake in San Bernardino County, about 9 miles northwest of the community of Hinkley. The SEGS VIII and IX facilities are immediately northwest of the AMSP site. GSEP is in the Sonoran Desert of east central Riverside County, about 25 miles west of Blythe. Each project consists of two 125-MW power plants for a combined total capacity of 500 MWs. Commercial operation of AMSP is anticipated in winter 2013. Commercial operation of the two GSEP power plants is anticipated to occur consecutively in spring 2013 and 2014. Natural gas-fired auxiliary boilers will provide equipment and HTF freeze protection for each 125-MW power island for the two projects.

When construction of AMSP is finished, it will cover approximately 1,765 acres. GSEP will cover approximately 1,800 acres. Land use efficiency for each project is a little over 7 acres per MW, which is comparable to the average land use efficiency for BrightSource Energy’s proposed HHSEGS and Rio Mesa SEGF projects.

AMSP will use wet cooling, and maximum operational water use for the project will total approximately 2,160 afy. GSEP will use dry cooling, requiring approximately 202 afy.

Potential to Attain Project Objectives

Development of an approximately 500-MW parabolic trough project at the proposed project site could potentially meet the project objectives related to construction and operation of a utility-scale renewable electrical generation facility, which would lead to the sale of renewable energy and contribute to achieving California's renewable energy goals; approval of amendments to the PPAs by CPUC could be required. This alternative could potentially satisfy the project objective to meet permitting requirements and comply with applicable LORS. This alternative would satisfy the project objective to develop a renewable energy facility in an area with high solar value and minimal slope. The Parabolic Trough Alternative could potentially satisfy the project objective to avoid or minimize significant impacts to the greatest extent feasible, although site grading and earthwork for a parabolic trough project generally requires removal of all vegetation and mass grading to level the site. Construction of engineered drainage channels is required to direct stormwater runoff around the solar field(s). The extent and intensity of ground disturbance could be greater under this alternative compared to the proposed project. See the discussions below under, "Environmental Analysis," for general analyses of the potential environmental effects of the Parabolic Trough Alternative.

Staff submitted data requests for additional information to compare the proposed HHSEGS project to an alternative using parabolic trough technology at the HHSEGS site. In the corresponding data responses, the applicant describes how "the HHSEGS site is roughly triangular in shape, and trough plants can only be built in large rectangles. An analysis of the HHSEGS site shows that about 25 percent of the site could not be exploited for a reasonable trough alternative...." (Hidden Hills Solar I and II, LLCs 2012b). Staff does not have information to confirm the accuracy of this estimate.

The Parabolic Trough Alternative could potentially satisfy five or six of the seven project objectives. Like the proposed project, this alternative would have a limited ability to satisfy the project objective addressing operational flexibility. The proposed 3,277-acre project site could possibly be used for construction of a parabolic trough project. Because this alternative would use the proposed project site, the objective to obtain site control and use within a reasonable period of time would be attained. The total potential generating capacity of this alternative is unknown and could be less than the proposed 500-MW capacity of the proposed project.

Potential Feasibility Issues

Changing the project technology at the HHSEGS site to a parabolic trough technology would likely require filing of an amended advice letter with CPUC requesting amendments to the PPAs, at least with regard to schedule. The work required to redesign the project and reconfigure the site to use a parabolic trough technology would delay the project schedule, and it is not known whether CPUC would approve amendments to the PPAs allowing the change, if such approvals would be necessary. It is not known at what point a project schedule delay would affect project viability.

Environmental Analysis

Alternatives Table 7 presents a summary comparison of impacts of the proposed HHSEGS project to the same or similar potential impacts of the Parabolic Trough Alternative. Comparative discussions for each environmental topic area follow the table.

Alternatives Table 7 Summary Comparison of the Proposed Project's Impacts to the Parabolic Trough Alternative		
Environmental Effect	Proposed Project	Parabolic Trough Alternative
Air Quality		
Construction-related emissions	SM	Similar to HHSEGS (SM)
Project operations emissions	SM	Similar to HHSEGS (SM)
Biological Resources		
Impacts on special-status plant species	SM	Same as HHSEGS (SM)
Impacts on waters of the U.S. and waters of the state	SM	Same as HHSEGS (SM)
Impacts on desert tortoise	SM	Same as HHSEGS (SM)
Impacts on special-status terrestrial wildlife species (other than desert tortoise)	SM	Same as HHSEGS (SM)
Impacts on avian species from collisions with project features (see biological resources note)	PSU	Unknown (PSU)
Impacts on avian species from exposure to concentrated solar flux	PSU	—
Potential impacts on groundwater dependent ecosystems	PSM	Similar to HHSEGS (PSM)
Biological resources note: Collisions could be secondary to retinal damage from glint or glare.		
Cultural Resources		
Potential to disturb, destroy, or visually degrade significant prehistoric and historical archaeological sites <i>on</i> the site (see note)	LS	Similar to HHSEGS (LS)
Potential to disturb, destroy, or visually degrade significant prehistoric and historical archaeological sites <i>beyond</i> the site	SU	Much less than HHSEGS (PSM)
Potential impacts on significant built-environment cultural resources (Old Spanish Trail – Mormon Road Northern Corridor) <i>on</i> the site	SM	Similar to HHSEGS (SM)
Potential impacts on significant built-environment cultural resources (Old Spanish Trail – Mormon Road Northern Corridor) <i>beyond</i> the site	SU	Somewhat less than HHSEGS (PSM)
Potential to disturb, destroy, or visually degrade significant ethnographic resources <i>on</i> the site	SU	Similar to HHSEGS (PSU)

**Alternatives Table 7
Summary Comparison of the Proposed Project's Impacts
to the Parabolic Trough Alternative**

Environmental Effect	Proposed Project	Parabolic Trough Alternative
Potential to disturb, destroy, or visually degrade significant ethnographic resources <i>beyond</i> the site	SU	Somewhat less than HHSEGS (PSU)
Note: "Site" means the facility site proper and does not include linear or ancillary infrastructure away from the facility site.		
Fire Protection		
Potential impacts on local fire protection resources	PSM	Much greater than HHSEGS (SM)
Potential impacts on emergency response services	PSM	Much greater than HHSEGS (SM)
Geology and Paleontology		
Potential impacts from strong seismic shaking	SM	Much less than HHSEGS (PSM)
Potential impacts from soil failure caused by liquefaction, hydrocollapse, formation of soil fissures, and/or dynamic compaction	SM	Much less than HHSEGS (PSM)
Potential impacts on paleontological resources	SM	Less than HHSEGS (PSM)
Potential impacts on geological or mineralogical resources	LS	Same as HHSEGS (LS)
Hazardous Materials		
Potential for release of hazardous materials to occur on-site	SM	Somewhat greater than HHSEGS (SM)
Potential for release of hazardous materials to occur off-site	SM	Somewhat greater than HHSEGS (SM)
Land Use		
Conflicts or inconsistencies with general plan land use designations and zoning	SU	Same as HHSEGS (SU)
Conversion of agricultural land	—	—
Noise and Vibration		
Potential for noise to impact noise-sensitive receptors	PSM	Similar to HHSEGS (PSM)
Public Health		
Potential for project construction to cause air toxics-related impacts that could affect public health	LS	Similar to HHSEGS (LS)
Potential for project operations to cause air toxics-related impacts that could affect public health	LS	Similar to HHSEGS (LS)
Socioeconomic Resources		
Construction employment and increased taxes and fees	B	Similar to HHSEGS (B)

**Alternatives Table 7
Summary Comparison of the Proposed Project's Impacts
to the Parabolic Trough Alternative**

Environmental Effect	Proposed Project	Parabolic Trough Alternative
Displacement of existing rural residences	—	—
Potential impacts on emergency medical and law enforcement services	PSM	Similar to HHSEGS (PSM)
Traffic and Transportation		
Potential impacts on roadway infrastructure	SM	Same as HHSEGS (SM)
Potential for glint and glare to cause safety hazards or a distinct visual distraction effect from an operator control perspective (i.e., vehicle drivers and aircraft pilots)	PSM	Less than HHSEGS (PSM)
Potential for construction equipment and/or permanent structures to exceed 200 feet in height above ground level	SM	—
Transmission Line Safety and Nuisance		
Potential for impacts related to aviation safety, hazardous shocks, nuisance shocks, and electric and magnetic field exposure	SM	Similar to HHSEGS (SM)
Visual Resources		
Construction-Related Impacts		
Potential to substantially degrade the existing visual character or quality of the site and its surroundings	SU	Similar to HHSEGS (SU)
Potential to create a new source of substantial light or glare which would adversely affect day or nighttime views in the area	SU	Similar to HHSEGS (PSM)
Project Operations Impacts		
Potential to substantially degrade the existing visual character or quality of the site and its surroundings	SU	Somewhat less than HHSEGS (SU)
Potential to create a new source of substantial light or glare which would adversely affect day or nighttime views in the area	SU	Somewhat less than HHSEGS (SU)
Waste Management		
Potential for disposal or diversion of project materials to cause impacts on existing waste disposal or diversion facilities	SM	Similar to HHSEGS (PSM)
Potential for impacts on human health and the environment related to past or present soil or water contamination	PSM	Similar to HHSEGS (PSM)
Soil and Surface Water		
Soil erosion by wind and water during project construction	SM	Much greater than HHSEGS (SM)

Alternatives Table 7
Summary Comparison of the Proposed Project's Impacts
to the Parabolic Trough Alternative

Environmental Effect	Proposed Project	Parabolic Trough Alternative
Soil erosion by wind and water during project operations	PSM	Less than HHSEGS (PSM)
Water quality impacts from contaminated storm water runoff	SM	Somewhat greater than HHSEGS (SM)
Water quality impacts from storm damage	PSM	Greater than HHSEGS (PSM)
Water quality impacts from power plant operations	SM	Similar to HHSEGS (SM)
Water quality impacts from sanitary waste	SM	Similar to HHSEGS (SM)
Potential impacts from on-site and off-site flooding	SM	Much less than HHSEGS (SM)
Potential to impede or redirect 100-year flood flows, as shown on Federal Emergency Management Agency maps	LS	Similar to HHSEGS (LS)
Water Supply		
Potential impacts on local wells	PSM	Similar to HHSEGS (PSM)
Potential impacts on groundwater basin balance	PSM	Similar to HHSEGS (PSM)

Air Quality

The number and type of emitting sources during project operations under the Parabolic Trough Alternative would be the same or similar to those of the proposed project; however, this alternative would likely use a heat transfer fluid (HTF) in the receiver tubes of the parabolic mirrors during project operations. When HTF leaks from project apparatus (e.g., piping, flanges, leaks, etc.) it vaporizes into small amounts of volatile organic compounds (VOCs), which are ozone precursors. The local air district would most likely require controls to minimize impacts at the project site. Overall, air quality impacts would be **similar to HHSEGS** for the Parabolic Trough Alternative.

Construction-related emissions and impacts would be **similar to HHSEGS** for this alternative. Similar to the proposed project, this alternative would cause an overall cumulative reduction in GHG emissions from power plants; however, more stringent conditions of certification would be required compared to the proposed project to ensure that the Parabolic Trough Alternative would not make a cumulatively considerable contribution to a significant cumulative impact associated with air quality.

Biological Resources

The Parabolic Trough Alternative would be constructed and operated at the proposed HHSEGS site. Therefore, impacts on special-status plants, waters of the state, and

waters of the U.S. would be **the same as HHSEGS**. Impacts on desert tortoise and other special-status wildlife species would also be **the same as HHSEGS**.

Parabolic trough technology has the potential to impact avian species from collisions with solar troughs and other project facilities or transmission lines, exposure to glint and glare and the effects of polarized light pollution, and loss of habitat. The analysis of glint and glare impacts for the Blythe Solar Power Project (originally licensed by the Energy Commission as a parabolic trough project) concluded that pedestrians within approximately 60 feet of the solar field perimeter fencing could experience unsafe light intensity (Energy Commission 2010b). It is unknown how glint and glare effects from the Parabolic Trough Alternative would affect the vision of avian species; therefore, the level of significance of this impact is unclear. Similarly, the extent and severity of injury and mortality from collision with project structures under the Parabolic Trough Alternative are unknown, although the Energy Commission decision for the Blythe Solar Power Project concluded that impacts on avian species could be mitigated below a level of significance with implementation of Condition of Certification **BIO-15**, which would have been achieved through preparation and implementation of an “Avian Protection Plan” to monitor the death and injury of birds from collisions with facility features. **BIO-15** further requires that the monitoring data would be “used to inform an adaptive management program that would avoid and minimize project-related impacts” (Energy Commission 2010c). The Parabolic Trough Alternative would not require central collector towers, which would eliminate the potential for avian species to collide with extremely tall structures. However, without further data, staff concludes that impacts on avian species from collisions with project features under this alternative cannot be reasonably compared to the proposed project; and a conclusion for comparative avian impacts is **unknown**. No on-site avoidance measures for this impact are feasible; therefore, avian collision impacts would remain potentially significant and unavoidable.

By comparison, the proposed project would also have the potential to impact avian species through exposure to concentrated solar flux and loss of habitat. Parabolic trough technology does not concentrate solar flux over the solar field; therefore, **no impacts** on avian species from exposure to concentrated solar flux would occur under this alternative. Impacts related to habitat loss could be reduced to less than significant with implementation of appropriate mitigation measures.

Staff assumes this alternative would use dry cooling processes, with groundwater pumping for operational use similar to that of the proposed project. Under those conditions, potential impacts on groundwater dependent plants and associated wildlife species would be **similar to HHSEGS**. Conditions of certification would be recommended to reduce the project’s potential effects on groundwater dependent plants and wildlife species to below a level of significance.

Cultural Resources

Construction and operation of the Parabolic Trough Alternative at the proposed project site could increase the extent of physical ground disturbance on the project site due to the extensive site grading and leveling that would be required. However, staff has concluded that the potential to disturb, destroy, or visually degrade significant

prehistoric and historical on-site archaeological resources would be **similar to HHSEGS**; like the proposed project, the impact conclusion is less than significant for archaeological and built-environment resources. Due to the character of the ethnographic resources present *on* the facility site, the impact on those resources would remain potentially significant and unavoidable.

The vertical profile of this alternative would be dramatically reduced without the proposed HHSEGS power towers. The overall visual impacts of this alternative on the broad, landscape-scale resources that are of concern to staff and the relative visual intrusion on off-site resources would be **much less than HHSEGS** for the Parabolic Trough Alternative. The overall physical disturbance of the portions of the resources on the facility site, although small relative to the broad scales of the subject landscapes, would nonetheless be roughly comparable to the site disturbance that would occur under the proposed project. Staff characterizes the net effect of this alternative on historical resources as **much less than HHSEGS**. Of the impacts identified by cultural resources staff, two impacts addressing archaeological and built-environment resources *beyond* the site that are considered “significant and unavoidable” under the proposed project would be reduced to “potentially significant” under this alternative (see **Alternatives Table 7**). These two impacts could be reduced to less than significant with implementation of appropriate compensatory mitigation measures.

Impacts addressing two ethnographic resources *on* and *beyond* the site that are considered “significant” under the proposed project are considered “potentially significant” under this alternative. These two impacts are considered, **similar to HHSEGS**, and, **somewhat less than HHSEGS**, respectively. Because no feasible means of compensation are available to reduce these impacts on aboriginal ancestral territory, staff concludes that these two impacts would remain significant and unavoidable under the Parabolic Trough Alternative.

Fire Protection

The Parabolic Trough Alternative would require the use of significant amounts of combustible HTFs, which would significantly increase the fire risk at the facility and would also increase the potential for project construction and operations impacts on local fire protection resources that protect communities currently served by such resources. This alternative would also require a significant number of deliveries of HTF to the site during project construction. Traffic accidents, including those that could potentially cause spillage of flammable materials, would increase the need for emergency response services and potential impacts on local fire protection resources. Impacts on fire protection services and resources under the Parabolic Trough Alternative would be **much greater than HHSEGS**. Staff has determined that impacts on the local fire department would be significant under this alternative due to the predicted increase in emergency response calls during project construction and operation. Mitigation measures would require payment of as yet undetermined project-specific fees to the local fire protection service to enable augmentation of resources such as staff, equipment, and facilities. With implementation of appropriate mitigation

measures, impacts on local emergency services would be reduced to less than significant.

Geology and Paleontology

Construction and operation of the Parabolic Trough Alternative at the proposed project site could have fewer impacts compared to the proposed HHSEGS project. As discussed above, the Solar PV Alternative would not require the deep or otherwise specialized foundations that would be required for the SPTs and the numerous heliostat foundations of the proposed project. However, the Parabolic Trough Alternative would require relatively deep foundations (as deep as 20 feet below ground surface), but they would be fewer in number, larger in diameter, and constructed in drilled soil borings from which soils could be monitored and fossils recovered. The reduction in the number of deep foundations would decrease the potential for encountering fossil-bearing strata, and due to the elimination of the SPTs, this alternative as a whole would be much less susceptible to the effects of strong seismic shaking. The net effect of potential impacts on geological and paleontological resources under this alternative would be **less than HHSEGS**.

Hazardous Materials

The Parabolic Trough Alternative would require the use of significant amounts of HTF, which is a combustible material. The potential for off-site impacts in the event of an accidental release of hazardous materials would increase under this alternative due to the substantial increase in use of combustible liquid that is required with this technology. However, because of the site's remote location, an accidental release of hazardous materials is unlikely to cause significant impacts at the facility. This alternative would also involve the transport of significant amounts of combustible HTF to the site, which could increase risks to road users and populations living along transportation routes to the facility if an accidental release of hazardous materials occurred. Additional conditions of certification would be required to reduce significant impacts to less than significant. This impact is **somewhat greater than HHSEGS**.

Land Use

Construction and operation of the Parabolic Trough Alternative at the proposed project site would be inconsistent with Inyo County's designated land uses (OSR and REC) and zoning for the Charleston View area (OS-40). An amendment to the Inyo County General Plan would be required to ensure consistency of this alternative with the Land Use Element. Land use impacts would be the **same as HHSEGS** for the Parabolic Trough Alternative.

Noise and Vibration

Similar to the SPT technology, in an alternative project using the parabolic trough technology, the power blocks would be the chief noise producers. This technology, with its power blocks located in the center of each mirror field, would have similar noise impacts as those expected from HHSEGS. Impacts related to noise would be **similar to HHSEGS** under this alternative. Like the proposed project, conditions of certification

would be required to ensure that potentially significant noise impacts were reduced to less than significant during project construction and operation.

Public Health

The Parabolic Trough Alternative would require the use of similar equipment and apparatus for project operations as the proposed project. For both technologies, emissions would occur from vehicles and equipment that would be used to clean the mirrors. However, this alternative could cause emissions of small amounts of VOCs from potential leaks of HTF from flanges or that could be lost during routine maintenance activities such as HTF pipeline repair or replacement. Combustion-related criteria pollutants and hazardous air pollutants (HAPs) emissions are also possible from process boilers. Such emissions would occur at low levels; therefore, this alternative technology would not pose a significant risk from the emissions of concern in the public health analysis. This impact would be **similar to HHSEGS** for construction and operations emissions. No significant impacts would occur, and no conditions of certification would be required.

Socioeconomic Resources

Under the Parabolic Trough Alternative, the beneficial impact through construction employment and increased taxes and fees would be **similar to HHSEGS**. Potential impacts on emergency medical and law enforcement services would be **similar to HHSEGS**. Like the proposed HHSEGS project, this alternative would increase demand for these public services; however, similar mitigation measures would reduce these impacts to less than significant.

Traffic and Transportation

Similar to the proposed project, the Parabolic Trough Alternative would require use of SR 160 and the Old Spanish Trail Highway for hauling of equipment and materials to the project site, which could cause a significant impact on the structural integrity of the road due to the current and predicted future conditions of the roadway pavement. This impact would be the **same as HHSEGS**.

A parabolic trough is constructed as a long parabolic mirror. The trough is usually aligned on a north-south axis and rotated east-west to track the sun. Glint and glare from specular reflection off the troughs could occur when the troughs are moving from a stow to a tracking position and from a tracking to a stow position. This rotation occurs at the beginning and end of daily operations. This flash of brightness can be classified as an intrusive bright nuisance and optical hazard at short distances. As such, there would be the potential for specular reflection from the parabolic troughs associated with this alternative to affect motorists on the Old Spanish Trail Highway. Given that this alternative would not include power towers topped by SRSGs, it is assumed that potential impacts related to glint and glare would be **less than the proposed HHSEGS project**. Like the proposed project, this alternative would require preparation and implementation of a plan to ensure continuous monitoring of the heliostat mirrors for malfunctions and to ensure that they would remain properly aligned with the sun. (See Condition of Certification **TRANS-8** in this staff assessment.)

Staff reviewed the decisions for several of the parabolic trough projects that were licensed by the Energy Commission in 2010. No construction equipment or permanent structures were identified for those projects that would be taller than the projects' transmission lines, which are less than 200 feet tall. No structures would necessarily require review and approval by FAA, and **no impact** would occur under the Parabolic Trough Alternative.

Transmission Line Safety and Nuisance

Under the Parabolic Trough Alternative, the utilized transmission lines and related impacts would be of the same magnitude as those discussed for the proposed HHSEGS project in this staff assessment. This means that the magnitude of these transmission line-related impacts would be similarly less than significant. This impact would be **similar to HHSEGS**.

Visual Resources

Comparison of the Proposed HHSEGS Project to the Parabolic Trough Alternative

Similar to the Solar PV Alternative, the solar collectors associated with the Parabolic Trough Alternative would be arranged in parallel rows across the site. However, the basic processes to produce electricity under this alternative are similar to those of a power tower project. Project components for the Abengoa Mojave Solar Project include the two steam turbine generator buildings, each measuring approximately 73 feet tall, 42 feet long, and 108 feet wide. Most other structures will be less than 50 feet tall. The solar collector arrays are approximately 21 feet tall. The tallest structures are the 80- to 110-foot-tall transmission line monopoles. The overall vertical profile of the Parabolic Trough Alternative would be more uniform across the site compared to the proposed project.

Under this alternative, the parabolic trough solar collectors would be reflective on the mirror side. Sufficient setback distances, use of non-reflective finishes on the back side of the troughs, and visual screening measures could potentially mitigate the effects of glint and glare at KOP 3. Intervening ground plane elements would likely block views of the troughs from KOP 1, KOP 2, and KOP 4, but the project's other taller structures could be partially visible from KOPs 1 and 4. Conditions of certification, such as specifying the use of non-reflective surface finishes complementary to the desert landscape, could reduce impacts to less than significant at KOP 4. Views from KOP 5 would still be significantly altered because of the higher angle of views toward the reflective array of solar troughs. These impacts would remain significant and unavoidable under the Parabolic Trough Alternative. Visual resources impacts at KOP 6 could be reduced to less than significant with implementation of appropriate mitigation measures. It is difficult to characterize the visual impact on the view from KOP 7 without a visual simulation. It is likely that the arrays would appear prominently in the middle ground, as would this alternative's taller structures. Under existing conditions, there is little to impede the view from KOP 7. The visual impacts on the view from the Old Spanish National Historic Trail and the Pahrump Valley Wilderness would remain significant and unavoidable.

Environmental Impacts

Construction-related visual impacts of the Parabolic Trough Alternative would be **similar to the proposed HHSEGS project**. Views during project construction phases would include views of equipment and stored materials. The lack of extremely tall structures and cranes with FAA safety lighting under this alternative would reduce the severity of construction-related impacts on visual resources. At ground level, much of the construction activity would be screened, and conditions of certification would be implemented to partially screen views and reduce the impacts of construction area lighting. Staff identifies a “significant and unavoidable” impact for construction-related light or glare effects under the proposed project. Because the Parabolic Trough Alternative would not require lighting of extremely tall construction equipment and support structures, construction-related light or glare effects could be reduced compared to the proposed project to “less than significant” with implementation of appropriate mitigation measures. However, implementation of feasible mitigation measures would not be sufficient to reduce the overall level of effects to less than significant, and construction-related impacts on the existing visual character or quality of the site and its surroundings would remain significant and unavoidable.

Conditions of certification requiring sufficient setback distances, use of non-reflective finishes on the backs of the troughs, and visual screening measures could potentially reduce the visual impacts at KOPs 3 and 4 to less than significant. Overall, the visual impacts identified for the proposed project would be reduced under the Parabolic Trough Alternative. The visual analysis for the proposed HHSEGS project identifies significant and unavoidable impacts at six of the seven KOPs. Visual impacts under this alternative at KOPs 5 and 7 would be significant and unavoidable under the Parabolic Trough Alternative. The overall alternative project operations impacts on visual resources would be **somewhat less than the proposed HHSEGS project**. The net effect of this alternative on visual resources is considered significant and unavoidable due to the high reflectivity of the parabolic mirrors; no feasible mitigation measures could fully reduce the net effect to a less-than-significant level.

Waste Management

The location of the Parabolic Trough Alternative would be the same as the proposed project, and it would be no closer to any unidentified recognized environmental conditions. Similar to the proposed project, staff would require investigation and remediation of soil and groundwater contamination if it was encountered during construction and operation of this alternative. Site characterization and remediation requirements would remain the same as for the proposed project.

The Parabolic Trough Alternative would produce less waste than the proposed HHSEGS project based on a comparison to waste estimates provided for two parabolic trough projects that were licensed by the Energy Commission in 2010 (Genesis and Beacon Solar Energy Projects). Similar to the proposed project, staff considers project compliance with LORS and staff’s conditions of certification to be sufficient to ensure that no significant impacts would occur as a result of waste management associated

with the Parabolic Trough Alternative. Potential impacts on existing waste disposal facilities and human health and the environment would be **similar to HHSEGS**.

Soil and Surface Water

The Parabolic Trough Alternative would require traditional power plant facilities similar to the proposed project; therefore, potential impacts caused by the disposal of industrial wastewater would be **similar to HHSEGS**. However, the added risk of accidental leaks or spills of heat transfer fluid would increase the potential impacts of contaminated storm water runoff for the Parabolic Trough Alternative. This is an impact that would be unique to the Parabolic Trough Alternative; therefore, potential impacts related to contaminated storm water runoff would be **somewhat greater than HHSEGS**. Domestic sanitary waste would still need a septic system for proper disposal, so these impacts would be the **similar to HHSEGS**.

A technical limitation for parabolic trough facilities is the need for very flat terrain. Because the piping interconnecting of the troughs has a very low tolerance for change in slope, the parabolic troughs need to be on less than 2 percent slope, and preferably less than 1 percent (BLM 2010). Land requirements for utility-scale parabolic trough power plants that have been reviewed by staff range from about 5 acres per MW to a little over 7 acres per MW. Assuming a project site with the same net MW output as the proposed project, the acreage requirement for a parabolic trough alternative could be about the same as the proposed project. The additional amount of total soil disturbance would significantly increase due to the need to level the site for installation of parabolic troughs. As a result, impacts related to soil erosion during construction would be **much greater than HHSEGS** for the Parabolic Trough Alternative as thousands of acres would require vegetation removal and grading, compared to the low impact flow-through layout required for installation of heliostats.

The need for flat terrain results in very different approaches to storm water management between the two technologies. For parabolic trough technologies, large channels just within the project borders would typically be constructed to divert off-site flows away from the solar fields. These channels would help protect the site from off-site flows, so impacts due to on-site flooding would be reduced to less than significant and, therefore, would be **much less than HHSEGS**. However, potential impacts on these diversion channels from storm damage would be **greater than HHSEGS** because flows from multiple existing ephemeral channels would combine, which would increase discharge rates and runoff volumes. Impacts from 100-year flood flows (as shown on the FEMA maps) would be **similar to HHSEGS** for this alternative because the published flood plain boundaries cross the project footprint at two relatively small areas where diversion channels would not adversely impede or redirect flows.

A parabolic trough alternative would utilize soil stabilizers within the solar fields to reduce the amount of dust deposited on the solar collectors (dust adversely affects their efficiency). Therefore, despite the fact that many more acres of land would be disturbed, impacts related to soil erosion during operations likely would be **less than the proposed HHSEGS project**. In addition, the flat slopes and grading would prevent on-

site runoff from concentrating, resulting in shallow sheet flow which minimizes the potential for surface erosion.

Water Supply

Parabolic technology employs a similar steam cycle, and water use for this type of project would be similar to water use proposed for the HHSEGS project assuming dry cooling. Therefore, potential impacts on the Pahrump groundwater basin and local well owners would be **similar to HHSEGS**. These impacts would be potentially significant, and the proposed conditions of certification would be similar to those proposed for the HHSEGS project. Potential impacts on water supply would be mitigated to below a level of significance.

REDUCED ACREAGE ALTERNATIVE

Overview

The Reduced Acreage Alternative would involve reducing the total project acreage of the proposed project to approximately 1,694.5 acres and constructing and operating an approximately 250-MW SPT project at the proposed HHSEGS site. The technology for the Reduced Acreage Alternative would be the same as described for the proposed HHSEGS project. This alternative retains Solar Plant 2 from the proposed HHSEGS project, including one 750-foot SPT, and the adjacent 103-acre common area.

Alternatives Figure 10 shows the alternative site. The proposed natural gas pipeline and transmission line for this alternative are shown to follow the same routes as for the proposed project. A total of approximately 85,000 heliostats would be installed under this alternative. The temporary construction area for the proposed project is reduced to approximately 90 acres and relocated to the northwest corner of the alternative site. The total acreage for this alternative includes the 90-acre temporary construction area.

The Reduced Acreage Alternative was added to staff's alternatives analysis for publication in the final staff assessment and responds to comments on staff's alternatives analysis in the preliminary staff assessment requesting consideration of an alternative with a smaller site footprint.

Potential to Attain Project Objectives

Development of an approximately 250-MW SPT project using the same technology as the proposed HHSEGS project would partially satisfy the first project objective to construct and operate a renewable electrical generation facility resulting in the sale of competitively priced renewable energy consistent with the needs of California utility companies; however, the total proposed 500-MW capacity would not be achieved. The Reduced Acreage Alternative could potentially meet the project objective related to development of a renewable energy facility to contribute to achieving California's renewable energy goals.

This alternative could potentially satisfy the project objectives addressing the requirement to comply with applicable LORS and avoid or minimize significant impacts to the greatest extent feasible. Staff observes that impacts on some resources would be

reduced under this alternative compared to the proposed project, particularly when there is a direct correlation between project acreage and the extent of the impact. It is likely that the objective to obtain site control and use within a reasonable period of time could be attained for this alternative. The Reduced Acreage Alternative would satisfy the project objective to develop a renewable energy facility in an area with high solar value and minimal slope. See the discussions below under, “Environmental Analysis,” for general analyses of the potential environmental effects of the Reduced Acreage Alternative.

The Reduced Acreage Alternative could potentially satisfy five of the seven project objectives. Like the proposed project, this alternative would have a limited ability to satisfy the project objective addressing operational flexibility. This alternative could potentially satisfy the project objective to construct and operate a renewable electrical generation facility, although the total energy capacity of approximately 500 MWs would not be achieved; this objective would be partially satisfied.

Potential Feasibility Issues

Staff presumes that the two solar plants under the proposed project are each the subject of one of the PPAs approved by CPUC in 2010. If the total energy capacity was reduced to approximately 250 MWs under the Reduced Acreage Alternative, it is unknown whether an amendment to either of the approved PPAs by CPUC would be required. It is not known whether eliminating Solar Plant 1 from the northern portion of the proposed HHSEGS site would result in a project schedule delay, which could potentially affect project viability.

Environmental Analysis

Alternatives Table 8 presents a summary comparison of impacts of the proposed HHSEGS project to the same or similar potential impacts of the Reduced Acreage Alternative. Comparative discussions for each environmental topic area follow the table.

Alternatives Table 8 Summary Comparison of the Proposed Project’s Impacts to the Reduced Acreage Alternative		
Environmental Effect	Proposed Project	Reduced Acreage Alternative
Air Quality		
Construction-related emissions	SM	Similar to HHSEGS (SM)
Project operations emissions	SM	Somewhat less than HHSEGS (SM)
Biological Resources		
Impacts on special-status plant species	SM	Much less than HHSEGS (SM)
Impacts on waters of the U.S. and waters of the state	SM	Much less than HHSEGS (SM)

**Alternatives Table 8
Summary Comparison of the Proposed Project's Impacts
to the Reduced Acreage Alternative**

Environmental Effect	Proposed Project	Reduced Acreage Alternative
Impacts on desert tortoise	SM	Much less than HHSEGS (SM)
Impacts on special-status terrestrial wildlife species (other than desert tortoise)	SM	Much less than HHSEGS (SM)
Impacts on avian species from collisions with project features	PSU	Less than HHSEGS (PSU)
Impacts on avian species from exposure to concentrated solar flux	PSU	Less than HHSEGS (PSU)
Potential impacts on groundwater dependent ecosystems	PSM	Somewhat less than HHSEGS (PSM)
Cultural Resources		
Potential to disturb, destroy, or visually degrade significant prehistoric and historical archaeological sites <i>on the site</i> (see note)	LS	Somewhat less than HHSEGS (LS)
Potential to disturb, destroy, or visually degrade significant prehistoric and historical archaeological sites <i>beyond the site</i>	SU	Somewhat less than HHSEGS (SU)
Potential impacts on significant built-environment cultural resources (Old Spanish Trail – Mormon Road Northern Corridor) <i>on the site</i>	SM	Somewhat less than HHSEGS (SM)
Potential impacts on significant built-environment cultural resources (Old Spanish Trail – Mormon Road Northern Corridor) <i>beyond the site</i>	SU	Somewhat less than HHSEGS (SU)
Potential to disturb, destroy, or visually degrade significant ethnographic resources <i>on the site</i>	SU	Somewhat less than HHSEGS (SU)
Potential to disturb, destroy, or visually degrade significant ethnographic resources <i>beyond the site</i>	SU	Somewhat less than HHSEGS (SU)
Note: "Site" means the facility site proper and does not include linear or ancillary infrastructure away from the facility site.		
Fire Protection		
Potential impacts on local fire protection resources	PSM	Somewhat less than HHSEGS (PSM)
Potential impacts on emergency response services	PSM	Somewhat less than HHSEGS (PSM)
Geology and Paleontology		
Potential impacts from strong seismic shaking	SM	Much less than HHSEGS (PSM)
Potential impacts from soil failure caused by liquefaction, hydrocollapse, formation of soil fissures, and/or dynamic compaction	SM	Much less than HHSEGS (PSM)

**Alternatives Table 8
Summary Comparison of the Proposed Project's Impacts
to the Reduced Acreage Alternative**

Environmental Effect	Proposed Project	Reduced Acreage Alternative
Potential impacts on paleontological resources	SM	Much less than HHSEGS (PSM)
Potential impacts on geological or mineralogical resources	LS	Same as HHSEGS (LS)
Hazardous Materials		
Potential for release of hazardous materials to occur on-site	SM	Similar to HHSEGS (PSM)
Potential for release of hazardous materials to occur off-site	SM	Similar to HHSEGS (PSM)
Land Use		
Conflicts or inconsistencies with general plan land use designations and zoning	SU	Same as HHSEGS (SU)
Conversion of agricultural land	—	—
Noise and Vibration		
Potential for noise to impact noise-sensitive receptors	PSM	Similar to HHSEGS (PSM)
Public Health		
Potential for project construction to cause air toxics-related impacts that could affect public health	LS	Similar to HHSEGS (LS)
Potential for project operations to cause air toxics-related impacts that could affect public health	LS	Less than HHSEGS (LS)
Socioeconomic Resources		
Construction employment and increased taxes and fees	B	Similar to HHSEGS (B)
Displacement of existing rural residences	—	—
Potential impacts on emergency medical and law enforcement services	PSM	Similar to HHSEGS (PSM)
Traffic and Transportation		
Potential impacts on roadway infrastructure	SM	Same as HHSEGS (SM)
Potential for glint and glare to cause safety hazards or a distinct visual distraction effect from an operator control perspective (i.e., vehicle drivers and aircraft pilots)	PSM	Similar to HHSEGS (PSM)
Potential for construction equipment and/or permanent structures to exceed 200 feet in height above ground level	SM	Same as HHSEGS (SM)
Transmission Line Safety and Nuisance		
Potential for impacts related to aviation safety, hazardous shocks, nuisance shocks, and electric and magnetic field exposure	SM	Similar to HHSEGS (SM)

**Alternatives Table 8
Summary Comparison of the Proposed Project's Impacts
to the Reduced Acreage Alternative**

Environmental Effect	Proposed Project	Reduced Acreage Alternative
Visual Resources		
Construction-Related Impacts		
Potential to substantially degrade the existing visual character or quality of the site and its surroundings	SU	Similar to HHSEGS (SU)
Potential to create a new source of substantial light or glare which would adversely affect day or nighttime views in the area	SU	Similar to HHSEGS (SU)
Project Operations Impacts		
Potential to substantially degrade the existing visual character or quality of the site and its surroundings	SU	Similar to HHSEGS (SU)
Potential to create a new source of substantial light or glare which would adversely affect day or nighttime views in the area	SU	Similar to HHSEGS (SU)
Waste Management		
Potential for disposal or diversion of project materials to cause impacts on existing waste disposal or diversion facilities	SM	Similar to HHSEGS (PSM)
Potential for impacts on human health and the environment related to past or present soil or water contamination	PSM	Similar to HHSEGS (PSM)
Soil and Surface Water		
Soil erosion by wind and water during project construction	SM	Less than HHSEGS (SM)
Soil erosion by wind and water during project operations	PSM	Less than HHSEGS (PSM)
Water quality impacts from contaminated storm water runoff	SM	Less than HHSEGS (SM)
Water quality impacts from storm damage	PSM	Somewhat less than HHSEGS (PSM)
Water quality impacts from power plant operations	SM	Less than HHSEGS (SM)
Water quality impacts from sanitary waste	SM	Somewhat less than HHSEGS (SM)
Potential impacts from on-site and off-site flooding	SM	Similar to HHSEGS (SM)
Potential to impede or redirect 100-year flood flows, as shown on Federal Emergency Management Agency maps	LS	Similar to HHSEGS (LS)

Alternatives Table 8 Summary Comparison of the Proposed Project's Impacts to the Reduced Acreage Alternative		
Environmental Effect	Proposed Project	Reduced Acreage Alternative
Water Supply		
Potential impacts on local wells	PSM	Somewhat less than HHSEGS (PSM)
Potential impacts on groundwater basin balance	PSM	Somewhat less than HHSEGS (PSM)

Air Quality

The setting and existing conditions for this alternative are the same as for the proposed project. The existing ambient air quality does not change and the facility would still be within the same air basin and subject to the same LORS.

Assessment of Impacts and Discussion of Mitigation

The Reduced Acreage Alternative would essentially reduce the total construction and operations emissions of the proposed project by approximately 50 percent over each time period by eliminating the northern solar plant unit (Solar Plant 1). However, the maximum daily and annual construction emissions are assumed to be **similar to the proposed project**, assuming the same level of maximum activity but reducing the overall construction schedule from 29 months to slightly more than half the time, probably 15–18 months. Therefore, maximum construction emissions would be approximately the same as those shown in **Air Quality Table 7** in the **Air Quality** section of this staff assessment. Maximum construction period impacts for this alternative would also be approximately the same as shown in **Air Quality Table 9**. The maximum daily and annual operating emissions would be approximately 50 percent of those shown in **Air Quality Table 8** and **Air Quality Table 10**, respectively.

The maximum short-term and maximum annual construction pollutant concentration impacts for the Reduced Acreage Alternative could be as high, but no higher than that estimated for the proposed project, assuming the same maximum daily and annual construction activities. Therefore, the worst-case short-term and annual construction pollutant concentration impacts for this alternative are likely to be **similar to impacts shown for the proposed project in Air Quality Table 9**.

The maximum short-term and maximum annual operational air quality impacts for the Reduced Acreage Alternative are also likely to be **somewhat less than the proposed project** as shown in **Air Quality Table 10**. Because the duration of construction is about half, there is less likelihood that adverse meteorological conditions would occur, due to the stochastic nature of the atmosphere. However, any reduction in impacts is uncertain as the worst case impacts are also based on factors such as proximity to receptors and terrain as well as total emissions.

The Reduced Acreage Alternative would result in the following:

- The worst-case short-term construction emissions and ground level pollutant concentration impacts would be **similar to the proposed project** and would require the same level of mitigation. The total construction period and total construction emissions would be reduced from those required to construct the proposed project.
- The operation emissions and ground level pollutant concentration impacts would be **somewhat less than the proposed project**, but the same level of mitigation would be required.
- The benefits of the proposed project in displacing fossil fuel fired generation and reducing associated criteria pollutant and greenhouse gas emissions, potentially anywhere in the Western Electricity Coordinating Council, would be reduced by half.

CEQA Level of Significance

The level of significance under CEQA for the Reduced Acreage Alternative would be the **same as for the proposed project**, with the same significance rationale. Construction and operation of this alternative could cause significant NOx and particulate matter emission impacts. The mitigation measures recommended by staff for the proposed project would also apply to the Reduced Acreage Alternative, and impacts would be reduced to less than significant.

Biological Resources

This alternative would reduce the total project acreage to approximately 1,694.5 acres, using the southern portion of the site, which is Solar Plant 2 under the proposed project. A total of eleven special-status plant species are known to be located on the proposed project site, and of these, impacts on four plant species are considered significant and require mitigation to reduce the impacts to less than significant. The four plant species are gravel milk-vetch, Wheeler's skeletonweed, Torrey's joint, and Preuss' milk-vetch; and these species are distributed rather evenly across the Solar Plant 1 and Solar Plant 2 fields for the proposed project. The Reduced Acreage Alternative would generally avoid half of the mapped locations of these rare plant species identified at the proposed project site, and these impacts would be **much less than the proposed project**. Jurisdictional waters of the U.S. and the state, as identified and mapped all along the eastern boundary of the proposed project site, include slightly more acreage within the northern half of the project site (the Solar Plant 1 area). Impacts on waters of the U.S. and waters of the state under this alternative would be halved, and would, therefore, be **much less than HHSEGS**. Desert tortoise sign and tracks, along with other fully protected furbearing mammals (kit fox) and state species of special concern (burrowing owl) are known to have higher abundance within the northern portion of the proposed project site; therefore, impacts on these species under this alternative would be **much less than HHSEGS**.

The Reduced Acreage Alternative would eliminate one solar power tower and its associated heliostat field. Similar to the proposed project, the structures associated with this alternative could attract birds; it is unknown the extent to which eliminating one solar field would reduce the potential for collisions with project features. By the same reasoning, it is unknown the extent to which eliminating one solar field would reduce the

potential for exposure to concentrated solar flux. Staff concludes that impacts on avian species would be **less than HHSEGS**, to an unquantifiable degree, with elimination of one of the two solar fields. Potential impacts on the groundwater basin would be somewhat less than HHSEGS (see the subsection below, “Water Supply”); therefore, the impacts on groundwater dependent vegetation and associated plant and wildlife species would also be **somewhat less than HHSEGS**.

Cultural Resources

Construction and operation of the Reduced Acreage Alternative at the proposed project site would, by design, significantly reduce the extent of physical ground disturbance due to the reduced areal extent of the facility site. This alternative would produce a similar level of visual intrusion on off-site resources relative to the proposed project because the overall vertical profile of HHSEGS would remain essentially the same. Staff characterizes the net effect of this alternative on historical resources as **similar to that of HHSEGS**. The equivalent height of the vertical profile of the Reduced Acreage Alternative, although one power tower less dense, would nonetheless constitute a profound visual intrusion on the same off-site resources that would be impacted by the proposed project.

Fire Protection

The potential for incidents to occur under the Reduced Acreage Alternative would be similar to the proposed project (e.g., injuries, fires, hazardous materials spills), although because the site acreage and numbers of project structures would be reduced by approximately one-half, the occurrence probability for accidents and incidents would likely be reduced compared to the proposed project. Staff assumes that this alternative would require approximately half the crew size, half the number of heliostats to install and maintain, one less solar tower, and less traffic. In general, construction and operation of the Reduced Acreage Alternative would require half the tasks to be accomplished. Accidents and incidents requiring emergency response services would be expected to have somewhat less probability of occurring on average.

Similar to the proposed HHSEGS project, staff has determined that impacts on the local fire department would be potentially significant under this alternative due to the predicted increase in emergency response calls during project construction and operation. Mitigation measures would likely require payment of undetermined fees specific to this alternative to enable augmentation of resources such as staff, equipment, and facilities. Impacts on fire protection services and resources and corresponding fees under this alternative would be **somewhat less than HHSEGS**; implementation of appropriate mitigation measures would reduce potentially significant impacts to less than significant.

Geology and Paleontology

Construction and operation of the Reduced Acreage Alternative at the proposed project site could have significantly fewer impacts compared to the proposed HHSEGS project. Primarily, the Reduced Acreage Alternative would require installation of a deep or otherwise specialized foundation for the one power tower. This alternative would reduce

installation of heliostat foundations to approximately one-half of the number required for the proposed project. The reduced number of deep foundations would decrease the potential for encountering fossil-bearing strata, and due to elimination of one of the tall tower structures, this alternative as a whole would be less susceptible to the effects of strong seismic shaking. Potential impacts on geological and paleontological resources under this alternative would be **much less than HHSEGS**.

Hazardous Materials

Under the Reduced Acreage Alternative, the proposed project site would be reduced by approximately one half. The elements and major facility components for the solar plant that would be closest to the Old Spanish Trail Highway would be the same as described for the proposed project. This alternative would not necessarily reduce the potential risk of spillage or release of hazardous substances. As described for the proposed project, conditions of certification requiring conformance with applicable LORS would reduce potentially significant impacts to less than significant. No new or more severe significant off-site impacts would occur under this alternative. The potentially significant impacts under the Reduced Acreage Alternative would be **similar to HHSEGS**.

Land Use

The Reduced Acreage Alternative would be constructed and operated on approximately one half of the proposed project site. These lands are designated as Open Space and Recreation (OSR) and Recreation (REC) in the Inyo County General Plan. The zoning district is OS-40. The OSR and REC designations and OS-40 zoning do not allow for the development of large scale solar projects. As with the proposed project, the applicant would be required to apply for a general plan amendment and a zoning reclassification. Although this alternative would be constructed on less land compared to the proposed project, the Reduced Acreage Alternative would be inconsistent with Inyo County's designated land uses and zoning for the Charleston View area, and this land use impact would be the **same as the proposed HHSEGS project**.

Noise and Vibration

The Reduced Acreage Alternative would involve construction and operation of the one solar plant closest to the Old Spanish Trail Highway and approximately 900 feet from the closest sensitive receptors near the south side of the highway. The solar plant in the northern portion of the proposed HHSEGS site that is furthest from sensitive receptors would not be part of this alternative. Given the proximity of the power plant to the rural residences in the Charleston View area, impacts related to noise would be **similar to HHSEGS** under this alternative. Like the proposed project, conditions of certification would be required to ensure that potentially significant noise impacts were reduced to less than significant during project construction and operation.

Public Health

The technology for the Reduced Acreage Alternative would be the same as described for the proposed HHSEGS project. The Reduced Acreage Alternative would essentially reduce the total construction and operations emissions of the proposed project by

approximately 50 percent over each time period by eliminating one of the two units. With a smaller site footprint, toxic air emission levels under this alternative would be **less than HHSEGS** during operational periods. However, assuming the same level of maximum activity but reducing the overall construction schedule from 29 months to slightly more than half the time, probably 15–18 months, short-term emissions and impacts from toxic air contaminants during construction would be **similar to HHSEGS**. As discussed in the **Public Health** section of this staff assessment, potential air toxics-related impacts from operation of the proposed HHSEGS project would be below significance levels within the 6-mile radius of typical concern to staff; therefore, potential impacts within the same 6-mile radius from the Reduced Acreage Alternative would also be less than significant and no conditions of certification would be required. Any **short-term construction impacts would be similar to HHSEGS** and **long-term project operations impacts would be less than HHSEGS**.

Socioeconomic Resources

Under the Reduced Acreage Alternative, the beneficial impact through construction employment and increased taxes and fees would be less than HHSEGS. However, as noted in **Appendix Socio-1, *Socioeconomic and Fiscal Impacts of the Hidden Hills Solar Electric Generating System on Inyo County***, Inyo County's gains would be positive even if the amount of materials subject to sales tax is cut in half. Therefore, under the Reduced Acreage Alternative, the net present value of the project's fiscal impact on the County would still be positive. This impact would be **similar to HHSEGS**. Potential impacts on emergency medical and law enforcement services would be **similar to HHSEGS**. Like the proposed HHSEGS project, this alternative would increase demand for these public services; however, similar mitigation measures would reduce these impacts to less than significant.

Traffic and Transportation

Similar to the proposed project, the Reduced Acreage Alternative would require use of SR 160 and the Old Spanish Trail Highway for hauling of equipment and materials to the project site. Like the proposed project, daily trips under this alternative would have a significant impact on the structural integrity of the Old Spanish Trail Highway in Nevada and California due to the current and predicted future conditions of the roadway pavement. Although this alternative would reduce the number of trips by approximately half (2,000 daily trips compared to 4,000 daily trips, which are predicted for *peak month 19* under the proposed project), Old Spanish Trail Highway lacks shoulders and designed drainage, and is not built or designed for the proposed level of construction traffic that would occur with implementation of this alternative. This impact would be the **same as the proposed HHSEGS project**.

Many of the project elements and major facility components (e.g., heliostat mirrors) that could produce glint and glare effects under this alternative would be the same as those of the proposed HHSEGS project. However, this alternative would include one power tower topped by an SRSG compared to two power towers for the proposed project and approximately half the number of heliostats. Although this alternative would reduce the number of sources that could create glint and glare, the potential for glint and glare

effects would remain. Therefore, it is assumed that potential impacts related to glint and glare would be **similar to the proposed HHSEGS project**.

Because of the solar tower height, the applicant would be required to notify the FAA of construction pursuant to the Code of Federal Regulations, Title 14, Aeronautics and Space, Part 77. These regulations require FAA notification for any proposed structure over 200 feet in height AGL regardless of the distance from an airport. This impact would be **the same as HHSEGS**.

Transmission Line Safety and Nuisance

Under the Reduced Acreage Alternative, the transmission lines would be the same as shown for Solar Plant 2 under the proposed project. No differences in field and nonfield impacts are identified under this alternative, and the magnitude of impacts discussed for the proposed project would be **similar to those described for the proposed HHSEGS project** under this alternative.

Visual Resources

Under the Reduced Acreage Alternative, the project would consist of a single SPT with an SRSG at the location of Solar Plant 2, related generation facilities, and a 103-acre common area. Solar Plant 2 includes the power tower closest to Old Spanish Trail Highway/Tecopa Road as depicted for the proposed HHSEGS project. Like the proposed HHSEGS project with two power towers, implementation of conditions of certification would reduce potential impacts on visual resources for views at the ground plane. Potential impacts of structural lighting could be partially mitigated with implementation of standard conditions of certification to control lighting and screen views. No feasible mitigation measures would reduce the visual impacts of the SPT, brightness of the SRSG, and potential visual effects of FAA night safety lighting. Similar to the proposed project, this alternative could cause substantial degradation of the existing visual character or quality of the site and its surroundings. Visual resources impacts would remain significant and unavoidable. The potential visual effects of the Reduced Acreage Alternative would be **similar to the proposed HHSEGS project**.

This alternative would not worsen impacts of the proposed project nor make a cumulatively considerable contribution to any significant cumulative impact associated with visual resources.

Waste Management

The potential presence of environmental concerns under the Reduced Acreage Alternative would be similar to the proposed project. Site characterization and remediation requirements would remain the same as for the proposed project.

Development of one solar power tower facility instead of two facilities under this alternative would decrease the volume of the waste stream. Adequate available Class III landfill capacity is available in Nevada landfills. Similar to the proposed project, staff considers project compliance with LORS and staff's conditions of certification to be sufficient to ensure that no significant impacts would occur as a result of waste

management associated with the Reduced Acreage Alternative. Potential impacts on existing waste disposal facilities and human health and the environment would be **similar to HHSEGS**, even with the waste stream volume reductions.

Soil and Surface Water

Because the footprint for the Reduced Acreage Alternative would decrease to roughly half that of HHSEGS, impacts related to soil erosion during construction (grading of roadways and power plant construction) and operations (heliostat washing and vegetation maintenance) would be **less than the proposed HHSEGS project**.

Operation of one power plant compared to two would decrease the volume of process wastewater and contamination of storm water runoff; therefore, these impacts would be **less than HHSEGS**. The number of septic systems for proper disposal of domestic sanitary waste would decrease from three to two, so these impacts would be **somewhat less than HHSEGS**. Because the majority of off-site flows pass through HHSEGS Solar Plant 2, impacts from 100-year flood flows and flooding for the Reduced Acreage Alternative would be **similar to the proposed HHSEGS project**. However, by avoiding storm damage impacts in the Solar Plant 1 solar field, the overall impacts of storm water damage for the Reduced Acreage Alternative would be **somewhat less than HHSEGS**.

Water Supply

The Reduced Acreage Alternative would require less operational water use for process and heliostat washing compared to the proposed HHSEGS project. Assuming installation of approximately half the total number of heliostats compared to the proposed project, operational water use could be reduced up to approximately 68 afy under this alternative. Potential impacts on the Pahrump groundwater basin and local well owners would be reduced relative to the proposed HHSEGS project. The Reduced Acreage Alternative would involve construction of the solar field that is closest to Stump Springs and the rural development south of the proposed project site. Although operational water use would be reduced under this alternative, the potential effects of increased groundwater use on local well owners and sensitive resources that are relatively close to the project site would not necessarily be reduced to half that of the proposed project. Therefore, staff concludes that potential impacts on water supply would be **somewhat less than HHSEGS**.

The groundwater basin is already in overdraft; therefore, any additional water use, no matter how little, could result in a cumulatively significant impact. If significant impacts were identified on water supply, the same conditions of certification proposed for the HHSEGS project would be recommended for this alternative, which would reduce the impacts to a less-than-significant level.

PROJECT ALTERNATIVES COMPARED TO THE PROPOSED PROJECT

The environmental effects of constructing and operating the proposed project are described in detail for each resource topic in the **Environmental Assessment** section of this staff assessment. The summary table shown in **Alternatives Appendix-3** compares the environmental impacts of the proposed project to the same or similar impacts that would be expected to occur with construction and operation of each of the

project alternatives, including the No-Project Alternative. **Alternatives Appendix-3** is included at the end of this section of the staff assessment.

ENGINEERING ASSESSMENT OF THE ALTERNATIVES

POWER PLANT EFFICIENCY AND RELIABILITY

This section evaluates the efficacy of each project alternative in providing an efficient and reliable source of power generation and compares the project alternatives using alternative technologies to the proposed project. The proposed HHSEGS project would use a solar power tower technology (SPT), which is one of a variety of solar thermal power systems called concentrating solar power (CSP). Solar technologies in California include CSP and PV technologies. The SPT with Energy Storage Alternative, the Parabolic Trough Alternative, and the Reduced Acreage Alternative in this analysis of project alternatives are CSP technologies.

The energy generation system for the proposed HHSEGS project is a solar thermal system that would use approximately 85,000 sun-tracking, flat mirrors (heliostats) to focus and concentrate the sun's rays on a solar receiver steam generator (SRSG) at the top of a 750-foot SPT that would stand in the middle of an array of heliostats. This general arrangement would be used for each of the two 250-MW systems proposed for the HHSEGS project. The SRSG absorbs the radiation energy and converts it to conductive energy suitable for making steam. The steam drives a conventional turbine that drives an electric generator.

Sandy Valley Off-site Alternative

This off-site alternative is located approximately 20 miles southeast (as the crow flies) of the HHSEGS site and has a similar topography as the HHSEGS site. The available *solar insolation*⁷ is essentially the same for the two sites. Therefore, the performance of the SPT's thermal power cycle at the Sandy Valley Off-site Alternative site would not change to any measureable degree. The power cycle efficiency, power plant reliability, and the solar array area displacement (i.e., the land area requirement for each of the two solar arrays) would not change.

SPT with Energy Storage Alternative

Enhancement of the power tower technology with several hours of thermal energy storage (TES) using molten salt would provide more flexibility for incorporating the facility into the power grid by extending generation beyond the hours of available sunlight. However, incorporating TES into the design of the project would require more land due both to an increased footprint for the heliostat field to accommodate additional heliostats for the thermal storage component and the additional acreage that would be required to incorporate the storage system and tanks in the power plant areas.

⁷ Sunlight intensity at a site or area is measured in units of solar insolation, which is often expressed as kilowatt hours per square meter per day (kWh/m²-day).

Solar PV Alternative

PV cells convert solar radiation directly into electrical current. Photons of light excite electrons to a higher energy state, providing the potential to induce current. Direct current (DC) from the PV cells pass through an inverter, which converts DC to alternating current suitable for transmission to the electrical power grid. PV systems can be switched off and on but do not provide ramping capability.

Using average annual daily radiation as a benchmark, **Alternatives Table 9** shows the effectiveness of different types of solar collectors for the alternative renewable technologies evaluated in this staff assessment. The table lists the total daily values for the weather station nearest the project site, represented by monthly and average annual conditions and sorted by collector type. Data are shown for a double-axis flat-plate collector typical of a power tower heliostat; the daily insolation value is 9.4 kWh/m²-day (Category 1.3). From **Alternatives Table 9**, the incident radiation for a flat-plate fixed-tilt PV panel is 6.6 kWh/m²-day (Category 1.1) and 9.1 for a single-axis flat-plate collector typical of a tracking PV system (Category 1.2). Using comparative ratios, the flat-plate double-axis collectors associated with the SPT project perform 42 percent better than the fixed-tilt PV panels $[(9.4-6.6)/6.6 = 0.42]$. The performance factor between the single-axis tracking PV panels and the representative SPT heliostats is 3.0 percent $[(9.4-9.1)/9.1 = 0.03]$. To conclude, the SPT project heliostats function 42 percent better than the fixed-tilt PV panels, but the performance differential between the SPT heliostats and the single-axis tracking PV panels is insignificant⁸.

⁸ Since 3.0 percent is less than the plus or minus 9.0 percent uncertainty in the historical measurements, the collection effectiveness of the HHSEGS heliostats and a project using single-axis tracking flat plate PV collectors is virtually equal.

Alternatives Table 9 Average Daily Solar Radiation at Daggett, California (kilowatt hours per square meter [kWh/m²])													
Tilt	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Category 1.1: Flat-Plate Collectors with Fixed-Tilt PV Modules													
34.9°	5.3	6.0	6.8	7.4	7.4	7.4	7.2	7.3	7.3	6.8	5.2	6.6	6.6
Category 1.2: Flat-Plate Collectors with Single-Axis Tracking, North-South Axis, Tracking PV Modules													
34.9°	6.5	7.5	9.0	10.3	10.9	11.2	10.7	10.6	10.1	8.8	7.2	6.3	9.1
Category 1.3: Flat-Plate Collectors with Double-Axis Tracking, SPT Heliostats													
34.9°	6.9	7.7	9.0	10.4	11.3	12.0	11.4	10.8	10.1	9.0	7.5	6.8	9.4
Category 1.4: Single-Axis Direct Beam Concentrating Collectors, Parabolic Trough													
34.9°	5.1	5.8	6.9	8.0	8.4	8.9	8.4	8.4	8.2	7.2	5.7	5.0	7.2
Source: Weather Bureau Army Navy (WBAN), excerpts from WBAN No. 23161 for Daggett, California, which is the closest measuring station to the proposed HHSEGS site.													

Parabolic Trough Alternative

A parabolic trough system is a CSP technology where heat transfer fluid (HTF) is pumped through a tube suspended at the focal point of a curve-shaped collector. This tube absorbs the radiation energy, heating the HTF to a temperature high enough to make steam in a boiler. In turn, the steam drives a turbine and generates electricity. This system gets its name from the shape of the collector where the cross section is curved and its length is straight, giving it its characteristic trough shape.

As shown in **Alternatives Table 9**, the value for incident radiation for parabolic trough collectors is 7.2 (Category 1.4). Using the values in the table as a basis for comparison, the SPT technology uses land more effectively and collects solar energy 30 percent more efficiently than the parabolic trough technology $[(9.4-7.2)/7.2 = 0.30]$.

Note that the comparison of ideal collector performance (see **Alternatives Table 9**) is a very simple measurement using side-by-side comparisons of the different solar technologies. Various site limitations could affect the ability of a project site (e.g., the HHSEGS site) to be developed with an alternative renewable technology. The topography of an area could limit the development potential of a site and/or ground slope needed to receive maximum solar energy by the collectors. Requirements for the geometric orientation of a collector array could dictate the configuration of a project site. Variations in available solar insolation could affect actual system performance in a particular area.

Reduced Acreage Alternative

The Reduced Acreage Alternative would use the same solar thermal system as described for the proposed project. A total of approximately 85,000 sun-tracking, heliostats would focus and concentrate the sun's rays on a SRSG at the top of a 750-foot SPT that would stand in the middle of an array of heliostats. This general arrangement would be used for the 250-MW system shown in **Alternatives Figure 10**. This alternative would have a total energy capacity of approximately 250 MWs; the solar field and common area for this alternative would use a total of approximately 1,514 acres at the proposed HHSEGS site. The technology would be the same for the one 250-MW solar plant depicted as Solar Plant 2 under the proposed project. The power cycle efficiency, power plant reliability, and the solar array area displacement (i.e., the land area requirement for the one solar array) would not change compared to the proposed project.

Conclusion

The comparison of ideal collector performance shown in **Alternatives Table 9** is a simple measurement using side-by-side comparisons of the alternative solar technologies. Various site limitations would affect actual system performance.

The SPT system proposed for HHSEGS compares equally with the conditions where the facility is relocated or enhanced using TES. Although TES increases operational flexibility, it does not influence the performance of the heliostats for an SPT project with or without energy storage capabilities. The representative SPT project compares favorably to parabolic trough because of the tracking limitations of trough collectors. Lastly, the SPT heliostats perform better than the fixed-tilt PV system, and equally as well as the tracking PV system. Other PV performance limitations, including its "on-off" intermittency when utilized on the electric power grid, make SPT a more attractive technology from a project efficiency and reliability perspective.

TRANSMISSION SYSTEM ENGINEERING

Compared to the proposed HHSEGS project, the Sandy Valley Off-site Alternative site is closer to the existing Pahrump-Bob Tap 230-kV transmission line, which could be used to interconnect this alternative to the Valley Electric Association (VEA) system. Under this alternative, the required generator tie-line would be approximately 3 miles shorter than for the proposed HHSEGS project. A fewer number of transmission line poles would be required, which would reduce the total acreage of ground disturbance from construction of the generator tie-line and power poles.

As discussed under the subsection, "Transmission Line Safety and Nuisance," for the Sandy Valley Off-site Alternative, the potential alignment for the transmission line would exit the east side of the alternative site study area in California to generally parallel Quartz Avenue through Sandy Valley, Nevada, before turning northeast to parallel Kingston Road east of Sandy Valley. Staff observes that no studies have been done on the potential feasibility of constructing a 230-kV transmission line along the described route.

No significant impacts are identified related to transmission system engineering (TSE) under the proposed project. The downstream transmission system impacts under the Sandy Valley Off-site Alternative would be the **same as described for the proposed HHSEGS site**. This alternative would comply with applicable LORS pertaining to TSE. The same or similar conditions of certification identified in the TSE analysis for the proposed project would apply to this alternative.

None of the project alternatives using alternative technologies would cause greater impacts than those described for the proposed HHSEGS project. The Reduced Acreage Alternative could reduce potential impacts on the VEA system compared to the proposed project; this impact would be **slightly less than or similar to the proposed project**. The alternatives, including the alternative technologies, would generate electricity at the same power output and would interconnect to the same Crazy Eyes Tap substation. Power would be distributed to the same VEA transmission system. Therefore, the downstream transmission system impacts from the alternatives using alternative technologies would be **similar to the impacts of the proposed HHSEGS project**.

ENVIRONMENTALLY SUPERIOR ALTERNATIVE

The State CEQA Guidelines call for identification of an environmentally superior alternative and specify that “[i]f the environmentally superior alternative is the ‘no project’ alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives” (Cal. Code Regs., tit. 14, § 15126.6[e][2]).

The project alternatives that are included in staff’s analysis are those that could potentially attain most of the basic objectives of the project while avoiding or substantially lessening the significant impacts of the proposed project.

From the perspective of purely minimizing effects on the existing environment, the No-Project Alternative would be the superior alternative because it would result in no changes in the existing condition. However, the No-Project Alternative would not meet the key project objective of constructing and operating a renewable electrical generation facility resulting in sales of renewable energy consistent with the needs of California utility companies.

The continuation of existing conditions at the proposed HHSEGS site could result in varying degrees of changes to resource conditions for Biological Resources, Cultural Resources, Soil and Surface Water, and Water Supply; all changes to resource conditions under the No-Project Alternative would be less than those identified for the proposed project and are considered less than significant compared to the proposed project. Because no construction is proposed under the No-Project Alternative, no further analysis of these predicted changes to resource conditions is required. No significant differences between the project alternatives and the proposed project are identified for these environmental resources: Public Health, Socioeconomics, and Transmission Line Safety and Nuisance. For these resources, all impacts across all of the project alternatives could be reduced to less than significant with implementation of

mitigation measures that would be the same as or similar to the conditions of certification recommended for the proposed project.

Although a greater impact on Socioeconomic Resources is identified for the Sandy Valley Off-site Alternative due to the potential displacement of rural residences, acquisition of properties would include appropriate compensation to the landowners displaced by this alternative; therefore, this impact would be less than significant.

Staff identifies significant impacts on Land Use related to inconsistencies with adopted plans and policies for all project alternatives. For the Sandy Valley Off-site Alternative, staff identifies a significant impact on agricultural resources due to the conversion of several hundred acres of agricultural land to a non-agricultural use (discussed below); this impact would be reduced to less than significant with implementation of appropriate mitigation measures.

For potential impacts on Biological Resources, staff developed a qualitative comparison of the project alternatives to the proposed project that considers the severity of impacts, the extent to which impacts could be reduced with implementation of mitigation measures, and the nature of the affected resource. Some resources, such as threatened and endangered species, are more vulnerable to perturbation and recover more slowly; therefore, impacts on those resources are weighted more heavily than impacts on common wildlife. The discussions below include staff's conclusions for impacts on Biological Resources.

SUMMARY CONCLUSIONS FOR THE PROJECT ALTERNATIVES

SPT with Energy Storage Alternative

Of the project alternatives, the SPT with Energy Storage Alternative is most similar to the proposed project; and for most environmental resources, comparative impacts are described as, "same as," "similar to," or "somewhat greater than," the proposed project. For impacts that generally correlate to the extent of the site footprint, potentially greater impacts are identified for this alternative because of the possible need to expand the site boundary for the molten-salt storage tanks and additional heliostats. Staff concludes that potential impacts on groundwater resources could increase proportionally with increased water usage under this alternative, concluding that impacts related to groundwater depletion would be "somewhat greater than HHSEGS." Like the proposed project, mitigation measures would be required to reduce potential groundwater impacts to less than significant. Staff concludes that impacts on special-status plant species and desert tortoise and other special-status terrestrial species would be "similar to or somewhat greater than HHSEGS." Impacts on avian species would be "similar to or somewhat greater than HHSEGS," and no feasible mitigation measures could reduce this impact to less than significant.

No significant impact identified for the proposed project would be avoided or substantially lessened under the SPT with Energy Storage Alternative, and assuming that minimizing direct environmental effects is the priority for this alternatives analysis, staff concludes that this alternative would not be the environmentally superior alternative. As discussed above, the SPT with Energy Storage Alternative could

potentially attain most of the basic project objectives, although it is unknown how changing the proposed project to add thermal energy storage would affect project viability.

Sandy Valley Off-site Alternative

For many environmental resources, staff concludes that impacts for the Sandy Valley Off-site Alternative would be “similar to HHSEGS.” Because several hundred acres at the Sandy Valley Off-site Alternative study area have been disturbed by historical agricultural uses, some of the impacts on Biological Resources would be “much less than HHSEGS.” However, because the technology of this alternative would be the same, impacts on avian species from exposure to concentrated solar flux in the airspace over the heliostat field and potential collisions with the solar power towers and other project structures would be “similar to or somewhat greater than HHSEGS” and are considered significant and unavoidable.

Cultural Resources staff has preliminarily determined that potential impacts on significant on-site prehistoric and historical archaeological sites would be, “somewhat greater than HHSEGS,” under this alternative. Further analysis of the Sandy Valley alternative site and study area would be needed to verify that conclusion. None of the cultural resources impacts identified for the proposed project could be avoided or substantially lessened under this alternative. Staff has determined that the potential for this alternative to visually degrade significant ethnographic resources would be “similar to HHSEGS,” and no feasible mitigation measures would reduce these impacts to less than significant.

The Sandy Valley Off-site Alternative would convert approximately 750 acres of agricultural land to a non-agricultural use. This conversion of agricultural land would be a significant impact, and it is an impact that would not occur under the proposed project. Mitigation measures would be required to reduce the impact to less than significant. Staff identified the potential for uses of herbicides or pesticides to have contaminated soils at the Sandy Valley site and determined that the impact on human health and the environment would be “somewhat greater than HHSEGS.” Implementation of remediation that could be required to address any soils contamination would reduce the impact to less than significant.

Under this alternative, impacts on special-status plants, habitats, waters of the U.S., and waters of the state would be “much less than at the proposed HHSEGS site.” Like the proposed project, mitigation measures would be required to reduce these significant impacts to less than significant. No other environmental impacts would be substantially lessened with construction and operation of the Sandy Valley Off-site Alternative. Staff concludes that the Sandy Valley Off-site Alternative would not be the environmentally superior alternative.

The Sandy Valley Off-site Alternative could potentially satisfy many of the project objectives. The feasibility of obtaining site control and use within a reasonable period of time is unclear, and achieving this project objective would be critical to the viability of this alternative.

Parabolic Trough Alternative

For the environmental topics of Air Quality, Land Use, Noise and Vibration, Waste Management, and Water Supply, staff concludes that comparative impacts would be “similar to HHSEGS” or “same as HHSEGS” under the Parabolic Trough Alternative. In general, staff concludes that without the solar towers that would be constructed under the proposed project, some impacts on Visual Resources, Geology and Paleontology, Traffic and Transportation, and Cultural Resources would be less than HHSEGS, in varying degrees, under this alternative. Impacts on avian species from the effects of concentrated solar flux above the solar collector arrays would not occur under the Parabolic Trough Alternative. Staff concludes that impacts on special-status plants, waters of the state and waters of the U.S., and special-status wildlife species would be the “same as HHSEGS.” For potentially significant impacts on avian species from collisions with the solar collectors and other equipment, staff concludes that the impacts would be “unknown” compared to HHSEGS even though the absence of the power towers under the Parabolic Trough Alternative would eliminate the potential for avian species to collide with those extremely tall structures.

Comparative impacts on Visual Resources under this alternative are described as “similar to” or “somewhat less than HHSEGS.” Under this alternative, staff concludes that the impact addressing the project’s potential to create a new source of substantial light or glare during project construction (considered “significant and unavoidable” under the proposed project) would be reduced to “potentially significant” under this alternative. This impact could potentially be reduced to less than significant with implementation of appropriate mitigation measures. Staff concludes that the net effect of this alternative on visual resources is considered “significant and unavoidable” due to the high reflectivity of the parabolic mirrors; no feasible mitigation measures could fully reduce the net effect to a less-than-significant level.

Given that this alternative would not include power towers topped by SRSGs, Traffic and Transportation staff concludes that the potential for glint and glare to cause a distinct visual distraction effect from an operator control perspective (i.e., vehicle motorists and aircraft pilots) would be “less than HHSEGS” under the Parabolic Trough Alternative. Like the proposed project, mitigation measures would be recommended to reduce the potential for glint and glare from the parabolic mirrors to create a distinct visual distraction effect to less than significant.

Staff concludes that the Parabolic Trough Alternative would be much less susceptible to the effects of strong seismic shaking due to the elimination of the SPTs. This technology would cause fewer potential impacts on paleontological resources, and staff concludes that the net effect of potential impacts on geological and paleontological resources would be “less than HHSEGS.” Like the proposed project, significant or potentially significant impacts on these resources would be reduced to less than significant with implementation of appropriate mitigation measures.

Cultural Resources staff has determined that the Parabolic Trough Alternative would reduce impacts on historical resources compared to the proposed project and that the net effect of this alternative would be “much less than HHSEGS.” Of the impacts

identified by staff, two impacts addressing resources *beyond* the site that are considered “significant and unavoidable” under the proposed project would be reduced to “potentially significant” under this alternative (see **Alternatives Table 7**); the resources are the *Pahrump Metapatch Mesquite Woodland-Coppice Dune Archaeological Landscape* and the *Old Spanish Trail–Mormon Road Northern Corridor*. (Please see the **Cultural Resources** section of this staff assessment for discussions of these resources.) These two impacts could potentially be reduced to less than significant with implementation of appropriate compensatory mitigation measures, which would likely include delivery of programs that would address three broad objectives in relation to the affected historical resources: research, interpretation, and preservation. Preservation could refer to preserving particular places or portions of places on the ground, as well as material remains from such places or portions thereof. Preservation could also refer to retaining information that would provide the content needed to interpret the value of important resources.

For impacts on Soil and Surface Water, staff concludes that some impacts would be “greater than HHSEGS” while others would be “less than HHSEGS.” Staff concludes that increased earth moving during project construction would cause a “much greater” soil erosion impact. Engineered storm water management would reduce potential impacts from on-site and off-site flooding compared to the proposed project; however, potential impacts on the diversion channels from storm damage would be “greater than HHSEGS.” All impacts on soil and surface water resources would be reduced to less than significant with implementation of appropriate mitigation measures. The impact conclusions for potential impacts on soil and surface water resources would not change under this alternative, and staff concludes that the net effect of the Parabolic Trough Alternative on soil and surface water resources would be similar to the net effect of the proposed project.

Because the Parabolic Trough Alternative does not use solar power towers to collect solar radiation, this technology would not impact avian species from the effects of exposure to concentrated solar flux in the airspace over the solar collector array areas. Similar to the proposed project, potentially significant impacts on avian species could stem from the disruptive effects of glint and glare and potential collisions with project structures, including the parabolic mirrors. Without further data, staff has determined that the net effect of potential impacts on avian species related to glare and collisions with structures under this alternative cannot be reasonably compared to the proposed project. Like the proposed project, impacts related to habitat loss could be reduced to less than significant with implementation of appropriate mitigation measures. However, no evidence exists demonstrating that impacts on avian species from collisions with the solar collectors and other equipment associated with large-scale renewable energy facilities could be reduced to below a level of significance, and these impacts could remain significant and unavoidable.

Due to the use of combustible substances and the increased fire risk associated with the Parabolic Trough Alternative, staff concludes that impacts on fire protection services and facilities would be “much greater than HHSEGS.” Hazardous materials impacts are

considered to be “somewhat greater than HHSEGS.” Implementation of appropriate mitigation measures would reduce these impacts to less than significant.

Staff concludes that the Parabolic Trough Alternative would not substantially lessen impacts on Water Supply or Visual Resources. Like the proposed project, impacts on Geology and Paleontology and Traffic and Transportation are “significant” or “potentially significant,” requiring mitigation measures to reduce the impacts to less than significant. Most of the impacts on Biological Resources would be the “same as HHSEGS.” This alternative would cause greater impacts related to Fire Protection and Hazardous Materials. The overall effect of this alternative on Cultural Resources would be “much less than HHSEGS,” and staff considers this to be the primary benefit of this alternative compared to the proposed project. If substantially reducing the two direct environmental effects on Cultural Resources is a critical factor, then the Parabolic Trough Alternative would be somewhat superior to the proposed project.

Although the Parabolic Trough Alternative could potentially attain many of the basic project objectives, it is unknown how changing the project technology would affect project viability.

Reduced Acreage Alternative

For most environmental resources, comparative impacts under this alternative are described as, “similar to,” “somewhat less than,” or “much less than HHSEGS.” Based on the distribution of particular species and habitats across the proposed project site, staff concludes that impacts on special-status plants, habitats, waters of the U.S., and waters of the state would be “much less than HHSEGS.” Staff concludes that impacts on avian species from potential collisions with project structures and exposure to solar flux would be reduced, and the comparative impact conclusion is “less than HHSEGS.” However, no feasible mitigation measures could reduce the impacts on avian species related to glint and glare and collisions with the solar tower to less than significant, and like the proposed project, this impact would remain significant and unavoidable. Other than reducing the potential extent of impacts on Biological Resources, no other environmental impacts would be substantially lessened with construction and operation of the Sandy Valley Off-site Alternative.

Reducing the project site and number of structures by approximately one-half would cause this alternative as a whole to be less susceptible to the effects of strong seismic shaking, and staff concludes that impacts on geological resources would be “much less than HHSEGS.” Like the proposed project, all significant or potentially significant impacts on geological and paleontological resources would be reduced to less than significant with implementation of appropriate mitigation measures.

Staff concludes that impacts on Visual Resources would be “similar to HHSEGS,” and no feasible mitigation measures could reduce these impacts to less than significant; like the proposed project, visual resources impacts would remain significant and unavoidable.

Comparative impacts on Cultural Resources under the Reduced Acreage Alternative are described as “somewhat less than HHSEGS.” Like the proposed project, no feasible

mitigation measures would reduce the impacts described as “significant and unavoidable” to less than significant.

The overall effect of the Reduced Acreage Alternative on Biological Resources would be “much less than HHSEGS,” and staff considers this to be the primary benefit of this alternative compared to the proposed project. Impacts on avian species from potential collisions with the power towers and exposure to solar flux would be reduced; however, these impacts would remain significant and unavoidable. If reducing the overall extent of impacts on special-status species, including avian species; habitats; waters of the U.S., and waters of the state is the critical factor, then the Reduced Acreage Alternative would be somewhat superior to the proposed project.

Although the Reduced Acreage Alternative could potentially attain many of the basic project objectives, it is unknown how eliminating the northern solar plant would affect project viability.

Solar PV Alternative

For the environmental topics of Visual Resources, Fire Protection, Geology and Paleontology, and Noise and Vibration, staff concludes that most comparative impacts would be “less than HHSEGS” or “much less than HHSEGS” under the Solar PV Alternative. Like the proposed project, most of the impact conclusions under these topics are identified as “significant” or “potentially significant,” requiring mitigation measures to reduce the impacts to less than significant.

Given the lower operational water use for the Solar PV Alternative (estimated up to approximately 12 afy compared to approximately 140 afy for the proposed project), potential impacts on Water Supply would be “somewhat less than HHSEGS.” Because the groundwater basin is already in overdraft, any additional water use, no matter how little, could result in a cumulatively significant impact on groundwater resources. Like the proposed project, impacts on Water Supply are considered “potentially significant” under this alternative. Mitigation measures similar to those recommended for the proposed project would be implemented to reduce the impact on Water Supply to less than significant, if such an impact occurred.

Use of fossil fuel-fired energy generation is not required under this alternative, and for potential impacts on Air Quality, staff concludes that operational impacts related to criteria pollutant emissions would be “less than HHSEGS.” Like the proposed project, construction and operations emissions would be reduced to less than significant with implementation of appropriate mitigation measures.

Impacts related to Hazardous Materials and Waste Management would be “similar to” or “somewhat greater than HHSEGS.” All associated impacts would be reduced to less than significant with implementation of mitigation measures to protect human health and the environment.

For impacts on Soil and Surface Water resources, staff concludes that some impacts would be less than HHSEGS, in varying degrees. In part because of the decrease in

frequency for washing of PV panels compared to what would be required to maintain the heliostats under the proposed project, this alternative would create less dust overall from washer vehicles driving on the dirt roads, and impacts related to soil erosion during project operations would be “less than HHSEGS.” Depending on the PV module technology, the potential impact on water quality from storm damage would be “somewhat greater than HHSEGS.” Implementation of appropriate mitigation measures would reduce the impact to less than significant. Staff concludes that other impacts on Soil and Surface Water resources, including the potential for on-site and off-site flooding, would be “similar to HHSEGS.” Staff concludes that the net effect of the Solar PV Alternative on soil and surface water resources would be similar to the net effect of the proposed project.

Staff concludes that the Solar PV Alternative would reduce impacts on Visual Resources compared to the proposed project, and that the effects of this alternative would be “less than HHSEGS” for construction-related impacts and “much less than HHSEGS” for project operations impacts. Impacts identified by staff as “significant and unavoidable” under the proposed project would be reduced to “significant” or “potentially significant” under this alternative (see **Alternatives Table 6**). These impacts would be reduced to less than significant with implementation of appropriate mitigation measures. Given that the Solar PV Alternative would not include power towers topped by SRSGs or highly reflective solar collectors, Traffic and Transportation staff concludes that the potential for glint and glare to cause a distinct visual distraction effect from an operator control perspective would be “much less than HHSEGS,” and the impact conclusion is less than significant.

Biological Resources staff concludes that significant impacts on special-status plants, wildlife, waters of the U.S. and waters of the state could be reduced to less than significant with implementation of appropriate mitigation measures. The real benefit of the Solar PV Alternative relates to the extent of identified significant impacts on avian species, the only biological resource for which no feasible mitigation measures exist to reduce the impacts by any known measure. Large-scale solar PV installations can cause impacts on avian species from potential collisions with the PV panels, and the reflection of the sky in the solar panels may mimic the appearance of water, thus serving as an attractant to birds. While the proposed HHSEGS project has the potential to impact birds from collisions with project structures, it would also increase the potential for significant impacts on avian species compared to the Solar PV Alternative; collisions with the 750-foot-tall towers and potentially fatal exposure to concentrated solar flux in the airspace over the heliostat field would not occur under this alternative. No feasible mitigation measures are available to reduce the extent or severity of these impacts on avian species.

A 2009 technical memorandum on a review of potential impacts of solar array developments on biological resources states that “non-reflective flat plate panels are preferred over reflective technologies, such as CSP, for sites with burrowing owls. It is recommended that the impact of solar panel reflective properties be part of the procurement selection criteria to minimize impacts on avian wildlife” (City of San Jose 2009). Staff concludes that the potential benefit to burrowing owls from the Solar PV

Alternative compared to the proposed project could benefit all bird species that would likely be impacted by the proposed project.

The reduced groundwater pumping that would be required under the Solar PV Alternative compared to the proposed project would lessen potential impacts on groundwater dependent vegetation and associated plants and wildlife. The infrequent washing of PV panels under this alternative would reduce on-site disturbance. With driving over the site reduced under this alternative, dust generation and potential impacts on wildlife at the site would decrease. Although conditions of certification are included in the **Air Quality** section requiring staff's approval of the dust suppression product that would be used at the proposed project site (**AQ-SC3** and **AQ-SC7**), the use of any such product would likely be reduced under the Solar PV Alternative, which would increase the benefit to wildlife to some extent. The reduced frequency of driving on the site under this alternative during project operations could also decrease the potential for weed growth at the site.

At the Ivanpah Solar Electric Generating System construction site, special-status species and/or fully protected species such as burrowing owl, kit fox, and desert tortoise continue to be discovered on the site, and move on and off the site, even though construction began in late 2010, and the site is enclosed by a perimeter fence (with desert tortoise exclusionary fencing attached). This would be expected at any large solar development, particularly where vegetation is allowed to remain on-site. Staff concludes that the potential for wildlife to be crushed, buried, or injured during maintenance work, including washing of solar collectors, would be reduced under the Solar PV Alternative.

For potential impacts on Cultural Resources, staff concludes that the Solar PV Alternative would pose far less of a visual intrusion on off-site historical resources compared to the project alternatives that would duplicate the vertical profile of the proposed HHSEGS project. The reduced vertical profile of the Solar PV Alternative and the relatively non-reflective PV panels would cause lesser impacts on the broad, landscape-scale resources that are of concern, and the PV arrays would be much less visually intrusive than the proposed power towers where the array was visible. Of the impacts identified by staff, two impacts addressing resources *beyond* the site that are considered "significant and unavoidable" under the proposed project would be reduced to "potentially significant" under the Solar PV Alternative, and these impacts would be reduced to a greater extent compared to the Parabolic Trough Alternative (see **Alternatives Tables 6 and 7**); the resources are the *Pahrump Metapatch Mesquite Woodland-Coppice Dune Archaeological Landscape* and the *Old Spanish Trail-Mormon Road Northern Corridor*. Cultural resources staff concludes that of all the project alternatives, the Solar PV Alternative would offer the potential to develop mitigation measures that would go furthest toward reducing impacts on historical resources compared to the proposed project.

The primary benefits of the Solar PV Alternative compared to the proposed project are greatly reduced impacts on Visual Resources, Biological Resources, and Cultural Resources. The Solar PV Alternative would go furthest toward minimizing and avoiding avian impacts; this conclusion is based on the possibility that the Solar PV Alternative

could cause somewhat less potential for collision impacts and would eliminate the potential for mortality and morbidity from exposure to concentrated solar flux. If substantially reducing the extent and severity of direct environmental effects is the priority, then the Solar PV Alternative would be environmentally superior to the proposed project.

Although the Solar PV Alternative could potentially attain many of the basic project objectives, it is unknown how changing the project technology would affect project viability.

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APPENDIX ALTERNATIVES-1: STAFF CONTRIBUTORS TO THE COMPARATIVE ANALYSIS OF ALTERNATIVES

This appendix lists staff responsible for specific technical analyses in the **Alternatives** section of this staff assessment. Staff names are listed with their area of technical expertise.

Technical Area	Staff
Air Quality	Jacquelyn Leyva
Biological Resources	Carol Watson Carolyn Chainey-Davis
Fire Protection	Geoff Lesh, P.E.
Geology and Paleontology	Casey W. Weaver, CEG
Hazardous Materials Management	Geoff Lesh, P.E.
Land Use	Christina Snow
Noise and Vibration	Shahab Khoshmashrab, P.E.
Power Plant Efficiency and Reliability	Ed Brady, P.E.
Public Health	Huei-An (Ann) Chu, Ph.D.
Socioeconomic Resources	Steven Kerr
Traffic and Transportation	Candace Hill
Transmission Line Safety and Nuisance	Obed Odoemelam, Ph.D.
Transmission System Engineering	Sudath Edirishuriya
Visual Resources	Melissa Mourkas, ASLA
Waste Management	Ellen Townsend-Hough
Soil and Surface Water	Marylou Taylor, P.E.
Water Supply	Mike Conway
Grid-Level Integration Issues	Michael R. Jaske, Ph.D. Mark Hesters

APPENDIX ALTERNATIVES-2: OTHER RENEWABLE ENERGY TECHNOLOGIES

INTRODUCTION

This appendix briefly discusses several renewable energy technologies that are not included in the review of potentially feasible alternatives to the proposed project in the **Alternatives** section of the staff assessment.

The renewable technologies discussed in this appendix include solar and non-solar technologies:

- Concentrated photovoltaic technology
- Dish/engine technology
- Linear Fresnel technology
- Solid Oxide Fuel Cells (e.g., Bloom's Energy Server™)
- Wind
- Geothermal
- Biomass
- Small hydroelectric
- Wave and tidal

These renewable energy technologies are not considered alternatives to the proposed project for several reasons; some of them represent different projects that could be proposed and implemented by various applicants, public utilities, or lead agencies in parts of the state or environments that are far removed from the location of the proposed project. New technologies such as those using solid oxide fuel cells are being deployed to serve on-site load but do not yet have the infrastructure and public policy support needed to begin serving load on the *utility-side of the meter* (also referred to as system-side generation).

A project proposed to use one of the technologies listed above could be required to comply with the California Environmental Quality Act (CEQA) and other applicable environmental laws and regulations, which could include preparation of an alternatives analysis pursuant to Section 15126.6 of the State CEQA Guidelines. Rather than being considered alternatives to the proposed project, specific projects proposed to use one of the technologies listed above could be subject to a full analysis of its potential environmental effects, in accordance with the requirements of CEQA. These other renewable technologies are further discussed below. Brief discussions are provided describing why the technologies were not evaluated as potentially feasible alternatives to the proposed project.

RENEWABLE SOLAR TECHNOLOGIES

In 2010, solar generation provided 3 percent of in-state renewable generation (0.4 percent of total in-state energy generation) (California Energy Commission 2010). Renewable solar technologies in California fall into two general categories—concentrating solar power (CSP) and photovoltaic (PV). CSP technologies are those that concentrate the sun’s energy to produce heat. The heat drives either a steam turbine or an external heat engine to produce electricity. In PV technologies, the photons in sunlight are converted directly to electricity. Distributed energy resources include various fuels and technologies; the **Alternatives** section of this staff assessment includes a discussion and analysis of the distributed generation PV category of renewable energy.

CONCENTRATED PHOTOVOLTAIC TECHNOLOGY

Overview

Concentrated photovoltaic (CPV) systems have an optical component, which *concentrates* significant amounts of sunlight onto *multi-junction* solar cells (EnergyTrend 2011). These special cells have higher energy conversion efficiency, potentially greater than 40 percent, but are typically more expensive than high-efficiency silicon solar cells. The system's optical unit functions like a telescope, concentrating sunlight on solar modules mounted on a tracking system that automatically tracks the position of the sun from sunrise to sunset. Concentration allows for a decreased cell area for these special cells relative to conventional photovoltaic cells. CPV has the ability to ramp to gigawatts of production very rapidly (CPV Consortium 2012). While CPV systems have a much higher efficiency than traditional silicon-based PV, this is offset by their ability to only use direct sunlight because of their concentrating component. Clouds and overcast conditions create diffused light that essentially cannot be concentrated.

California Energy Commission (Energy Commission) staff researched the availability of CPV projects in the United States (U.S.) through the Solar Energy Industries Association (SEIA), a national trade organization of the U.S. solar energy industry, and the availability of CPV projects internationally through the various companies that manufacture and develop this technology. CPV technology front-runners are Amonix, Inc. (Amonix 7700 CPV Solar Power Generator); Soitec (Concentrix™); and SolFocus, Inc. (SF-1136SX Concentrator Photovoltaic System). Other manufacturers of CPV technology include SunPower Corporation (SunPower® C7 Tracker); Entech Solar, Inc. (SolarVolt™); and GreenVolts, Inc., a previous recipient of a grant from the Energy Commission’s Public Interest Energy Research Program.

GreenVolts’ CPV system has a total installed capacity of 0.5 megawatt (MW) at six locations in California and Arizona. Several sites are also in development with capacities ranging from 200 kilowatts (kW) to 1 MW; Pacific Gas & Electric Company (PG&E) has a 2.5-MW power plant near Tracy, California, representing the first power purchase agreement to be signed by PG&E using this technology (Energy Commission 2011a). CPV projects in California, Arizona, Colorado, and New Mexico, both operational and under development, range from 1 MW, 5 megawatts (MWs), 30 MWs and peaking at 50 MWs.

Imperial Solar Energy Center West in Imperial County has been approved for development with a capacity of up to 150 MWs (Tenaska Solar Ventures 2012). This project has been approved with the flexibility of using either CPV or PV technology.

Companies with international development of CPV projects are SolFocus and Amonix. SolFocus has developed two pilot projects in Chile (8.8 kW each), a pilot project in South Africa (8.4 kW), two projects in Spain (200 kW, 300 kW), one project in Italy (8.4 kW), a pilot project in Malta (8.4 kW), a combined 1.28 MW for multiple customers in Greece, one project in Saudi Arabia (132 kW), one project in Malaysia (8.4 kW), and one project in Australia (235 kW) (SolFocus 2012). SolFocus announced on March 29, 2012, its plans to launch a 450-MW CPV plant in Baja California, Mexico, with construction proceeding in 50-MW sections. Construction is anticipated to begin in late 2012 and be operational by the end of 2013. Amonix has developed two projects in Spain (950 kW and 7.8 MW), both of which are operational (Amonix 2012).

With the exception of Tenaska Solar Venture's Imperial Solar Energy Center West, and the 450-MW plant in Mexico, each of these technology front-runners has small-scale CPV facilities but nothing at the utility scale (50 MW or greater). Scaling technology to the utility-scale level involves the ability of the technology to function and generate energy at a larger scale, but it also includes other cost considerations. Developing CPV technology at the utility scale internationally may have different cost considerations from development in the U.S.

Decision to Eliminate the Technology from the Alternatives Analysis

Staff's decision to eliminate the technology from the alternatives analysis is generally based on the state of the technology. Based on staff's research, CPV technology is not yet proven at the utility scale. CPV has been proven at the small scale at some specific locations while projected technology development shows potential to make it a utility-scale solar technology. While CPV systems show promise, they have rarely been implemented at a larger scale (50 MW or greater). Scaling up to utility scale presents different technical challenges and cost issues.

CONCENTRATING SOLAR POWER

Overview

According to the National Renewable Energy Laboratory (NREL) the three main types of CSP systems are linear concentrator, dish/engine, and power tower systems (NREL 2009). The proposed project uses solar power tower technology; therefore, the technology is not described in this appendix. Counties with the greatest potential for CSP facilities include Kern, San Bernardino, Riverside, and Imperial (Energy Commission 2011b).

Energy Commission staff researched the availability of dish/engine and linear Fresnel projects in the U.S. through SEIA, and internationally through the various companies that develop and manufacture this technology.

Dish/Engine Systems

A dish/engine system uses the surface of a mirrored dish to direct and concentrate sunlight onto a thermal receiver, which absorbs and collects the heat and transfers it to the engine generator (NREL 2009). The most common type of heat engine in dish/engine systems is known as the Stirling engine. This system uses the fluid heated by the receiver to move pistons and create mechanical power. The mechanical power is used to run a generator or alternator to produce electricity. Prior to September 2011, there were three dish/engine technology front-runners; Stirling Energy Systems, Wizard Power (Big Dish), and Infinia Corporation (PowerDish). In September 2011, Stirling Energy Systems filed for Chapter 7 bankruptcy. Research shows only a couple of dish/engine projects under development in the U.S., including a 10-MW project in Arizona and a 145-MW project in Colorado. At the international level, construction of Wizard Power's Big Dish 40-MW demonstration project in Australia is likely to begin in May 2013 and will be completed in about 30 months (CSP Today 2012). Infinia Corporation's largest deployment of its Power Dish technology is a 10-MW project in India, which is scheduled to be installed and commissioned by the end of 2012 (Recharge 2011).

Linear Fresnel Systems

The linear Fresnel system is one of two types of linear concentrator systems. The other is parabolic trough. The staff assessment for the proposed HHSEGS project includes an analysis of a parabolic trough alternative; therefore, the technology is not described in this appendix. The linear Fresnel system uses several mirrors to collect and focus the sun's energy on one receiver tube positioned above the mirrors (NREL 2009). The linear Fresnel system uses flat mirrors, allowing more reflectors to be placed in the same amount of space. Flat mirrors cost less than parabolic mirrors. The sunlight heats a fluid flowing through the tubes that is then used to boil water in a conventional steam-turbine generator to produce electricity. Novatec Solar, AREVA Solar (Ausra), and Solar Power Group are some of the developers of linear Fresnel technology. A 5-MW linear Fresnel power plant is operating in California. Novatec Solar has developed a 30-MW linear Fresnel power plant in Spain that began operating in January 2012. In spring 2010, a 1.4-MW plant began operating in Spain. A 9.3-MW (peak thermal output) plant in Liddell, Australia is planned for completion in mid-2012 (Cogeneration & On-Site Power Production 2012).

In October 2007, an Application for Certification (AFC) was submitted to the Energy Commission for the Carrizo Energy Solar Farm, a 177-MW solar thermal project on the Carrizo Plain that was proposed using approximately 195 compact linear Fresnel reflector (CLFR) solar concentrating lines (07-AFC-8). Each line was planned with ten rows of reflectors; the slightly curved linear solar reflectors would have concentrated the sun's energy on pipes in 56-foot-tall receiver structures. In the November 2008 preliminary staff assessment (PSA), staff identified impacts on multiple protected wildlife species and blockage or impairment of wildlife corridors. When the PSA was published, staff had not yet determined whether impacts on biological and visual resources could have been mitigated to less-than-significant levels. The cumulative impact analysis addressed the potential for the project to contribute to significant cumulative impacts on biological and visual resources. Impacts related to traffic and transportation were

determined to be significant, and no feasible mitigation measures were identified to reduce impacts to below a level of significance. Draft portions of the final staff assessment were published between June and August 2009. In November 2009, the applicant withdrew the AFC and the project was terminated.

Decision to Eliminate the Technology from the Alternatives Analysis

Staff's decision to eliminate the technology from the alternatives analysis is generally based on technological and practical limitations. Based on staff's research, the dish/engine technology is not yet successfully demonstrated at a large scale (50 MWs or greater). The linear Fresnel technology has not yet been proven at the utility scale.

NON-SOLAR RENEWABLE POWER GENERATION

SOLID OXIDE FUEL CELLS

Overview

A solid oxide fuel cell (SOFC) is an electrochemical conversion device that produces electricity directly from oxidizing a fuel. Fuel cells are characterized by their *electrolyte* material¹; the SOFC has a solid oxide or ceramic electrolyte. Advantages of the SOFC include high efficiency, reliability, and durability. The largest disadvantage is the high operating temperature, which results in longer start-up times and mechanical and chemical compatibility issues (Wikipedia 2012, IEEE Spectrum Magazine 2012).

Bloom Energy is a company headquartered in Sunnyvale, California. Bloom's Energy Server™ is a new class of distributed power generation using SOFC technology to generate electricity through an electro-chemical process (Bloom Energy 2012). Bloom Energy's fuel cells can operate on natural gas or renewable fuels (e.g., biogas²). Each fuel cell can produce about 25 watts of power, and each energy server consists of thousands of fuel cells enabling each energy server to provide 200 kW of power. Electricity is typically produced at the customer site. According to information on the Bloom Energy website, 200 kW of power meets the baseload needs of 160 average homes or an office building, operates day and night, and requires approximately the area of a standard parking space. The systems are scalable and modular, allowing more power to be added with additional energy servers. Bloom Energy is installing Bloom's Energy Server™ technology at many sites, including The Coca Cola Company (500 kW³ in California), Google (400 kW in California), Bank of America (500 kW in California), FedEx Express (500 kW in California), California Institute of Technology (2 MWs), eBay (500 kW in California and 6 MWs in Utah), Washington Gas (200 kW in Virginia), and Fireman's Fund (600 kW in California) (Bloom Energy 2012). Almost all of Bloom Energy's installations in California are on the customer side of the meter.

¹ In basic terms, an electrolyte is a solution or molten substance that conducts electricity.

² Certain businesses produce organic waste that can be repurposed into a clean, renewable fuel source called biogas. When biogas is conditioned to pipeline-quality natural gas, it becomes biomethane. Businesses that tend to have their own supplies of the waste needed to make biomethane include dairies, food processing companies, and wastewater treatment plants.

³ 500 kW is equal to 0.5 MW.

The 6-MW Bloom Energy SOFC system at eBay will power an expanded data center in Utah and is described as the largest stationary fuel cell bank ever installed in a non-utility setting. Project completion is anticipated in 2013. According to a June 2012 energy and power blog post, this project marks the first time a data center has been designed to rely on fuel cells as its primary energy source with the grid serving as backup (IEEE Spectrum Magazine 2012). Data centers normally rely on electricity from the grid, with a backup system of some kind being available if the grid goes down. Most or all of the fuel for this project will be derived from biogas.

Delmarva Power in Delaware is installing a total of 30 MWs of Bloom Energy's fuel cell technology near two of its substations. When completed, this installation will represent the largest utility-scale deployment of fuel cell technology in the U.S. The Delmarva Power installations of the new technology will use natural gas fuel sources.

Energy Commission staff contacted Bloom Energy for information on the technology and its development status in California. A company representative states that the Bloom Energy power generation systems can be physically located throughout the state and scaled for varying levels of electrical power generation on either side of the meter (Grizard, pers. comm., 2012). The technology is not limited to applications that generate several hundred kW to serve on-site load. There are grid benefits to locating the systems in areas with transmission and/or distribution line congestion (i.e., developed areas close to load centers), including mitigating voltage variances and increasing grid stability, but this is not a limiting factor, and fuel cell farms are also an option for centralized power production.

A fuel cell facility must use renewable fuel to be eligible for California's RPS program. Development of a Bloom's Energy Server™ system that runs on biogas requires access to the renewable fuel source. Currently there are scarce biogas resources for use under the state's RPS program, and this is proving to be a limiting factor for biogas projects of any type. A few bills in the California Legislature could facilitate delivery of biomethane from intrastate producers and development of future SOFC projects that are eligible for the RPS program. A description of fuel cell facilities and renewable fuels is available in the Energy Commission publication, "Renewables Portfolio Standard Eligibility" (Energy Commission 2012).

Online sources from May 2012 report on a new, small-scale SOFC system developed at the U.S. Department of Energy's (DOE) Pacific Northwest National Laboratory (PNNL) that could be used for household and neighborhood power generation (Gizmag 2012, ScienceDaily 2012). A paper published in the Journal of Power Sources (Powell et al. 2012) describes the work performed by the DOE PNNL team and how SOFCs are being developed for a variety of applications because of their high efficiency over a wide range of power levels. Applications for SOFCs include 1–2-kW residential combined heat and power applications, 100–250-kW systems for distributed generation and grid extension, and megawatt-scale power plants using coal (Powell et al. 2012). The system developed by the DOE PNNL team is a small-scale SOFC power system that operates on methane, which is the primary component of natural gas. The paper describes the team's demonstration of a highly efficient small-scale (approximately 2 kW) SOFC system that can be readily scaled for a 100–250-kW natural gas-fueled distributed generation application (Powell et al. 2012).

Versa Power Systems is also developing SOFC technology, but it is in the demonstration phase of development and uses hydrogen combined with oxygen to produce electricity (Versa Power Systems 2012).

Decision to Eliminate the Technology from the Alternatives Analysis

Use of this new technology for utility-scale installations in California is not yet a viable alternative. Based on staff's research, SOFCs are primarily being developed and installed for on-site generation of electricity. The work conducted by the DOE PNNL team and described in the Journal of Power Sources indicates that a small-scale SOFC power system can be scaled for distributed generation applications.

Except for the Delmarva Power project, Bloom's Energy Server™ installations described above are primarily serving on-site load. Changes to California state policy is the critical factor needed to drive the utilities to invest in Bloom Energy's SOFC technology and incentivize development of the technology at the utility scale (Grizard, pers. comm., 2012). Because the technology is new, and state policy is not in place to drive the utilities to make the investment, future deployment of large-scale systems in the state cannot be presumed. Also, only development of SOFC technologies using a renewable fuel source would be eligible for the state's RPS program.

Continued development of SOFC technologies and evolving state energy policies may reduce the need for utility-scale projects such as the proposed HHSEGS project. However, the SOFC technology, including Bloom's Energy Server™, is not currently an alternative to a 500-MW utility scale energy generation project.

WIND ENERGY

Overview

Wind turbines, like windmills, are mounted on a tower to capture the most energy from the resource (NREL 2012a). Turbines catch the wind's energy with their propeller-like blades; usually two or three blades are mounted on a shaft to form a rotor. The wind's force against the blade causes the rotor to spin like a propeller, and the turning shaft spins a generator to make electricity. Wind turbines can be used as stand-alone applications (e.g., for water pumping or communications). Wind turbines can be combined with a PV system. For utility-scale applications, large numbers of wind turbines are built in various configurations in the same general area to form a wind power plant. Small wind systems have potential as distributed generation systems. Utility-scale turbines range from 50–750 kW. Single small turbines generally have a capacity of less than 50 kW.

The U.S. Bureau of Land Management (BLM) maintains a website with information on wind energy development. Wind energy resources are categorized by wind-power density classes that range from class 1 (the lowest) to class 7 (the highest). Good wind resources are class 3 and above and have average annual wind speeds of at least 13 miles per hour (BLM 2012). Wind speed is a critical feature of wind resources.

In October 2012, BLM issued its Record of Decision approving the Chokecherry and Sierra Madre Wind Energy site in Wyoming (Associated Press 2012). The 2,000–3,000

MW project is planned for construction across an area that includes private and federally-managed land. Roadwork and groundwork for the project could begin in 2013. After that, installation of up to 1,000 wind turbines will be accomplished over approximately 3 years. The project is expected to provide electricity to approximately one million homes.

Wind resources provide 21 percent of California's in-state renewable generation (3 percent of total in-state energy generation) (Energy Commission 2010, 2011b). Although wind is considered a mature technology, it continues to face challenges due to intermittency of the resource, lack of transmission access in remote areas, and environmental issues (Energy Commission 2011b). The majority of onshore wind development is concentrated in four regions of the state: Altamont Pass (east of San Francisco), Tehachapi (southeast of Bakersfield), Solano-Montezuma Hills (Solano County), and San Geronio (near Palm Springs, east of Los Angeles). Kern, San Joaquin, and Riverside counties also have large amounts of wind capacity, about 800 MWs, 600 MWs, and 500 MWs, respectively (Energy Commission 2011b).

Decision to Eliminate the Technology from the Alternatives Analysis

This technology has practical limitations. Based on staff's research, wind technology is limited to areas with wind resources where the wind-power density is class 3 and above (average annual wind speeds of at least 13 miles per hour). According to the NREL California 50 Meter Wind Resource Map⁴, there are a scattering of small areas with superb (class 7) wind resource, mostly in western Inyo County, though most areas have marginal (class 2) to fair (class 3) wind resources. The proposed HHSEGS site is in an extensive area with poor (class 1) wind resources, making it an unsuitable location for a wind energy project.

GEOTHERMAL ENERGY

Overview

Geothermal energy is heat from inside the earth. Geothermal power plants use steam produced from reservoirs of hot water found a few miles or more below the earth's surface to produce electricity (NREL 2012b). The steam rotates a turbine that activates a generator, which produces electricity. There are three types of geothermal power plants: dry steam, flash steam, and binary cycle. Geothermal is a mature industry, and geothermal power plants provide steady and predictable baseload power (National Geothermal Collaborative 2004).

Geothermal energy is limited to areas with reservoirs of steam or hot water, known as hydrothermal resources, which are often associated with volcanic and seismically active regions. California has 25 known geothermal resource areas, including 14 resource areas with temperatures of 300 degrees Fahrenheit or greater. Forty-eight of the fifty-eight California counties have lower temperature resources for direct-use geothermal. The counties with high amounts of geothermal capacity include Sonoma County with

⁴ Wind speed estimates at 50 meters (m) above the ground. The map depicts the resource that could be used for community-scale wind development using wind turbines at 50–60-m hub heights.

1,601 MWs of capacity (more than 60 percent of all geothermal capacity installed in California), Imperial County with 650 MWs, and Inyo County with 302 MWs (Energy Commission 2011b). Geothermal plants provide 42 percent of in-state renewable generation (6.2 percent of total in-state energy generation) (Energy Commission 2010, 2011b). The counties with the greatest geothermal resource potential include Sonoma and Imperial.

Because hot water and steam cannot be transported long distances economically, use of geothermal resources is restricted to locations where they are found and initially available (National Geothermal Collaborative 2004). Geothermal steam resources can be depleted over time, leading to a reduction in electricity generation (Energy Commission 2011b). Geothermal exploration is time-consuming because of the difficulty in establishing what, exactly, is in the subsurface.

In Santa Rosa, California, highly treated wastewater from the Laguna Treatment Plant is being pumped to The Geysers steam fields (a large complex of geothermal power plants in Sonoma and Lake counties) to recharge the aquifer. Evidence suggests that the injection of treated wastewater is preserving the geothermal resource and having an added benefit of disposing of treated wastewater.

Decision to Eliminate the Technology from the Alternatives Analysis

This technology has practical limitations. Geothermal technology is limited to areas with geothermal resources. There are two known resource areas in Inyo County, the Coso Hot Springs and Saline Valley, both northwest of the project site. Coso Hot Springs is inside the boundary of the China Lake Naval Air Weapons Station, near the Coso Mountains. Saline Valley is northwest of Death Valley and east of the Owens Valley. The proposed HHSEGS site is not a feasible location for a geothermal project.

BIOMASS ENERGY

Overview

Biomass energy or *bioenergy* is the energy from plants and plant-derived materials. Wood is currently the largest biomass energy resource. Other biomass energy resources include food crops, grassy and woody plants, residues from agriculture or forestry, oil-rich algae, and the organic component of municipal and industrial wastes (NREL 2012c). The main biomass feedstocks for power are paper mill residue, lumber mill scrap, and municipal waste. The most common feedstocks used today are corn grain (to make ethanol) and soybeans (to make biodiesel) (NREL 2012c). Biopower is the use of biomass to produce energy and technologies include direct-firing, cofiring, gasification, pyrolysis, and anaerobic digestion.

While biomass facilities can be located throughout California, due to the availability of fuel from forest and agricultural waste, most biomass development occurs in the northern part of the state (Energy Commission 2011b). The counties with the greatest biomass potential from all sources of feedstocks (forestry, agricultural and municipal waste) include Siskiyou, Humboldt, Shasta, Mendocino, Fresno, Tulare, Kern, San Bernardino, Los Angeles, Riverside and San Diego (Energy Commission 2011b). Biomass generation provides nearly 20 percent of in-state renewable generation (2.8

percent of total in-state energy generation) (Energy Commission 2010, 2011b). Additional potential may be limited due to cost, air quality issues, and regulatory barriers.

Decision to Eliminate the Technology from the Alternatives Analysis

This technology has practical limitations. Biomass technology is limited to areas with access to biomass feedstock. Inyo County is not a county with large quantities of biomass feedstock. The proposed HHSEGS site is not a feasible location for a biomass project.

SMALL HYDROELECTRIC

Overview

Hydropower is derived from the kinetic energy of flowing water as it moves downstream. Turbines and generators convert the energy into electricity, which is then fed into the electrical grid (U.S. Department of Energy 2011). Small hydroelectric power is defined as systems with a capacity of 30 MWs or less (Energy Commission 2011b). Less than 10 percent of the hydropower units in the state are 30 MW or smaller. Units located in natural waterways may be operated as run-of-the-river where the amount of energy produced at any one time is determined by the current flow in the river. The amount of energy generated from small hydroelectric systems depends largely on the amount of snow and rainfall received, and the amount of hydroelectricity produced varies significantly from year to year (Energy Commission 2011b). Hydropower is considered to be a mature technology, and hydro projects with storage capability have some of the best operating characteristics of any renewable technology.

The three types of hydroelectric facilities are impoundment, diversion, and pumped storage. Some hydropower plants use dams and some do not. Pumped storage systems do not depend solely on runoff and are typically used to provide power during peak demand periods on very short notice. Some power plants are located on rivers, streams, and canals, but for a reliable water supply, dams are needed (U.S. Bureau of Reclamation 2005). Hydropower is available in 52 of the 58 state counties, but the counties with the highest potential energy are in the mountain ranges north and east of the Central Valley. Small hydroelectric power represents 15 percent of in-state renewable generation (2.2 percent of total in-state energy generation) (Energy Commission 2010, 2011b). The counties with the greatest small hydroelectric potential include Siskiyou, Shasta, Plumas, Butte, Sierra, Amador, Calaveras, Stanislaus, Tuolumne, Madera, and Fresno (Energy Commission 2011b).

While there are a variety of equipment options and plant configurations that can accommodate nearly every site condition, the remote location of hydroelectric resources adds challenges to resource development due to the interconnection requirements and suitable market and permitting requirements (Energy Commission 2011b).

Decision to Eliminate the Technology from the Alternatives Analysis

This technology has practical limitations. Small hydroelectric technology is limited to areas where water is in motion. A sufficient quantity of falling water is needed for electricity generation, so hilly or mountainous areas are the best sites for hydroelectric

resources. The proposed HHSEGS site is not a feasible location for a small hydroelectric project.

WAVE AND TIDAL ENERGY

Overview

Ocean wave energy technologies rely on the up-and-down motion of ocean waves produced by wind to generate electricity (Ocean Energy Council 2012a). *Wave energy conversion* (WEC) devices can be sorted into several categories based on the type of wave motion from which the devices produce energy. For example, wave motions include the roll or vertical heave of a wave as it passes a device or the horizontal surge in nearer-shore conditions (City and County of San Francisco 2009). Categories of WEC devices include: (1) the attenuator (pitching motion), (2) point absorbers (heave and surge), (3) oscillating surge devices (surge), (4) oscillating water column device (air pressure), (5) overtopping device (breaking wave run-up), and (6) submerged pressure differential (pressure).

Tidal electricity generation has traditionally used a barrage (dam-like structure) across an estuary to block the incoming and outgoing tide (Ocean Energy Council 2012b). When there is adequate difference in the elevation on the different sides of the barrage, the gates are opened, releasing the water through the turbines to generate electricity. Newer technologies use in-stream tidal technology that harnesses offshore tidal streams using underwater devices similar to wind turbines. A tidal range of at least 7 meters (23 feet) is required for economical operation and sufficient head of water for the turbines. The size of the barrage required (length and height) and difference in height between high and low tide are the major factors in determining the cost effectiveness of a tidal power site.

Decision to Eliminate the Technology from the Alternatives Analysis

This technology has technological and practical limitations. Wave and tidal technology is not ready for commercial use (Energy Commission 2011b). Some technologies are closer to commercialization while others are emerging. Wave and tidal technology is limited to areas with water bodies with tidal or wave action. Inyo County does not have areas of wave and tidal resources.

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Alternatives Appendix-3
Summary Comparison of the Proposed Project's Impacts to the Project Alternatives and the No-Project Alternative
(Please see explanatory notes at the bottom of the table)

Environmental Effect	Proposed HHSEGS Project	No-Project Alternative	Sandy Valley Off-site Alternative	Solar Power Tower with Energy Storage Alternative	Solar Photovoltaic Alternative	Parabolic Trough Alternative	Reduced Acreage Alternative
Air Quality							
Construction-related emissions	SM	—	Similar to HHSEGS (SM)	Similar to HHSEGS (SM)	Similar to HHSEGS (SM)	Similar to HHSEGS (SM)	Similar to HHSEGS (SM)
Project operations emissions	SM	—	Similar to HHSEGS (SM)	Similar to HHSEGS (SM)	Less than HHSEGS (SM)	Similar to HHSEGS (SM)	Somewhat less than HHSEGS (SM)
Biological Resources							
Impacts on special-status plant species	SM	Much less than HHSEGS (LS)	Much less than HHSEGS (SM)	Similar to or somewhat greater than HHSEGS (SM)	Same as HHSEGS (SM)	Same as HHSEGS (SM)	Much less than HHSEGS (SM)
Impacts on waters of the U.S. and waters of the state	SM	Much less than HHSEGS (LS)	Much less than HHSEGS (SM)	Similar to or somewhat greater than HHSEGS (SM)	Same as HHSEGS (SM)	Same as HHSEGS (SM)	Much less than HHSEGS (SM)
Impacts on desert tortoise	SM	Much less than HHSEGS (LS)	Much less than HHSEGS (SM)	Similar to or somewhat greater than HHSEGS (SM)	Same as HHSEGS (SM)	Same as HHSEGS (SM)	Much less than HHSEGS (SM)
Impacts on special-status terrestrial wildlife species (other than desert tortoise)	SM	Much less than HHSEGS (LS)	Much less than HHSEGS (SM)	Similar to or somewhat greater than HHSEGS (SM)	Same as HHSEGS (SM)	Same as HHSEGS (SM)	Much less than HHSEGS (SM)
Impacts on avian species from collisions with project features (see biological resources note)	PSU	—	Similar to or somewhat greater than HHSEGS (PSU)	Similar to or somewhat greater than HHSEGS (PSU)	Unknown (PSU)	Unknown (PSU)	Less than HHSEGS (PSU)
Impacts on avian species from exposure to concentrated solar flux	PSU	—	Similar to or somewhat greater than HHSEGS (PSU)	Similar to or somewhat greater than HHSEGS (PSU)	—	—	Less than HHSEGS (PSU)
Potential impacts on groundwater dependent ecosystems	PSM	Somewhat less than HHSEGS (LS)	Somewhat less than HHSEGS (PSM)	Somewhat greater than HHSEGS (PSM)	Somewhat less than HHSEGS (PSM)	Similar to HHSEGS (PSM)	Somewhat less than HHSEGS (PSM)

Alternatives Appendix-3
Summary Comparison of the Proposed Project's Impacts to the Project Alternatives and the No-Project Alternative
(Please see explanatory notes at the bottom of the table)

Environmental Effect	Proposed HHSEGS Project	No-Project Alternative	Sandy Valley Off-site Alternative	Solar Power Tower with Energy Storage Alternative	Solar Photovoltaic Alternative	Parabolic Trough Alternative	Reduced Acreage Alternative
Biological resources note: For the Sandy Valley Off-site Alternative and the SPT with Energy Storage Alternative, avian collision impacts could be secondary to exposure to solar flux. For the Parabolic Trough Alternative, collisions could be secondary to retinal damage from glint or glare.							
Cultural Resources							
Potential to disturb, destroy, or visually degrade significant prehistoric and historical archaeological sites <i>on</i> the site (see note 1 on cultural resources)	LS	Much less than HHSEGS (LS)	Somewhat greater than HHSEGS (PSM)	Similar to HHSEGS (LS)	Similar to HHSEGS (LS)	Similar to HHSEGS (LS)	Somewhat less than HHSEGS (LS)
Potential to disturb, destroy, or visually degrade significant prehistoric and historical archaeological sites <i>beyond</i> the site	SU	Much less than HHSEGS (LS)	Similar to HHSEGS (PSU)	Similar to HHSEGS (SU)	Much less than HHSEGS (PSM)	Much less than HHSEGS (PSM)	Somewhat less than HHSEGS (SU)
Potential impacts on significant built-environment cultural resources <i>on</i> the site (see note 2 on cultural resources)	SM	Much less than HHSEGS (LS)	Similar to HHSEGS (PSM)	Similar to HHSEGS (SM)	Similar to HHSEGS (SM)	Similar to HHSEGS (SM)	Somewhat less than HHSEGS (SM)
Potential impacts on significant built-environment cultural resources <i>beyond</i> the site (see note 2 on cultural resources)	SU	Much less than HHSEGS (LS)	Similar to HHSEGS (PSU)	Similar to HHSEGS (SU)	Much less than HHSEGS (PSM)	Somewhat less than HHSEGS (PSM)	Somewhat less than HHSEGS (SU)
Potential to disturb, destroy, or visually degrade significant ethnographic resources <i>on</i> the site	SU	Much less than HHSEGS (LS)	Similar to HHSEGS (SU)	Similar to HHSEGS (SU)	Similar to HHSEGS (PSU)	Similar to HHSEGS (PSU)	Somewhat less than HHSEGS (SU)
Potential to disturb, destroy, or visually degrade significant ethnographic resources <i>beyond</i> the site	SU	Much less than HHSEGS (LS)	Similar to HHSEGS (SU)	Similar to HHSEGS (SU)	Somewhat less than HHSEGS (PSU)	Somewhat less than HHSEGS (PSU)	Somewhat less than HHSEGS (SU)
Note 1 on cultural resources: "Site" means the facility site proper and does not include linear or ancillary infrastructure away from the facility site. Note 2 on cultural resources: Except for the Sandy Valley Off-site Alternative, the built-environment cultural resource is the Old Spanish Trail – Mormon Road Northern Corridor.							
Fire Protection							
Potential impacts on local fire protection resources	PSM	—	Similar to HHSEGS (PSM)	Similar to HHSEGS (PSM)	Less than HHSEGS (PSM)	Much greater than HHSEGS (SM)	Somewhat less than HHSEGS (PSM)
Potential impacts on emergency response services	PSM	—	Similar to HHSEGS (PSM)	Similar to HHSEGS (PSM)	Less than HHSEGS (PSM)	Much greater than HHSEGS (SM)	Somewhat less than HHSEGS (PSM)
Geology and Paleontology							
Potential impacts from strong seismic shaking	SM	—	Similar to HHSEGS (PSM)	Same as HHSEGS (SM)	Much less than HHSEGS (PSM)	Much less than HHSEGS (PSM)	Much less than HHSEGS (PSM)

Alternatives Appendix-3
Summary Comparison of the Proposed Project's Impacts to the Project Alternatives and the No-Project Alternative
(Please see explanatory notes at the bottom of the table)

Environmental Effect	Proposed HHSEGS Project	No-Project Alternative	Sandy Valley Off-site Alternative	Solar Power Tower with Energy Storage Alternative	Solar Photovoltaic Alternative	Parabolic Trough Alternative	Reduced Acreage Alternative
Potential impacts from soil failure caused by liquefaction, hydrocollapse, formation of soil fissures, and/or dynamic compaction	SM	—	Similar to HHSEGS (PSM)	Same as HHSEGS (SM)	Much less than HHSEGS (PSM)	Much less than HHSEGS (PSM)	Much less than HHSEGS (PSM)
Potential impacts on paleontological resources	SM	—	Similar to HHSEGS (PSM)	Same as HHSEGS (SM)	Less than HHSEGS (PSM)	Less than HHSEGS (PSM)	Much less than HHSEGS (PSM)
Potential impacts on geological or mineralogical resources	LS	—	Similar to HHSEGS (LS)	Same as HHSEGS (LS)	Same as HHSEGS (LS)	Same as HHSEGS (LS)	Same as HHSEGS (LS)
Hazardous Materials							
Potential for release of hazardous materials to occur on-site	SM	—	Similar to HHSEGS (PSM)	Similar to HHSEGS (SM)	Similar to HHSEGS (SM)	Somewhat greater than HHSEGS (SM)	Similar to HHSEGS (PSM)
Potential for release of hazardous materials to occur off-site	SM	—	Similar to HHSEGS (PSM)	Similar to HHSEGS (SM)	Similar to HHSEGS (SM)	Somewhat greater than HHSEGS (SM)	Similar to HHSEGS (PSM)
Land Use							
Conflicts or inconsistencies with general plan land use designations and zoning	SU	—	Similar to HHSEGS (SU)	Same as HHSEGS (SU)	Same as HHSEGS (SU)	Same as HHSEGS (SU)	Same as HHSEGS (SU)
Conversion of agricultural land	—	—	Much greater than HHSEGS (SM)	—	—	—	—
Noise and Vibration							
Potential for noise to impact noise-sensitive receptors	PSM	—	Somewhat greater than HHSEGS (PSM)	Somewhat greater than HHSEGS (PSM)	Much less than HHSEGS (PSM)	Similar to HHSEGS (PSM)	Similar to HHSEGS (PSM)
Public Health							
Potential for project construction to cause air toxics-related impacts that could affect public health	LS	—	Similar to HHSEGS (LS)	Similar to HHSEGS (LS)	Similar to HHSEGS (LS)	Similar to HHSEGS (LS)	Similar to HHSEGS (LS)
Potential for project operations to cause air toxics-related impacts that could affect public health	LS	—	Similar to HHSEGS (LS)	Similar to HHSEGS (LS)	Less than HHSEGS (LS)	Similar to HHSEGS (LS)	Less than HHSEGS (LS)
Socioeconomic Resources							

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(Please see explanatory notes at the bottom of the table)

Environmental Effect	Proposed HHSEGS Project	No-Project Alternative	Sandy Valley Off-site Alternative	Solar Power Tower with Energy Storage Alternative	Solar Photovoltaic Alternative	Parabolic Trough Alternative	Reduced Acreage Alternative
Construction employment and increased taxes and fees	B	—	Similar to HHSEGS (B)	Similar to HHSEGS (B)	Similar to HHSEGS (B)	Similar to HHSEGS (B)	Similar to HHSEGS (B)
Displacement of existing rural residences	—	—	Greater than HHSEGS (LS)	—	—	—	—
Potential impacts on emergency medical and law enforcement services	PSM	—	Similar to HHSEGS (PSM)	Similar to HHSEGS (PSM)	Similar to HHSEGS (PSM)	Similar to HHSEGS (PSM)	Similar to HHSEGS (PSM)
Traffic and Transportation							
Potential impacts on roadway infrastructure	SM	—	Similar to HHSEGS (SM)	Same as HHSEGS (SM)	Same as HHSEGS (SM)	Same as HHSEGS (SM)	Same as HHSEGS (SM)
Potential for glint and glare to cause safety hazards or a distinct visual distraction effect from an operator control perspective (i.e., vehicle drivers and aircraft pilots)	PSM	—	Similar to HHSEGS (PSM)	Same as HHSEGS (PSM)	Much less than HHSEGS (LS)	Less than HHSEGS (PSM)	Similar to HHSEGS (PSM)
Potential for construction equipment and/or permanent structures to exceed 200 feet in height above ground level	SM	—	Similar to HHSEGS (SM)	Same as HHSEGS (SM)	—	—	Same as HHSEGS (SM)
Transmission Line Safety and Nuisance							
Potential for impacts related to aviation safety, hazardous shocks, nuisance shocks, and electric and magnetic field exposure	SM	—	Similar to HHSEGS (SM)	Similar to HHSEGS (SM)	Similar to HHSEGS (SM)	Similar to HHSEGS (SM)	Similar to HHSEGS (SM)
Visual Resources							
Construction-Related Impacts							
Potential to substantially degrade the existing visual character or quality of the site and its surroundings	SU	—	Similar to HHSEGS (SU)	Similar to HHSEGS (SU)	Less than HHSEGS (SM)	Similar to HHSEGS (SU)	Similar to HHSEGS (SU)
Potential to create a new source of substantial light or glare which would adversely affect day or nighttime views in the area	SU	—	Similar to HHSEGS (SU)	Similar to HHSEGS (SU)	Less than HHSEGS (SM)	Similar to HHSEGS (PSM)	Similar to HHSEGS (SU)
Project Operations Impacts							
Potential to substantially degrade the existing visual character or quality of the site and its surroundings	SU	—	Similar to HHSEGS (SU)	Same as HHSEGS (SU)	Much less than HHSEGS (PSM)	Somewhat less than HHSEGS (SU)	Similar to HHSEGS (SU)

Alternatives Appendix-3
Summary Comparison of the Proposed Project's Impacts to the Project Alternatives and the No-Project Alternative
(Please see explanatory notes at the bottom of the table)

Environmental Effect	Proposed HHSEGS Project	No-Project Alternative	Sandy Valley Off-site Alternative	Solar Power Tower with Energy Storage Alternative	Solar Photovoltaic Alternative	Parabolic Trough Alternative	Reduced Acreage Alternative
Potential to create a new source of substantial light or glare which would adversely affect day or nighttime views in the area	SU	—	Similar to HHSEGS (SU)	Same as HHSEGS (SU)	Much less than HHSEGS (PSM)	Somewhat less than HHSEGS (SU)	Similar to HHSEGS (SU)
Waste Management							
Potential for disposal or diversion of project materials to cause impacts on existing waste disposal or diversion facilities	SM	—	Similar to HHSEGS (PSM)	Similar to HHSEGS (PSM)	Similar to HHSEGS (PSM)	Similar to HHSEGS (PSM)	Similar to HHSEGS (PSM)
Potential for impacts on human health and the environment related to past or present soil or water contamination	PSM	—	Somewhat greater than HHSEGS (PSM)	Similar to HHSEGS (PSM)	Somewhat greater than HHSEGS (PSM)	Similar to HHSEGS (PSM)	Similar to HHSEGS (PSM)
Soil and Surface Water							
Soil erosion by wind and water during project construction	SM	—	Similar to HHSEGS (SM)	Greater than HHSEGS (SM)	Somewhat less than HHSEGS (SM)	Much greater than HHSEGS (SM)	Less than HHSEGS (SM)
Soil erosion by wind and water during project operations	PSM	Much less than HHSEGS (LS)	Similar to HHSEGS (PSM)	Somewhat greater than HHSEGS (PSM)	Less than HHSEGS (PSM)	Less than HHSEGS (PSM)	Less than HHSEGS (PSM)
Water quality impacts from contaminated storm water runoff	SM	Much less than HHSEGS (LS)	Same as HHSEGS (SM)	Somewhat greater than HHSEGS (SM)	Much less than HHSEGS (LS)	Somewhat greater than HHSEGS (SM)	Less than HHSEGS (SM)
Water quality impacts from storm damage	PSM	—	Similar to HHSEGS (PSM)	Similar to HHSEGS (PSM)	Somewhat greater than HHSEGS (PSM)	Greater than HHSEGS (PSM)	Somewhat less than HHSEGS (PSM)
Water quality impacts from power plant operations	SM	—	Same as HHSEGS (SM)	Somewhat greater than HHSEGS (SM)	Much less than HHSEGS (LS)	Similar to HHSEGS (SM)	Less than HHSEGS (SM)
Water quality impacts from sanitary waste	SM	—	Same as HHSEGS (SM)	Same as HHSEGS (SM)	Similar to HHSEGS (SM)	Similar to HHSEGS (SM)	Somewhat less than HHSEGS (SM)
Potential impacts from on-site and off-site flooding	SM	—	Similar to HHSEGS (SM)	Similar to HHSEGS (SM)	Similar to HHSEGS (SM)	Much less than HHSEGS (SM)	Similar to HHSEGS (SM)
Potential to impede or redirect 100-year flood flows, as shown on Federal Emergency	LS	—	Similar to HHSEGS (LS)	Similar to HHSEGS (LS)	Similar to HHSEGS (LS)	Similar to HHSEGS (LS)	Similar to HHSEGS (LS)

Alternatives Appendix-3
Summary Comparison of the Proposed Project's Impacts to the Project Alternatives and the No-Project Alternative
(Please see explanatory notes at the bottom of the table)

Environmental Effect	Proposed HHSEGS Project	No-Project Alternative	Sandy Valley Off-site Alternative	Solar Power Tower with Energy Storage Alternative	Solar Photovoltaic Alternative	Parabolic Trough Alternative	Reduced Acreage Alternative
Management Agency maps							
Water Supply							
Potential impacts on local wells	PSM	Somewhat less than HHSEGS (LS)	Similar to HHSEGS (PSM)	Somewhat greater than HHSEGS (PSM)	Somewhat less than HHSEGS (PSM)	Similar to HHSEGS (PSM)	Somewhat less than HHSEGS (PSM)
Potential impacts on groundwater basin balance	PSM	Somewhat less than HHSEGS (LS)	Similar to HHSEGS (PSM)	Somewhat greater than HHSEGS (PSM)	Somewhat less than HHSEGS (PSM)	Similar to HHSEGS (PSM)	Somewhat less than HHSEGS (PSM)
Notes: The comparison of impacts to the proposed project is conveyed, for most impacts, using these terms in a graded scale: <ul style="list-style-type: none"> • Much less than HHSEGS • Less than HHSEGS • Somewhat less than HHSEGS • Similar to HHSEGS • Same as HHSEGS • Somewhat greater than HHSEGS • Greater than HHSEGS • Much greater than HHSEGS 			Notes: Impact conclusions for the proposed project and the comparative impacts for the alternatives are shown using these abbreviations: <ul style="list-style-type: none"> — = no impact B = beneficial impact LS = less-than-significant impact, no mitigation required SM or PSM = significant or potentially significant impact that can be mitigated to less than significant SU or PSU = significant and unavoidable or potentially significant and unavoidable impact that cannot be mitigated to less than significant 				

ALTERNATIVES

List of Comment Letters

		Alternatives Comments?
1	Inyo County	
2	Bureau of Land Management	
3	National Park Service	
4	The Nature Conservancy	
5	Amargosa Conservancy	X
6	Basin & Range Watch	X
7	Pahrump Paiute Tribe	
8	Richard Arnold, Pahrump Piahute Tribe	
9	Big Pine Tribe of Owens Valley	X
10	Intervenor Cindy MacDonald	X
11	Intervenor Center for Biological Diversity	X
12	Intervenor, Old Spanish Trail Association	
13	Applicant, BrightSource Energy, Inc.	X

Comment #	DATE	COMMENT TOPIC	RESPONSE
5	July 21, 2012	The Amargosa Conservancy	
5.5		Request to analyze alternative sources of water for the project. Request to examine alternative locations such as Sandy Valley and alternative technologies such as solar PV and distributed generation.	Staff has not identified any viable alternative sources of water for the project. See the full analyses of the Sandy Valley Off-site Alternative and the Solar PV Alternative in the final staff assessment under the subsection, "Alternatives Evaluated in Detail." See also the discussion and analysis under the subsection, "Distributed Generation," of staff's alternatives analysis.
5.10		Same comment as 5.5.	See response to comment 5.5.

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Comment #	DATE	COMMENT TOPIC	RESPONSE
6	July 23, 2012	Basin and Range Watch	
6.1		Staff assessment does not consider private lands outside of the area.	See the full analysis under the subsection of staff's alternatives analysis, "Sandy Valley Off-site Alternative," which is mostly on private lands. See also the analysis of the potential feasibility of an alternative site on private land in the West Mojave under the subsection, "Barstow Preliminary Renewable Energy Study Area."
6.2		Staff assessment does not consider an off-site alternative on disturbed or degraded lands.	See response to comment 6.1.
6.3		Staff assessment does not evaluate a distributed generation (DG) alternative. States that the Energy Commission reviewed the DG alternative for other projects, including Ivanpah and Genesis.	See a full discussion of the DG category of renewable energy under the subsection of staff's alternatives analysis, "Distributed Generation." The alternatives analyses for the Palen Solar Power Project (PSPP), Ivanpah Solar Electric Generating System (ISEGS), and Genesis Solar Energy Project (GSEP) evaluated DG. For PSPP, staff eliminated DG from consideration and concluded that it was unknown whether the 500 MW of power generation could be achieved to replace the generating capacity of PSPP. For ISEGS, staff eliminated DG from the analysis and concluded that concentrating solar power (CSP) projects cannot be replaced by DG installations and that CSP projects are also needed to achieve the state's renewables portfolio standard goals. For GSEP, staff eliminated the technology from detailed consideration and concluded that installation of 250 MW of DG capacity could not be guaranteed to be accomplished in the timeframe for the project.

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<p align="center">6.4</p>		<p>Distributed generation should be given a much more full analysis, as it is a completely viable alternative.</p>	<p>See the discussion and analysis of the DG category of renewable energy under the subsection of staff's alternatives analysis, "Distributed Generation." See also the discussion under the subsection, "Decision to Eliminate this Category of Renewable Energy Generation from Detailed Consideration."</p>
<p align="center">6.5</p>		<p>Alternatives should be evaluated that are in load centers. The entire state should be considered.</p>	<p>See staff's analysis of the potential feasibility of an alternative site in the West Mojave, which is closer to a load center than the proposed project; see the subsection in staff's alternatives analysis, "Barstow Preliminary Renewable Energy Study Area." Staff's alternatives analysis was prepared in accordance with the California Environmental Quality Act (CEQA) regulations and guidelines. See the full discussion of those requirements under the subsections of staff's alternatives analysis, "CEQA Requirements," and, "Alternatives Screening." CEQA does not require an alternatives analysis to evaluate vast regional areas across the state to identify a different site for the proposed project.</p>
<p align="center">6.6</p>		<p>A master comprehensive plan should exist to determine recreational and biodiversity resources on public lands, assumptions for integrating various fuels mixes and technologies into the utilities' plans, a state plan, and a national plan. Loads should be carefully analyzed to determine whether additional capacity is needed. The plan might recommend building smaller units in cities.</p>	<p>See response to comment 6.5. Staff observes that planning efforts at the state and federal level are occurring to analyze and identify areas for development of renewable energy projects. See a brief description of the Desert Renewable Energy Conservation Plan (DRECP) under the subsection of staff's alternatives analysis, "Barstow Preliminary Renewable Energy Study Area." More information on the DRECP is at: <http://www.drecp.org>. See also the extensive resources on renewable energy planning and development on the California Energy Commission and California Public Utilities Commission (CPUC) websites. See also the online information center for the Solar Energy Development Programmatic EIS at: <http://solareis.anl.gov/>.</p>

<p>6.7</p>		<p>Renewables should be distributed generation in load centers. DG is a known technology that is proven in Germany. Environmental impacts of the proposed project could be avoided with a DG alternative.</p>	<p>See responses to comments 6.3 and 6.4. The subsection of staff's alternatives analysis, "Distributed Generation," describes incentive programs for customer-side of the meter and utility-side of the meter DG. CPUC regulates DG policies and programs in California. See the CPUC website for more information: <http://www.cpuc.ca.gov/PUC/energy/DistGen/>. See also information on the California Solar Initiative, the solar rebate program for the state's customers of Pacific Gas & Electric, Southern California Edison, and San Diego Gas & Electric: <http://www.gosolarcalifornia.org/about/csi.php>. The Energy Commission, along with other state agencies, work to support the state's renewables portfolio standard program goals, including goals for implementing DG. The Energy Commission publishes the Integrated Energy Policy Report (IEPR); the IEPR process features workshops and proceedings for public participation. The February 2012 IEPR addresses strategies to encourage demand for self-generation technologies, including PV systems. See the citation and reference in staff's alternatives analysis for the IEPR: Energy Commission 2012b. See also the Energy Commission's website for details on research and development, programs, incentives, permitting, etc., on the state's distributed energy resources: <http://www.energy.ca.gov/distgen/>.</p>
<p>6.8</p>		<p>Energy Commission staff rejected an alternative with a smaller footprint.</p>	<p>This comment refers to the discussion under the subsection of staff's alternatives analysis, "Alternatives Considered in the Application for Certification." This subsection of staff's analysis explains why the Applicant (not Energy Commission staff) rejected a smaller project alternative. The final staff assessment includes a full analysis of an alternative with a smaller site footprint. See the subsection in staff's alternatives analysis, "Reduced Acreage Alternative."</p>

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6.9		Energy Commission staff rejected an alternative with a smaller footprint for the benefit of BrightSource Energy.	See response to comment 6.8.
Comment #	DATE	COMMENT TOPIC	RESPONSE
9	July 21, 2012	Big Pine Tribe of Owens Valley	
9.4		Recommends inclusion of a DG alternative in staff's alternatives analysis	See the discussion and analysis of the DG category of renewable energy under the subsection of staff's alternatives analysis, "Distributed Generation." See also responses to comments 6.3, 6.4, and 6.7 in the comment letter from Basin and Range Watch.
Comment #	DATE	COMMENT TOPIC	RESPONSE
10	July 21, 2012	Intervenor Cindy MacDonald -- Alternatives, p. 4-1	
10.1	p. 4-2, #1	Requests details on information provided by the Applicant to Energy Commission staff on the Bloom's Energy Server™ distributed power generator.	Susan Strachan provided information on Bloom's Energy Server™ in an e-mail to staff on March 14, 2012. The information was provided on behalf of the Applicant and included: the Bloom Energy Corporation product data sheet on the ES-5700 energy server; and the company brochure, company overview, and Bloom Electrons™ overview.
10.2	p. 4-2, #2	Requests evidence that the Applicant contacted Bloom Energy Corporation regarding the site-specific feasibility and viability of using the technology at the proposed project site.	Energy Commission staff contacted Bloom Energy in August 2012 and received detailed information on the company's technology and its development status in California. Please see the revised and expanded discussion in the appendix to staff's alternatives analysis, "Appendix Alternatives-1: Other Renewable Energy Technologies," under the subsection, "Solid Oxide Fuel Cells."

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10.3	p. 4-3, #1	Requests information on the Applicant's statement that Bloom's Energy Server™ performs poorly in the heat, and inquires whether a climate-controlled building could resolve that issue.	See response to comment 10.2.
10.4	p. 4-3, #2	Requests information on the Applicant's statement that an alternative using Bloom's Energy Server™ would not qualify for the state's renewables portfolio standard (RPS) program requirements, and asks why this is important.	See the subsection in staff's alternatives analysis, "Alternatives Screening," which includes a brief discussion of the state's RPS program; this subsection of the analysis also describes the importance of achieving the state's RPS program goals and identifies a project objective to develop a renewable energy facility that will help publicly owned electric utilities satisfy those goals. Details on the state's RPS program is on the Energy Commission and CPUC websites. See the revised discussion of solid oxide fuel cells (SOFCs) in Alternatives Appendix-1, "Other Renewable Energy Technologies." As described in Alternatives Appendix-1, SOFCs (e.g., Bloom's Energy Server™) are being installed primarily to serve on-site load. See also the Energy Commission's, "Renewables Portfolio Standard Eligibility," Fifth Edition, May 2012 (publication number CEC-300-2012-002-CMF), which discusses fuel cell facilities using renewable fuel and their eligibility for the state's RPS program. Fuel cell facilities using natural gas are not eligible.
Comment #	DATE	COMMENT TOPIC	RESPONSE
11	July 23, 2012	Intervenor Center for Biological Diversity (CBD)	

<p>11.1</p>		<p>Refers to the California Environmental Quality Act (CEQA) Statute and Guidelines, describing sections that address feasible alternatives and conditions under which an alternative may not be approved.</p>	<p>Staff observes that the comment misinterprets the State CEQA Statute and Guidelines. Section 15021 of the State CEQA Guidelines describes the duty of public agencies to avoid or minimize environmental damage and balance competing public objectives. The comment from CBD does not acknowledge Section 15021(b), which allows a public agency to consider specific economic, environmental, legal, social, and technological factors in deciding whether changes in a project are feasible. Section 15126.6(c) of the Guidelines addresses selection of a range of potential alternatives, which “shall include those that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects.” No statement is made in Section 15126.6 addressing a requirement to reject the project.</p>
<p>11.2</p>		<p>States that environmental review documents must consider a range of alternatives, including alternative sites. States that the alternatives analysis for the proposed project is too limited and should explore other alternatives.</p>	<p>The Sandy Valley Off-site Alternative site was fully analyzed and compared to the proposed project in staff’s alternatives analysis. The alternative site is in an area with relatively disturbed habitat. Several hundred acres are in agricultural use, and on-site habitat values have been compromised as a result. See the subsection in the alternatives analysis, “Sandy Valley Off-site Alternative.” Staff also evaluated the potential feasibility of an alternative site on private land in the West Mojave; see the subsection in staff’s alternatives analysis, “Barstow Preliminary Renewable Energy Study Area”. Please also see the discussion and analysis of the “No-Project Alternative,” which allows decision makers to compare the impacts of approving the proposed HHSEGS project with the impacts of not approving the proposed project, in accordance with the State CEQA Guidelines (Cal. Code Regs., tit. 14, § 15126.6[e]).</p>

<p>11.3</p>		<p>States that staff's alternatives analysis has not adequately explored alternative sites, and that only one off-site alternative was evaluated in any detail. States that looking at one alternative site does not fulfill the Energy Commission's duty under CEQA.</p>	<p>In describing the purpose of an alternatives analysis, the State CEQA Guidelines state that "the discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project...(Cal. Code Regs., tit. 14, § 15126.6[b]). CEQA requires consideration of a "reasonable range of potentially feasible alternatives that will foster informed decision making and public participation" (Cal Code Regs., tit. 14, § 15126.6[a]). See also response to comment 11.2. Nowhere is it stated in the alternatives analysis that there are no other sites in California where the project objectives could be accomplished. As stated in response to comment 6.5 in the comment letter from Basin and Range Watch, CEQA does not require an alternatives analysis to evaluate vast regions to identify a different site for the proposed project. Staff's alternatives analysis complies with the requirements of CEQA.</p>
<p>11.4</p>		<p>States that it is unclear if Sandy Valley refers to a currently proposed project called Sandy Valley SEGS.</p>	<p>BrightSource Energy has submitted a Plan of Development to the U.S. Bureau of Land Management (BLM) for its "Sandy Valley" project, a 750-MW solar power tower (SPT) project in Nevada a few miles southeast of the proposed HHSEGS site. BrightSource Energy's Sandy Valley project in Nevada is in the list of cumulative projects in the EXECUTIVE SUMMARY of the staff assessment. The Sandy Valley Off-site Alternative site that is evaluated in staff's alternatives analysis is in the Mesquite Valley in California in Inyo and San Bernardino counties. The alternative site is adjacent to the community of Sandy Valley, Nevada, and it is unrelated to BrightSource Energy's 750-MW SPT project named Sandy Valley.</p>

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<p align="center">11.5</p>		<p>The comment summarizes the potential environmental impacts of the Solar Photovoltaic Alternative compared to the proposed HHSEGS project.</p>	<p>Staff acknowledges the comments on the Solar PV Alternative.</p>
<p align="center">11.6</p>		<p>States that the alternative technology alternatives in staff's analysis appear to have been eliminated because of their "effectiveness." The comment references a page in the subsection of the alternatives analysis, "Power Plant Efficiency and Reliability."</p>	<p>Staff's alternatives analysis fully evaluates three alternative technologies, including the Solar Power Tower with Energy Storage Alternative, Solar Photovoltaic Alternative, and Parabolic Trough Alternative. None of these alternatives were eliminated from staff's analysis. The subsection in staff's alternatives analysis, "Engineering Assessment of the Alternatives," compares the effectiveness of the different solar collectors for each alternative. The engineering assessment of the solar collectors provides information that is applicable to a comparative analysis of alternatives. Staff's alternatives analysis also evaluates and compares environmental impacts of the proposed project to the same or similar impacts of the project alternatives.</p>
<p align="center">11.7</p>		<p>States that staff's alternatives analysis is deficient and refers to a CEQA court case in which the environmental impact report was rejected for not meeting the information requirements of CEQA. The comment suggests that the alternatives analysis for the proposed project relies too heavily on the Applicant's objectives and did not consider a smaller alternative that would have been environmentally superior.</p>	<p>See response to comment 6.8 in the comment letter from Basin and Range Watch.</p>

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<p align="center">11.8 Prt 1</p>		<p>States that staff's alternatives analysis unreasonably narrows the project objectives and includes timing of the environmental reivew as a basic objective of the project.</p>	<p>Staff did not indicate that timing of the environmental review is a basic objective of the project. The objective states: "Obtain site control and use within a reasonable time frame." The project objective addressed in this comment actually broadens the original project objective provided by the Applicant, which addresses "the potential of achieving a commercial on-line date as soon as possible, targeted for the first/second quarter of 2015."</p>
<p align="center">11.8 Prt 2</p>		<p>States that staff's analysis fails to address whether the proposed project will result in sales of competitively priced renewable energy.</p>	<p>Pricing of renewable energy is not addressed in staff's alternatives analysis. As stated in staff's alternatives analysis (see the discussion of feasibility issues for the SPT with Energy Storage Alternative), the power generated by the proposed HHSEGS project would be sold to PG&E under two power purchase agreements (PPAs) approved by CPUC in 2010. The PPAs are approved, signifying that CPUC considers the energy to be reasonably priced (i.e., to reflect a competitive price).</p>
<p align="center">11.8a</p>		<p>States that the timing of the environmental review cannot be used as a basic objective of the project to limit the analysis of alternatives that would avoid significant impacts to the environment, and biological resources in particular. A comprehensive exploration of a range of alternative sites will avoid significant impacts of the proposed project.</p>	<p>See response to comment 11.8. Staff evaluated the potential feasibility of eight off-site alternatives to the proposed project. See the subsection in staff's alternatives analysis, "Review of Off-site Alternatives." Of those eight sites, the Sandy Valley alternative site was fully analyzed and compared to the proposed project in staff's analysis. See the subsection, "Sandy Valley Off-site Alternative." As stated above, staff also evaluated the potential feasibility of an alternative site on private land in the West Mojave.</p>
<p align="center">11.9</p>		<p>States that staff's alternatives analysis should evaluate re-use of disturbed sites as an alternative to the proposed project.</p>	<p>See response to comment 6.5 in the comment letter from Basin and Range Watch. See also response to comment 11.2.</p>

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11.10		States that staff's alternatives analysis should explore the use of a distributed generation alternative.	See responses to comments 6.3, 6.4, and 6.7 in the comment letter from Basin and Range Watch. See also response to comment 9.4 in the comment letter from Big Pine Tribe of Owens Valley.
Comment #	DATE	COMMENT TOPIC	RESPONSE
13	July 23, 2012	Applicant, BrightSource Energy, Inc. -- Alternatives p. 18	
13.14	p. 18, #1	Replace references to "BrightSource" with HHSEGS or the Applicant.	Staff changed all citations and references pertaining to the proposed project to Hidden Hills Solar I, LLC; Hidden Hills Solar II, LLC.
13.15	p. 18, #2	The alternatives analysis in the staff assessment should be based on the Applicant's project objectives.	Staff's alternatives analysis is substantially based on the Applicant's original project objectives. The issue was addressed by the Hidden Hills Committee in the "ORDER RE: APPLICANT'S MOTION IN LIMINE" dated and posted October 2, 2012 (Docket tn: 67435 CEC 2012ff).
13.16	p. 20, #3	States that the underlying purpose of the project is to construct the Applicant's proposed project by a specific date.	The subsection in staff's alternatives analysis, "Alternatives Screening," clearly describes CEQA requirements for a statement of objectives and the underlying purpose of the project. Staff's alternatives analysis complies with the requirements of CEQA.

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<p align="center">13.17</p>	<p align="center">p. 21, #4</p>	<p>The project objectives in the staff assessment are not the objectives of the Applicant. States that the Commission has no authority to transform the project objectives into generic policy objectives.</p>	<p>Staff's alternatives analysis did not consider the project objectives from the application for certification (AFC) that specifically address using BrightSource's proprietary technology and complying with provisions of the power sales agreements with a commercial on-line date targeted for the first/second quarter of 2015. These two project objectives specifically address implementation of the Applicant's proposed project. Nothing in CEQA supports such a narrowing of an alternatives analysis that would result from including such objectives. Using the Applicant's two referenced project objectives in a comparison of project alternatives would overly influence the alternatives analysis. Relying on project objectives that directly target approval and construction of the proposed project is inconsistent with the purpose of CEQA for an alternatives analysis.</p>
<p align="center">13.18</p>	<p align="center">p. 21, #5</p>	<p>Staff's alternatives analysis arbitrarily eliminates the Applicant's project objectives. A table should be included comparing the project objectives from the AFC to those in the alternatives analysis of the staff assessment.</p>	<p>The subsection of staff's alternatives analysis, "Alternatives Screening," references the Applicant's original project objectives in the "Executive Summary" of the AFC for the project. The AFC is available to all interested parties in the Applicant's documents for the project proceeding on the Energy Commission's website. It is not necessary to list them in staff's alternatives analysis.</p>
<p align="center">13.19</p>	<p align="center">p. 21, #6</p>	<p>States that two off-site alternatives, Calvada South and Trona, were presented in the AFC but eliminated from the staff assessment. Also states that these alternatives are within the reasonable range of alternatives to the project because they satisfy most of the project objectives.</p>	<p>The subsection in staff's alternatives analysis, "Review of Off-site Alternatives," evaluates in detail the potential feasibility of the Calvada South and Trona off-site alternatives. Based on staff's analysis, neither of these alternative sites could avoid or lessen any significant effects of the project. Staff concluded, based on a careful screening analysis, that the significant effects of either off-site alternative would be greater than those identified for the proposed project. Staff's analysis complies with the requirements of CEQA.</p>

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<p align="center">13.20</p>	<p align="center">p. 21, #7</p>	<p>Suggests that staff's alternatives analysis includes alternative locations that would not avoid or substantially lessen a significant effect of the project. Suggests that the project objectives in the alternatives analysis fit staff's preferred outcome. States that the staff assessment should describe how the alternative locations avoid or substantially lessen a significant effect of the project.</p>	<p>Staff evaluated the potential feasibility of the same eight off-site alternatives to the proposed project that are discussed in the AFC. Staff determined that the AFC presented insufficient information to eliminate the Sandy Valley Off-site Alternative from detailed consideration in the alternatives analysis; therefore, staff's analysis evaluates and compares the off-site alternative to the proposed project. The complete analysis is in the subsection of staff's alternatives analysis, "Sandy Valley Off-site Alternative." Staff's analysis objectively compares the potential environmental effects of the project alternatives to the proposed project. Staff's analysis complies with the requirements of CEQA.</p>
<p align="center">13.21</p>	<p align="center">p. 22, #8</p>	<p>The staff assessment must address whether the alternatives examined themselves cause one or more significant effects.</p>	<p>Staff's alternatives analysis evaluates and compares the environmental impacts of the proposed project to the same or similar impacts that would occur under each of the project alternatives. See the subsection in staff's alternatives analysis, "Alternatives Evaluated in Detail."</p>
<p align="center">13.22</p>	<p align="center">p. 22, #9</p>	<p>States that development of 170 parcels with single-family residences at the HHSEGS site is reasonably foreseeable under the No-Project Alternative. States that the No-Project Alternative should be revised to evaluate the potential environmental impacts from development of 170 homes sites, wells, and related infrastructure.</p>	<p>An EIR was prepared in 1974 by the Inyo County Planning Department for a project to subdivide and develop several thousand acres in Pahrump Valley, an area that includes the present site for the proposed project. It has been close to 40 years since the area was approved for development, and no residences or other occupied structures were ever constructed at the proposed HHSEGS site. See the complete discussion and analysis under the subsection in staff's alternatives analysis, "No-Project Alternative."</p>
<p align="center">13.23</p>	<p align="center">p. 23, #10</p>	<p>States that Alternatives Appendix-2 should be revised to reflect development under the No-Project Alternative of 170 single-family residences and related infrastructure.</p>	<p>See response to comment 13.22, above.</p>

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13.24	p. 23, #11	Replace references to "BrightSource Energy" with HHSEGS or the project companies' names.	See response to comment 13.14, above.
13.25	p. 23, #12	Requests citations and quotations in the staff assessment for sections of the State CEQA Guidelines that address feasibility.	The definition of feasibility in Section 15364 of the State CEQA Guidelines is in the subsection of staff's alternatives analysis, "Alternatives Evaluated in Detail." A description of what is meant by a range of reasonable alternatives is near the beginning of staff's alternatives analysis, under the subsection, "CEQA Requirements," and the citation is included.
13.26	p. 24, #13	Quotes Section 15126.6(e)(3)(B) of the State CEQA Guidelines and suggests that the No-Project Alternative would result in "predictable actions by others" (i.e., development of single-family residences on 170 parcels at the site).	See response to comment 13.22, above.
13.27	p. 24, #14	States that the site is partially developed by graded roads, distribution lines, and existing wells.	Staff responded to this comment in the alternatives analysis under the subsection, "No-Project Alternative." Staff confirms that the proposed project site is undeveloped and vacant.
13.28	p. 24, #15	States that the proposed project site is not Inyo County's land. States that no development plan is needed for future use of the site. States that development of up to 170 parcels for agricultural or residential use can occur without further discretionary approvals or environmental review. States that sale and development of up to 170 lots would occur if the proposed project was not approved.	Inyo County is the local agency with jurisdiction over the unincorporated area of the county. See response to comment 13.22, above.
13.29	p. 25, #16	Requests removal of the sentence from the alternatives analysis, "[t]he lack of a water source will continue to restrain development in the Charleston View area."	As requested, staff removed the sentence from the analysis. See the revised discussion and analysis under the subsection of staff's alternatives analysis, "No-Project Alternative."

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<p>13.30</p>	<p>p. 25, #17</p>	<p>Describes issuance of well permits by Inyo County and describes how the County has a legal duty to issue a permit that meets the ministerial criteria of the permit. The Applicant states that "[t]he No Project Alternative is characterized by the existing land use entitlement to develop 170 parcels and to assume the entitlement does not exist or would not be exercised is speculative and not supported by substantial evidence." States that the landowners and Inyo County want to see this land developed, even if the proposed project is not approved.</p>	<p>Staff has revised the alternatives analysis under the subsection, "No-Project Alternative," including removing the statement that it is "unknown whether the County would issue a well permit for a new residence." The "no project" analysis is required to discuss, "what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services" (Cal Code Regs., tit. 14, § 15126.6[e][2]). The Applicant's opinion on the probability of a significant level of development occurring at the project site under the No-Project Alternative is extremely speculative. See also response to comment 13.22. The mere existence of subdivided property does not make development of the area reasonably foreseeable. It is the Applicant's opinion that the landowners and Inyo County "want to see this land developed." Staff confirms that the No-Project Alternative is characterized by the continuation of existing conditions at the HHSEGS site.</p>
<p>13.31</p>	<p>p. 26, #18</p>	<p>States that the proposed project would not have a cone of depression impact beyond the project site boundary. States that the conclusion in the alternatives analysis for impacts on groundwater dependent plants and wildlife under the No-Project Alternative is incorrect; refers to the "Biological Resources" section and discussions of the current signs of stress on existing groundwater-dependent vegetation.</p>	<p>See the WATER SUPPLY section in the final staff assessment for a full analysis of potential impacts of the proposed project on groundwater resources. It is unsubstantiated opinion that the No-Project Alternative would result in development of 170 parcels. See response to comment 13.22.</p>
<p>13.32</p>	<p>p. 26, #19</p>	<p>States that the discussion of impacts on cultural resources must be revised to consider residential or agricultural development on 170 parcels.</p>	<p>It is unsubstantiated opinion that the No-Project Alternative would result in development of 170 parcels. See response to comment 13.22.</p>

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<p>13.33</p>	<p>p. 26, #20</p>	<p>States that the discussion of impacts on soil and surface water resources must be revised to consider residential or agricultural development on 170 parcels. States that because of the low-impact design and sheet flow drainage that would minimize impact on soil and surface water resources, staff's conclusion that impacts under the No-Project Alternative would be "much less than HHSEGS" is an exaggeration.</p>	<p>It is unsubstantiated opinion that the No-Project Alternative would result in development of 170 parcels. Although the proposed project's low-impact design and sheet flow would lessen impacts to soil and surface water, those impacts are not reduced to the level that is "similar to" or "somewhat less" than a site that is not developed. The proposed project includes the grading of roughly 440 acres during construction and about 850 acres of impervious area during operations. A portion of the west perimeter road would be elevated for the purpose of flooding about 125 acres and water would overtop this road after 20 percent of the storm events. Best Management Practices and conditions of certification would be implemented to protect soil and water resources, but the No-Project Alternative comparison is with continuation of existing conditions, which also accounts for the possibility of minor land use changes occurring at the site. Staff's determination that impacts would be much less than HHSEGS is not an exaggeration. See also response to comment 13.22.</p>
<p>13.34</p>	<p>p. 26, #21</p>	<p>States that the discussion of impacts on water supply must be revised to consider residential or agricultural development on 170 parcels.</p>	<p>It is unsubstantiated opinion that the No-Project Alternative would result in development of 170 parcels. See response to comment 13.22.</p>
<p>13.35</p>	<p>p. 26, #22</p>	<p>Refers to the conclusion for water supply under the No-Project Alternative, which states that "impacts from potential drawdown of local wells and impacts on groundwater basin balance would be much less than HHSEGS." The Applicant states that there are no facts or analysis to support the conclusion.</p>	<p>See the WATER SUPPLY section of the final staff assessment for a full analysis of potential impacts of the proposed project on groundwater resources. Under the No-Project Alternative, no uses are proposed at the site that would require groundwater pumping.</p>

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<p align="center">13.36</p>	<p align="center">p. 27, #23</p>	<p>The applicant states that, "the law is very clear that an alternatives analysis should consider [of] a reasonable range of alternatives that will meet the Applicant's project objectives and it is inappropriate to substitute the Lead Agency's policy objectives for the Applicant's project objectives, merely to facilitate consideration of an alternative that may be favored by the agency." Provided edited text for a sentence in staff's analysis about the applicant's project objectives.</p>	<p>The Applicant's statements are false. Staff's alternatives analysis is substantially based on the Applicant's project objectives; staff eliminated the project objectives that specifically address implementing the Applicant's proposed project. It is not correct that staff's alternatives analysis must only use the project objectives provided by the Applicant in the AFC. There is no such requirement. See also responses to comments 13.15, 13.16, 13.17, and 13.18, above. Staff edited this sentence in the alternatives analysis, which now reads: "The alternatives analysis cannot be guided by project objectives that specifically target implementation of the project as proposed; this approach would lead the analysis toward a conclusion that no alternative is as valid as the applicant's proposal, which would be inconsistent with CEQA's purpose for an alternatives analysis."</p>
<p align="center">13.37</p>	<p align="center">p. 27, #24</p>	<p>States that the Applicant's project objectives permit consideration of a reasonable range of alternatives.</p>	<p>See responses to comments 13.15, 13.16, 13.17, 13.18, and 13.36, above.</p>
<p align="center">13.38</p>	<p align="center">p. 27, #25</p>	<p>Refers to impacts on groundwater dependent species for the Sandy Valley Off-site Alternative and questions the conclusion that impacts under this alternative would be "somewhat less than HHSEGS."</p>	<p>Because the Sandy Valley Off-site Alternative is located in an area with greater overall ground disturbance compared to the proposed project, the effect of declining groundwater levels on groundwater dependent species is somewhat less than HHSEGS under this alternative.</p>

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<p align="center">13.39</p>	<p align="center">p. 27, #26</p>	<p>Refers to impacts on groundwater dependent species (e.g., mesquite bosques) for the Sandy Valley Off-site Alternative. States that there are no mesquite bosques near the HHSEGS site.</p>	<p>The importance of mesquite habitats—in all forms—is a matter of empirical fact, supported by the literature, and by resource agency policy and practice. All mesquite in southern Nevada, and particularly the mesquite in Pahrump Valley and Stump Springs, are recognized conservation priorities in the BLM-sponsored "Mesquite-Acacia Conservation Management Strategy" (Crampton et al. 2006), adopted for the Clark County Multiple Species Habitat Conservation Plan. Staff notes that the California Natural Diversity Database (data date January 3, 2012) nomenclature of "mesquite bosque" is reflected in the FSA alternatives analysis, and shows mesquite bosques at less than 3.0 miles from the Sandy Valley alternative site. Mesquite-dominated habitat at Stump Springs is approximately 5.0 miles from the proposed project site.</p>
<p align="center">13.40</p>	<p align="center">p. 27, #27</p>	<p>Refers to the introductory statement of impacts on cultural resources for the Sandy Valley Off-site Alternative. Questions the conclusion that impacts on cultural resources for the alternative site would be "somewhat greater than those of the proposed HHSEGS project." Questions what the conclusion means.</p>	<p>The cited statement introduces the analysis of impacts on cultural resources. See staff's full analysis pertaining to this alternative on the several pages that follow the introductory statement.</p>
<p align="center">13.41</p>	<p align="center">p. 28, #28</p>	<p>Refers to the potential land use impact for the Sandy Valley Off-site Alternative related to potential conflicts with applicable plans. Questions the conclusion that the impact would be "similar to HHSEGS." States that "HHSEGS has applied for a general plan amendment overlay and zoning overlay."</p>	<p>Although the Applicant has applied for a general plan amendment and zoning overlay, Inyo County has deemed the application incomplete due to the lack of the appropriate land owner signatures on the proposed HHSEGS project site. As of the date of the final staff assessment, the project is inconsistent with the general plan and zoning code.</p>

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<p>13.42</p>	<p>p. 28, #29</p>	<p>Questions whether the Sandy Valley Off-site Alternative would comply with the Northern and Eastern Mojave Desert Management Plan (NEMO Plan).</p>	<p>Staff dispensed with this sentence from the alternatives analysis: "Compliance of this alternative with the NEMO Plan would be required." Other than the possible requirement to coordinate with BLM and file Standard Form SF-299, no compliance issue is identified by staff. No further analysis is required because no impact on land use would occur. See the additional text discussion of the applicability of the NEMO Plan under the subsection of staff's alternatives analysis, "Northern and Eastern Mojave Desert Management Plan."</p>
<p>13.43</p>	<p>p. 28, #30</p>	<p>Refers to the comparison of impacts on traffic and transportation between the proposed project and the Sandy Valley Off-site Alternative. Describes what would be a more difficult project construction access route to the off-site alternative site, and implies that the impact would not be similar to HHSEGS.</p>	<p>Staff agrees that access to the proposed project site is along a fairly straight, flat roadway from state route 160. However, the "fairly straight, flat roadway" being referred to, the Old Spanish Trail Highway (aka "Tecopa Road"), is not designed to withstand frequent and heavy construction traffic. The addition of 4,000 daily trips would have a significant impact on the structural integrity of the Old Spanish Trail Highway due to the current and potential future conditions of the roadway pavement. Similarly, potential transportation route(s) for the Sandy Valley Off-site Alternative are probably not designed to withstand frequent and heavy construction traffic. Conditions of certification that are similar to those identified for the proposed project in the TRAFFIC AND TRANSPORTATION section of the final staff assessment would be required for the Sandy Valley Off-site Alternative to reduce impacts on the roadway infrastructure.</p>
<p>13.44</p>	<p>p. 28, #31</p>	<p>Same comment as 13.43.</p>	<p>See response to comment 13.43, above.</p>

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13.45	p. 28, #32	Refers to the Solar Power Tower (SPT) with Energy Storage Alternative. Questions if it is properly considered an alternative to the project as a whole, or an alternative to a part of the project.	The SPT with Energy Storage Alternative is an alternative to the proposed project. The Applicant's AFC includes a Central Tower with Integral Thermal Storage using molten salt as the heat transfer fluid. It is described as an alternative technology. The SPT with Energy Storage Alternative in staff's alternatives analysis is appropriately reviewed as an alternative to the proposed project. Changing the technology to include energy storage is not an ancillary facet of the proposed project.
13.46	p. 28, #33	Refers to staff's analysis of the SPT with Energy Storage Alternative for impacts on avian species related to solar flux. Asks what the basis is for the assertion that impact on avian species are significant. Proposes edits to staff's analysis for impacts on avian species under this alternative to remove text stating that the Applicant has identified no means of mitigating or minimizing impacts on avian species at the HHSEGS site.	Staff disagrees with the Applicant's statement that documentation submitted by the Applicant demonstrates that no significant impacts on avian species could be caused by the proposed project. Furthermore, the zone of concentrated flux considered to pose a danger to avian species extends over 300 meters around each tower, in the shape of a ring (in top down view). To refer to this as "close proximity" is not accurate. See the BIOLOGICAL RESOURCES section of this FSA for more details. No change to staff's analysis is necessary in response to this comment.
13.47	p. 29, #34	States that no basis exists for a conclusion that impacts on avian species are significant (referring to the text that was deleted by the Applicant under comment 13.46).	See the revised analysis of impacts on biological resources in staff's alternatives analysis for the SPT with Energy Storage Alternative.
13.48	p. 29, #35	Asks if the Desert Sunlight Solar Farm PV Project is single axis or fixed tilt.	The Desert Sunlight Solar Farm PV Project will use all fixed-tilt panels, approximately 9 million panels total.
13.49	p. 29, #36	Same comment as 13.48.	See response to comment 13.48, above.

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<p>13.50 Prt 1</p>	<p>p. 29, #37</p>	<p>States that a PV alternative does not provide flexible generation, which brings into question its suitability for large scale generation.</p>	<p>Each of the four utility-scale PV projects described in staff's alternatives analysis has agreements for the sale of electricity to a California utility company or companies. (California Valley Solar Ranch has a contract with Pacific Gas & Electric Company [PG&E]; Desert Sunlight Solar Farm has contracts with Southern California Edison and PG&E; Topaz Solar Farm Project has a contract with PG&E; and AV Solar Ranch One has a contract with PG&E). These PV projects are approved, under construction, and with agreements in place for the sale of electricity, which indicates their suitability for large-scale generation of renewable energy.</p>
<p>13.50 Prt 2</p>	<p>p. 30, #37</p>	<p>Describes the operational characteristics of the proposed project.</p>	<p>Staff acknowledges the applicant's summary of the operational characteristics of the proposed project.</p>

<p>13.50 Prt 3</p>	<p>p. 30, #37</p>	<p>States that a generic PV alternative would not obtain site control and use for a 500-MW facility in a reasonable period of time. States that the HHSEGS site is too small to support a PV alternative. Concludes that "to produce the same quantity of power to the grid using single-axis or fixed-tilt PV would require 4,950 acres of land, or 51 percent more land than using Applicant's technology."</p>	<p>Staff obtained information on annual energy generation for the four PV projects described in staff's alternatives analysis. See the subsection, "Solar Photovoltaic (PV) Alternative," of staff's analysis for the additional data and discussion. The two largest PV projects that will have generating capacities closest to the proposed project each have capacities of 550 MW; land use efficiency for the two projects is slightly below 7.0 acres per MW, which is comparable to the proposed project. The average land use efficiency for the four PV projects is approximately 7.0 acres per MW. See also the new text in the alternatives analysis on the April 2012 DRECP Stakeholder Committee Meeting, which included a review of the updated renewable energy calculator developed by Energy Commission staff. A modified land use efficiency ratio of 7.0 acres per MW was determined to be plausible and reasonable for all central station solar projects, including solar thermal and PV project types. Based on the sample 500-MW PV project described by the applicant in its comment, such a project would require 4,950 acres, which represents a land use efficiency ratio of almost 10.0 acres per MW of electricity.</p>
<p>13.50 Prt 4</p>	<p>p. 30, #37</p>	<p>Questions the ability of the Solar PV Alternative to satisfy the project objectives addressing construction and operation of a renewable electrical energy facility leading to sales of competitively priced renewable energy consistent with the procurement obligations of California's utilities.</p>	<p>Staff has modified the discussion on the potential for the PV Alternative to attain the first two project objectives. See the revised text on this alternative under the subsection, "Potential to Attain Project Objectives." Construction and operation of the Solar PV Alternative would require CPUC's approval of amendments to the power purchase agreements for the proposed project.</p>
<p>13.51</p>	<p>p. 30, #38</p>	<p>For the Solar PV Alternative, requests editing of text in staff's alternatives analysis to indicate that it is not known whether PG&E would agree to amend the PPAs to allow the project to continue to be feasible.</p>	<p>Staff's analysis of potential feasibility issues for the Solar PV Alternative is sufficient as written. No change was made to staff's analysis in response to this comment.</p>

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<p align="center">13.52</p>	<p align="center">p. 31, #39</p>	<p>Disagrees with staff's conclusion that potential impacts on biological resources for the Solar PV Alternative would be "similar to HHSEGS." States that impacts on biological resources would be greater than HHSEGS based on the Applicant's assumption that the PV Alternative would require far more acreage and substantial grading and leveling of the site.</p>	<p>See response to comment 13.50 Prt 3 for a discussion of land use requirements for central station renewable energy projects, including solar thermal and PV project types. Staff's analysis of the potential impacts on biological resources for the Solar PV Alternative states that impacts could be slightly more or less if a change to the project boundary was needed to install PV arrays under this alternative. The environmental compliance documents for the utility-scale PV projects reviewed by staff discuss site preparation techniques to minimize site grading. See the additional text discussion on site grading and disturbance under the subsection of staff's alternatives analysis, "Overview," for the Solar PV Alternative.</p>
<p align="center">13.53</p>	<p align="center">p. 31, #40</p>	<p>For the Solar PV Alternative, states that staff's analysis of potential impacts on biological resources should address the impact of increasing the project boundaries to accommodate a 500-MW PV project.</p>	<p>See responses to comments 13.50 Prt 3 and 13.52, above.</p>
<p align="center">13.54</p>	<p align="center">p. 31, #41</p>	<p>Edits staff's alternatives analysis describing the potential impacts of the Solar PV Alternative on groundwater dependent biological resources and avian species. Changes the conclusion for potential impacts on avian species under this alternative to be the "same as" or "greater than HHSEGS." States again that the PV Alternative would require substantial grading and leveling of the site.</p>	<p>Staff has determined that the impact on the groundwater basin under the Solar PV Alternative would be much less than HHSEGS. Therefore, the related effect of groundwater pumping on phreatophytic vegetation in the vicinity of the project site would also be much less than the proposed project. See also response to comment 13.52.</p>

<p>13.55</p>	<p>p. 32, #42</p>	<p>For the Solar PV Alternative, states that staff's analysis of potential impacts on cultural resources should address the greater impact on subsurface cultural resources from increasing the site footprint and grading the entire site.</p>	<p>The applicant's statement that construction of the proposed project would leave subsurface archaeological deposits intact is incorrect. Archaeological deposits that could be present on the ground surface and to a depth of about 1.0 foot below the surface would be partially disturbed or destroyed due to repeated traffic of construction equipment such as truck-mounted augers, backhoes, and road graders. Archaeological deposits further below the surface could be disturbed during emplacement of approximately 170,000 heliostat pedestals. The effects of this alternative over the western half of the site, on the floor of the bolson, are comparable to the proposed project; the likelihood of buried archaeological resources being located there are low. The analysis of the visual effects of this alternative compared to the proposed project is accurate and appropriate given staff's knowledge and expertise on the topic. See staff's responses to comments in the CULTURAL RESOURCES analysis, comments 13.1, 13.1 (1), 13.7, 13.52, and 13.59. See also responses to comments 13.50 Prt 3 and 13.52, above.</p>
<p>13.56</p>	<p>p. 32, #43</p>	<p>For the Solar PV Alternative, states that staff's analysis of potential impacts related to geological and paleontological resources should address the greater impacts on those resources from increasing the site footprint and grading the entire site. Also disagrees with staff's analysis and states that the heliostats associated with the proposed project would require no foundations.</p>	<p>The heliostats would be supported by a foundational element referred to by the applicant as pedestals. These pedestals would be inserted to a depth of at least 10 feet below the ground surface to support the weight and wind loading of the heliostats. See also responses to comments 13.50 Prt 3 and 13.52, above.</p>

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<p align="center">13.57</p>	<p align="center">p. 32, #44</p>	<p>For the Solar PV Alternative, states that staff's analysis of potential impacts related to noise would be the "same as HHSEGS" rather than "much less than HHSEGS." The Applicant states that if the noise impacts of the proposed project are reduced to less than significant with implementation of conditions of certification, the impact conclusion should be the same for the PV Alternative.</p>	<p>A PV alternative with the same generating capacity (500 MW) would likely create less noise impacts than HHSEGS, prior to employing mitigation measures. However, with implementation of the conditions of certification (mitigation measures) for impacts related to noise, both the proposed project and the Solar PV Alternative would create less than significant impacts.</p>
<p align="center">13.58</p>	<p align="center">p. 32, #45</p>	<p>For the Solar PV Alternative, asks for an explanation of staff's statement that the infrequent washings of PV panels would result in reduced toxic air emissions compared to the proposed project.</p>	<p>See the additional text discussion on the potential use of diesel-fueled water trucks for infrequent washings of PV panels under the subsection of staff's alternatives analysis, "Public Health," for the Solar PV Alternative.</p>
<p align="center">13.59</p>	<p align="center">p. 33, #46</p>	<p>For the Solar PV Alternative, disagrees with staff's conclusion that the beneficial impact related to construction employment and increased taxes and fees would be the "same as HHSEGS." The Applicant states that the beneficial impact would be "less than HHSEGS" under this alternative.</p>	<p>See staff's revised conclusion under "Socioeconomic Resources" for the Solar PV Alternative in staff's alternatives analysis. Staff concludes that the beneficial impact related to construction employment and increased taxes and fees would be similar to HHSEGS. Given the similar size and scale of this alternative compared to the proposed project (an approximately 500 MW renewable energy project), staff has determined that the socioeconomic benefits would be similar.</p>
<p align="center">13.60</p>	<p align="center">p. 33. #47</p>	<p>For the Solar PV Alternative, states that the impacts of glint and glare, if any, can be mitigated to less than significant for the proposed project and the PV Alternative.</p>	<p>The Solar PV Alternative would have a much lower profile overall, and impacts of glint and glare would be reduced to less than significant.</p>

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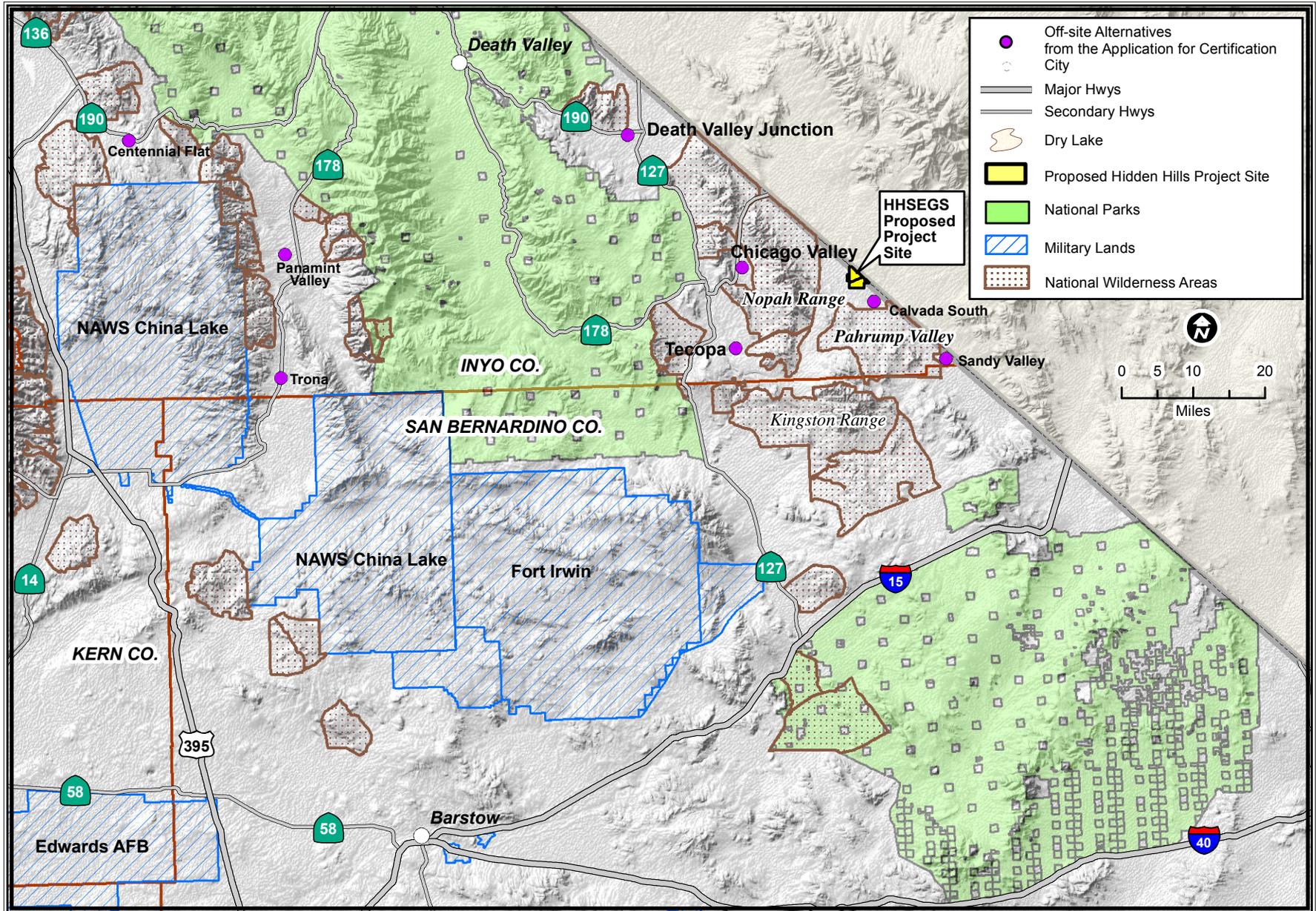
<p align="center">13.61</p>	<p align="center">p. 33, #48</p>	<p>For the Solar PV Alternative, states that impacts on visual resources would be greater than HHSEGS based on the Applicant's assumption that a 500-MW PV Alternative would require far more acreage. States that the Applicant disagrees with the conclusions that impacts on visual resources under the proposed project are significant.</p>	<p>See responses to comments 13.50 Prt 3 and 13.52, above. See also responses to comments in the VISUAL RESOURCES analysis.</p>
<p align="center">13.62</p>	<p align="center">p. 33, #49</p>	<p>For the Solar PV Alternative, refers to staff's statement in the alternatives analysis that land requirements for utility-scale PV power plants have been stated in the range of about 9.0 acres per MW. The Applicant states that this ratio should be recognized in other sections of staff's alternatives analysis.</p>	<p>See response to comment 13.50 Prt 3 for a discussion of land use requirements for central station renewable energy projects, including solar thermal and PV project types. See the additional text discussion on the estimated acreage requirements for utility-scale PV projects under the subsection of staff's alternatives analysis, "Overview," for the Solar PV Alternative.</p>
<p align="center">13.63</p>	<p align="center">p. 33, #50</p>	<p>For the Solar PV Alternative, refers to staff's analysis of impacts related to soil disturbance. The Applicant disagrees with staff's conclusion that the PV Alternative would result in less soil disturbance for construction laydown and temporary parking impacts. States that the California Valley Solar Ranch Project required a total of 37, 1.0-acre construction laydown areas.</p>	<p>Staff acknowledges that PV facilities require laydown areas and temporary parking for construction activities, which are similar to HHSEGS. However, the proposed project requires the added construction activities of building two power blocks, which includes operating a temporary concrete batch plant and on-site assembly of heliostats, which includes an assembly building and its associated activities. Additionally, staff has found that the PV Alternative could require an average of about 12 percent more land per MW of capacity compared to the proposed HHSEGS project. Based on this estimate, staff concludes that erosion during construction for the PV Alternative is "somewhat greater than HHSEGS."</p>

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<p align="center">13.64</p>	<p align="center">p. 33, #51</p>	<p>For the Parabolic Trough Alternative, questions staff's conclusion for the potential for avian species to collide with project structures (i.e., the solar power tower under the proposed project) to be "much less" for the Parabolic Trough Alternative. The Applicant asks "much less than what?"</p>	<p>See the revised analysis of impacts on biological resources in staff's alternatives analysis for the Parabolic Trough Alternative. Staff acknowledges the degree of uncertainty in predicting or estimating the likelihood of impacts on avian species from collisions with project structures.</p>
<p align="center">13.65</p>	<p align="center">p. 34, #52</p>	<p>For the Parabolic Trough Alternative, states that the "low-impact design of the HHSEGS" would "reduce ground disturbance" and result in less impacts on cultural resources.</p>	<p>Staff confirms that increased ground disturbance under this alternative would have a somewhat greater potential to disturb or destroy archaeological deposits compared to the proposed project. See the revised text on the effects of the Parabolic Trough Alternative under the subsection, "Cultural Resources," in staff's alternatives analysis. However, the net effect—the profound reduction of this alternative's visual effects would result in a much lower overall effect on cultural resources compared to the proposed project.</p>
<p align="center">13.66</p>	<p align="center">p. 34, #53</p>	<p>States that the No-Project Alternative would result in residential development of up to 170 parcels on the project site, and that compared to the proposed project, the HHSEGS project would be environmentally superior.</p>	<p>See responses to comments 13.22 and 13.30, above.</p>

ALTERNATIVES - FIGURE 1

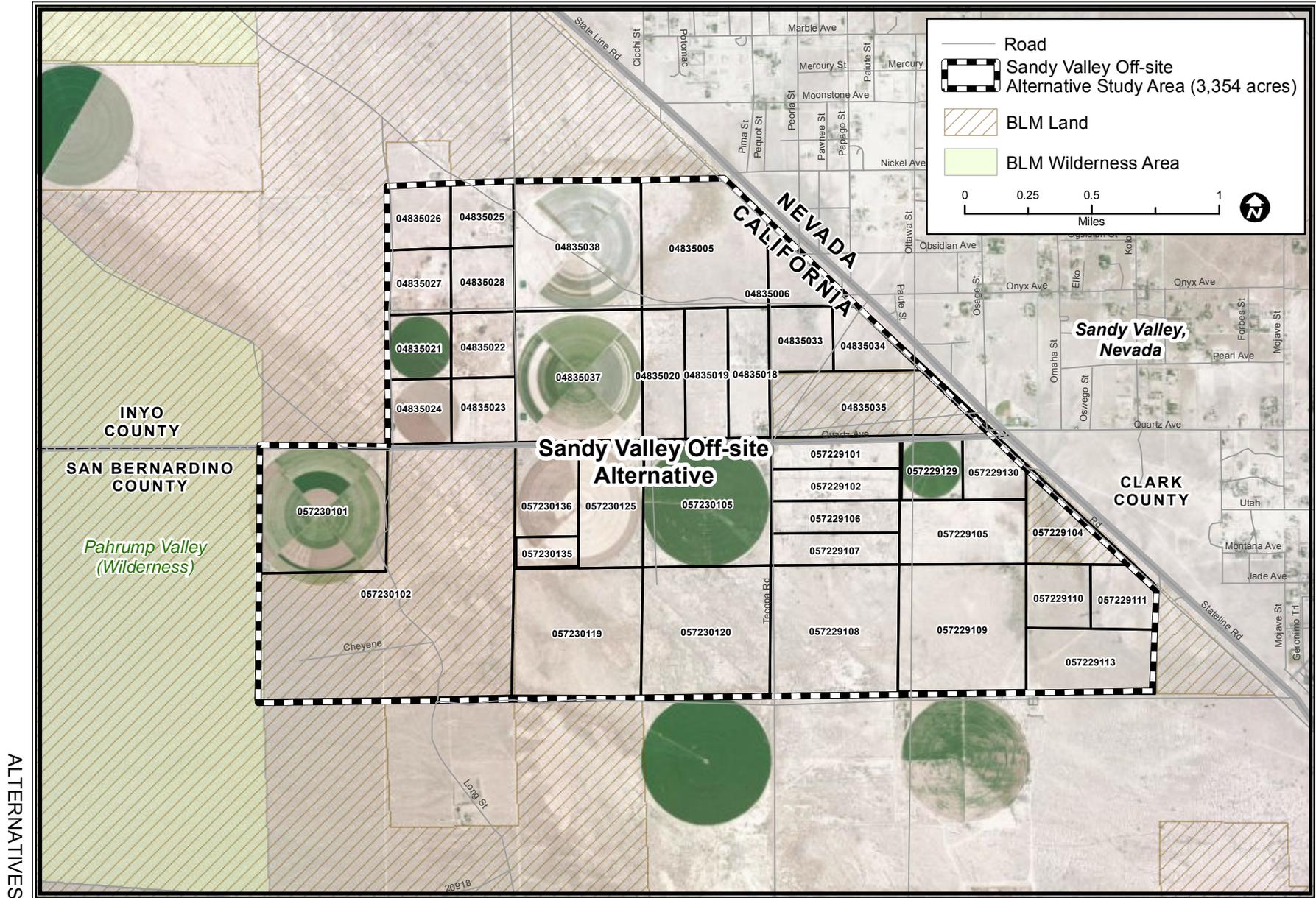
Hidden Hills Solar Electric Generating System (HHSEGS) - Off-site Alternatives Evaluated in the Application for Certification



ALTERNATIVES

ALTERNATIVES - FIGURE 3

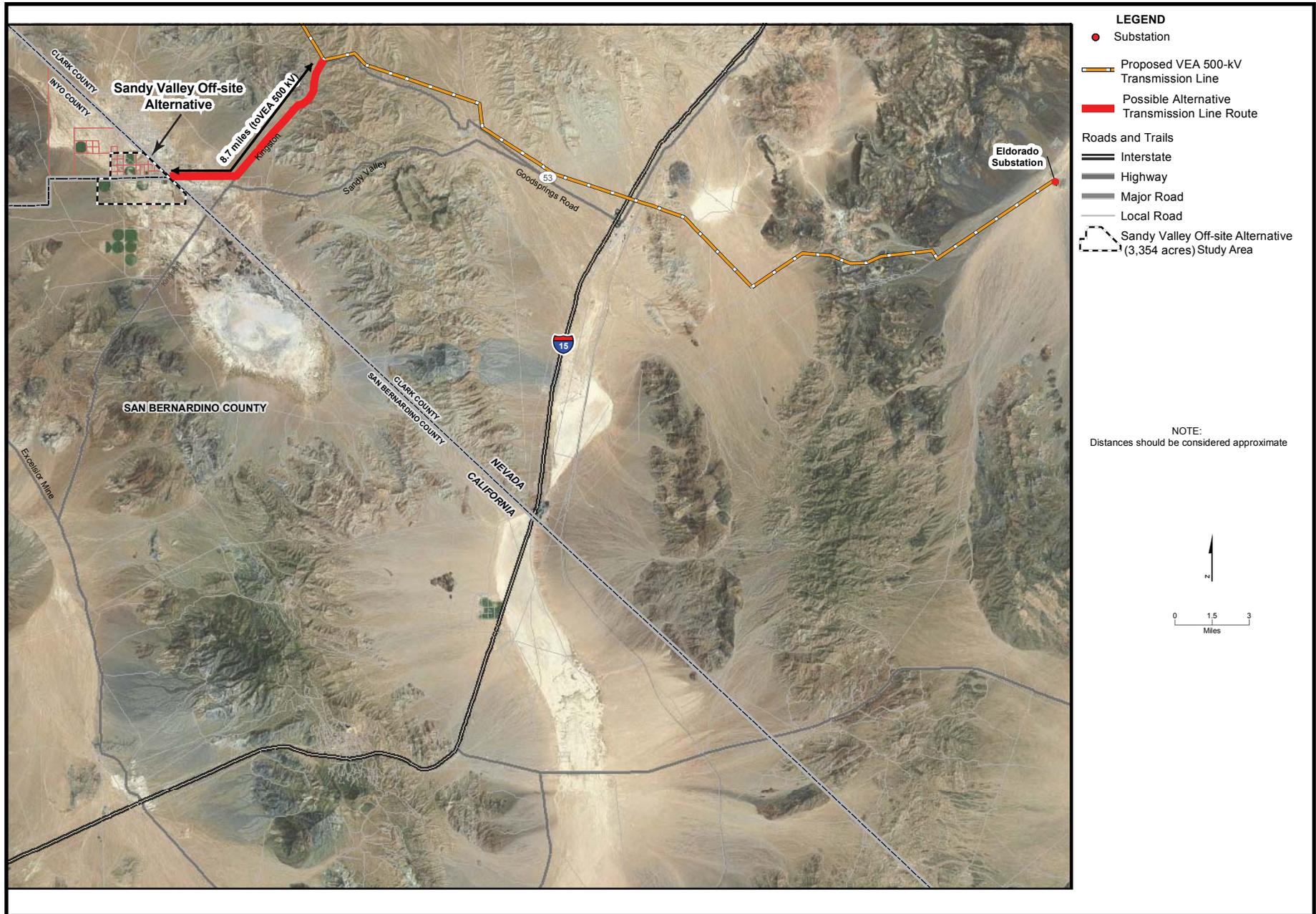
Hidden Hills Solar Electric Generating System (HHSEGS) - Sandy Valley Off-site Alternative Study Area



ALTERNATIVES

ALTERNATIVES - FIGURE 4

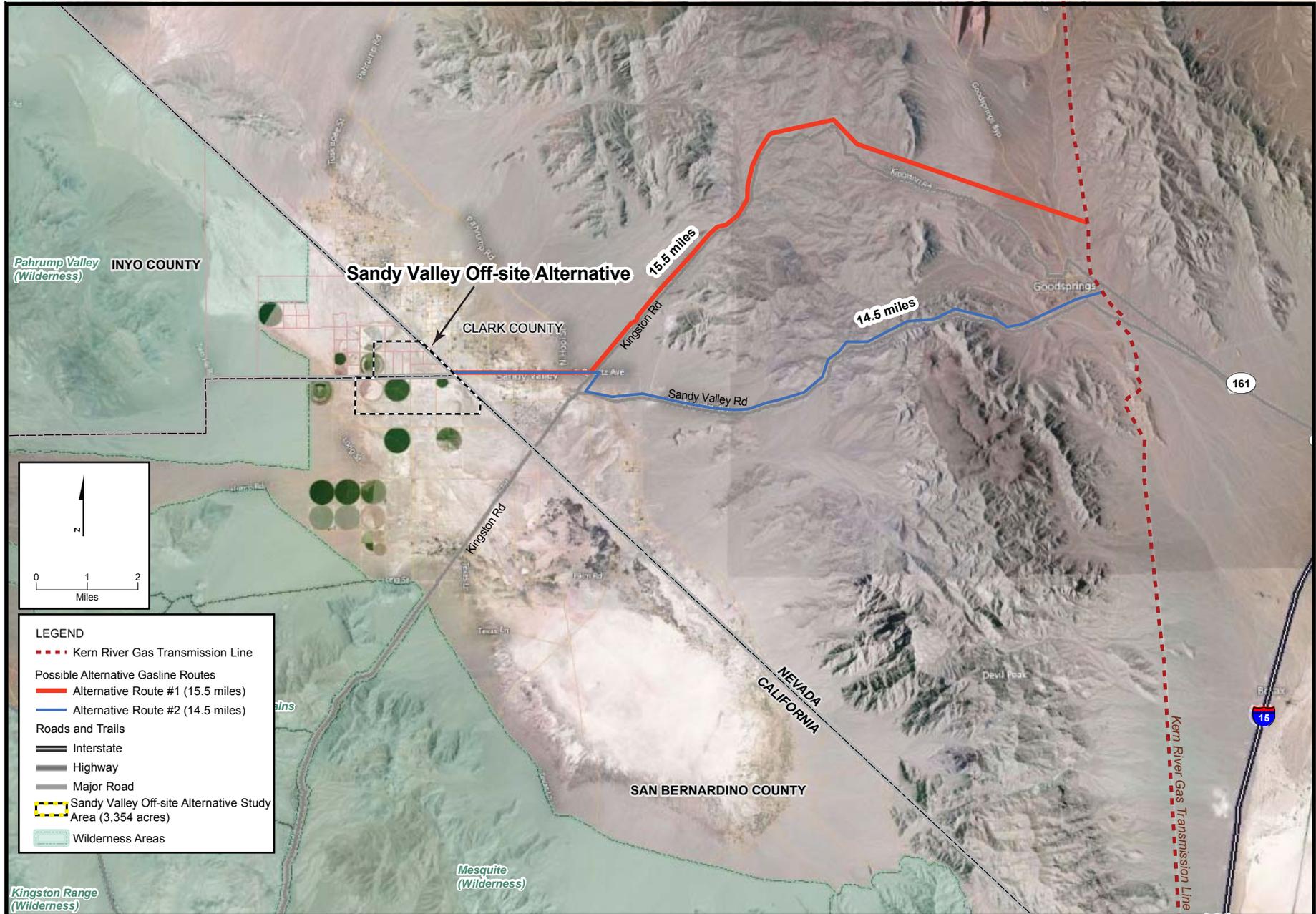
Hidden Hills Solar Electric Generating System (HHSEGS) - Potential Transmission Line Alignment for the Sandy Valley Off-site Alternative



ALTERNATIVES

ALTERNATIVES - FIGURE 5

Hidden Hills Solar Electric Generating System (HHSEGS) - Potential Natural Gas Pipeline Alignments for the Sandy Valley Off-site Alternative



ALTERNATIVES

ALTERNATIVES - FIGURE 6a, 6b

Hidden Hills Solar Electric Generating System (HHSEGS) - Photographs of the Sandy Valley Off-site Alternative Study Area

View toward the Sandy Valley study area from Sandy Valley, NV



View of the Sandy Valley study area looking toward the Pahrump Valley Wilderness and Kingston Range



ALTERNATIVES - FIGURE 6c

Hidden Hills Solar Electric Generating System (HHSEGS) - Photographs of the Sandy Valley Off-site Alternative Study Area

View from the Sandy Valley study area toward Sandy Valley, NV



ALTERNATIVES - FIGURE 7

Hidden Hills Solar Electric Generating System (HHSEGS) - Solar Power Tower with Energy Storage Alternative

Solar Power Tower with Molten-Salt Energy Storage



Source: BrightSource Energy

Completed 540-foot Solar Power Tower for the Crescent Dunes Solar Energy Project in Tonopah, NV



Source: SolarReserve

ALTERNATIVES - FIGURE 8a, 8b

Hidden Hills Solar Electric Generating System (HHSEGS) - Solar Photovoltaic Alternative

Copper Mountain Solar 1 in Boulder City, NV, about 40 miles southeast of Las Vegas



Source: Discovery News

First Solar's Thin Film Solar Photovoltaic Field



Source: Susan Lee

ALTERNATIVES - FIGURE 8c

Hidden Hills Solar Electric Generating System (HHSEGS) - Solar Photovoltaic Alternative

Horizontal Single-Axis Trackers (Ray Tracker) Solar Installation near Winters, California



Source: Wikipedia

ALTERNATIVES - FIGURE 9a

Hidden Hills Solar Electric Generating System (HHSEGS) - Parabolic Trough Alternative

Parabolic troughs like those originally proposed to be used at the Blythe Solar Power Project in California



Source: Energy Commission

ALTERNATIVES - FIGURE 9b, 9c

Hidden Hills Solar Electric Generating System (HHSEGS) - Parabolic Trough Alternative

Two views of the Solar Electric Generating Systems Projects at Kramer Junction



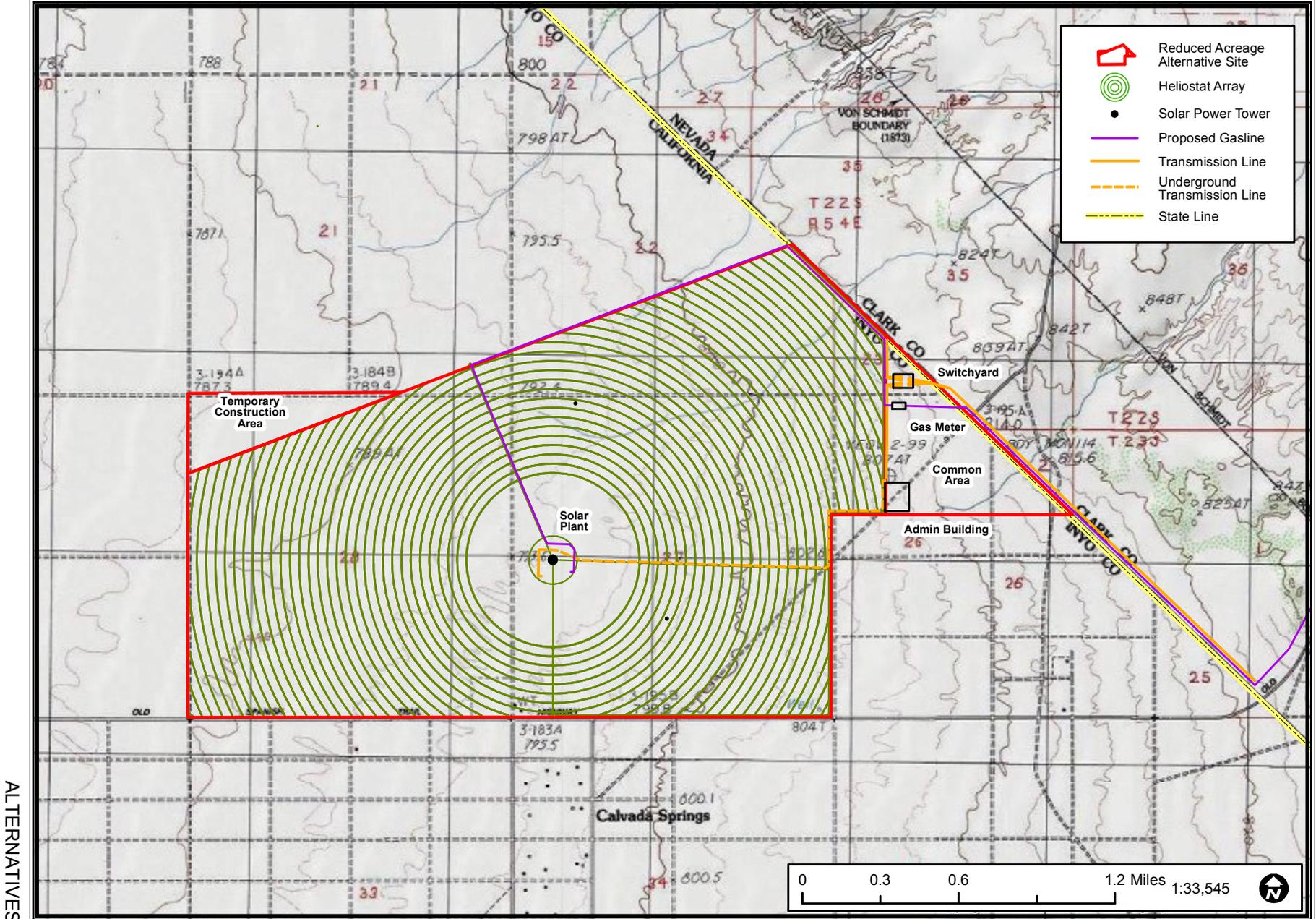
SOURCE: Michael Clayton & Associates



SOURCE: Michael Clayton & Associates

ALTERNATIVES - FIGURE 10

Hidden Hills Solar Electric Generating System (HHSEGS) - Reduced Acreage Alternative



ALTERNATIVES

GENERAL CONDITIONS INCLUDING COMPLIANCE MONITORING AND CLOSURE PLAN

Testimony of Joseph Douglas

INTRODUCTION

The project's General Compliance Conditions of Certification, including Compliance Monitoring and Closure Plan (Compliance Plan) have been established as required by Public Resources Code section 25532. The plan provides a means for assuring that the facility is constructed, operated, and closed in compliance with public health and safety, environmental, and other applicable regulations, guidelines, and conditions adopted or established by the California Energy Commission and specified in the written Final Decision on the Application for Certification (AFC) 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 potentially 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.

KEY PROJECT EVENT DEFINITIONS

The following terms and definitions help determine when many of the Conditions of Certification are implemented.

Project Certification

Project certification occurs on the day the Energy Commission docket its final Decision after having adopted it at a publically noticed Business Meeting or Hearing. At that time, all Energy Commission conditions of certification become binding on the project owner and the proposed facility.

Regulatory definitions of ground disturbance or site mobilization vary. To ensure adequate compliance with all conditions of certification and applicable LORS the following definitions apply.

Site Assessment and Preconstruction Activities

Site Assessment and preconstruction activities include the following, but only to the extent the activities are minimally disruptive to soil and vegetation and will not affect listed or special-status species or other sensitive resources:

1. the installation of environmental monitoring equipment;
2. a minimally invasive 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;
5. any minimally invasive work to provide safe access to the site for any of the purposes specified in 1-4 above.

Many of the Energy Commission's conditions of certification require compliance submittals prior to the start of construction, hence the term "preconstruction". When technical staff and the CPM have approved all preconstruction conditions and the project has been certified, then site assessment and preconstruction activities can occur.

Site Mobilization and Construction

For compliance monitoring purposes, the definition of site mobilization and construction includes both a calendar date and the activities necessary to provide site access for construction mobilization and facility installation activities including both temporary and permanent equipment and structures. Site Mobilization and construction activities include, but are not limited to,

1. ground disturbance activities like grading, boring, trenching, leveling, mechanical clearing, grubbing, and scraping;
2. site preparation activities such as access roads, temporary fencing, construction trailer and utility installation, construction equipment installation and storage, equipment and supply laydown areas, borrow and fill sites, temporary parking facilities, chemical spraying, and controlled burns;
3. permanent installation activities for all facility and linear structures including access roads, fencing, utilities, parking facilities, equipment storage, mitigation and landscaping activities, and other installations as applicable.

Commissioning

Commissioning activities include testing the functional adequacy of the installed components and systems to ensure the plant operates safely and reliably. Commissioning provides a multistage, integrated approach to testing, calibrating and proving all systems, software, and networks within the project boundary. For compliance monitoring purposes examples of commissioning activities include interface connection and utility pre-testing, “cold” and “hot” electrical testing, system pressurization and optimization tests, grid synchronization, and combustion turbine “first fire”.

Start of Commercial Operation and Maintenance

For compliance monitoring purposes, “commercial operation” begins once commissioning activities are complete, the certificate of occupancy has been issued, and the power plant has reached reliable steady-state electrical production. At the start of commercial operation, plant control is usually transferred from the construction manager to the plant operations manager. Operation activities can include a steady state of electrical production or for “peaker plants” a seasonal or on-demand operational regime to meet peak load demands. Maintenance can include activities initiated while the facility remains online or when a facility is taken offline for a specified timeframe, usually not to exceed ninety (90) days, to facilitate optimization activities, in-situ repair or in-kind replacement of plant equipment or infrastructure only.

Facility Closures

Facility closures can be temporary or permanent in nature, encompassing either part of (partial closure) or the entire facility (full closure). Temporary closure is defined as a shutdown for a period exceeding the time required for normal maintenance and includes closure for overhaul or replacement of facility equipment. Other causes for temporary closure can include supply or transmission disruptions, unforeseen circumstances resulting in facility damage, or profitability considerations. Permanent closure is the shutdown of operations with no intent to restart the facility. Permanent closures occur for a variety of factors including, but not limited to, the functional or economic obsolescence of the facility, or irreparable damage.

ROLES AND RESPONSIBILITIES

Provided below is a generalized description of the compliance roles and responsibilities for Energy Commission Staff and the Project Owner for the construction and operation of the HHSEGS

COMPLIANCE PROJECT MANAGER RESPONSIBILITIES

The Compliance Project Manager’s (CPM) compliance monitoring and project oversight responsibilities include:

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 Final Decision;
2. resolving complaints;

3. processing post-certification project amendments for changes to the project description, conditions of certification, and ownership or operational control and requests for extension to the deadline for the start of construction (See **COM-13** for instructions on filing a petition to amend or extension request);
4. documenting and tracking compliance filings; and
5. ensuring that compliance files are maintained and accessible.

The CPM is the primary contact person for the Energy Commission during project preconstruction, construction, operation, and closure. The CPM will consult with the appropriate responsible parties when handling compliance issues, disputes, complaints, and amendments.

All project compliance submittals are submitted to the CPM for processing. Where a submittal requires CPM approval, the approval will involve appropriate Energy Commission technical staff and management. All submittals must include searchable electronic versions (pdf, MS Word or equivalent files).

Preconstruction 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 preconstruction 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 the Energy Commission's conditions of certification will not delay the construction and operation of the plant due to a compliance oversight, and to prevent last-minute unforeseen issues. Preconstruction 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 maintains the following documents and information as a public record, in either the Compliance files or Dockets files, 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 project related complaints of alleged 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.

CBO DELEGATION AND AGENCY COOPERATION

In performing project construction and operation monitoring, 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 in the 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 public/worker safety and environmental protection when conducting project monitoring.

PROJECT OWNER RESPONSIBILITIES

The project owner or operator (hereinafter the project owner) is responsible for ensuring that the compliance conditions of certification and all other conditions of certification that appear in the Energy Commission Final 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 the case and revocation of Energy Commission certification, an administrative fine, or other corrective action as appropriate. A summary of the Compliance Conditions of Certification is included as **Compliance Table 1** at the conclusion of this section.

COMPLIANCE ENFORCEMENT

The Energy Commission's legal authority to enforce the terms and conditions of its Final Decision are specified in Public Resources Code sections 25534 and 25900. The Energy Commission may amend or revoke a project certification, and may impose a civil penalty for any significant failure to comply with the terms or conditions of the Final Decision. The Energy Commission's actions and fine assessments would take into account the specific circumstances of the incident(s).

COMPLIANCE REPORTING CONDITIONS

There are two different periodic 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 Final 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.

INCIDENT REPORTING AND CONTINGENCY PLANNING

To protect public and environmental health and safety, the Energy Commission staff and its will delegates monitor the ongoing compliance of a facility during all phases of construction, operation, emergency response and closure. The compliance conditions of

certification include an integrated on-site contingency plan and incident reporting policy, not only to ensure compliance with the various health and safety practices required, but also to assist the Energy Commission staff during on-site facility monitoring and inspections. The on-site contingency plan helps ensure that all necessary steps are taken in a timely manner to avoid, limit, or mitigate potential impacts posed by any form of temporary closure. Part of the Contingency Plan includes an incident reporting process. All incidents requiring any emergency response, including but not limited to, a response from fire, hazardous materials, medical, or police emergency services (i.e. personal injury, hazardous materials spill, flood, fire, or explosion, etc.) must be reported and documented for the CPM in the manner provided by the technical and general conditions.

NONCOMPLIANCE COMPLAINT PROCEDURES

Any person or agency may file a complaint with the Energy Commission 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. An informal and a formal complaint procedure, as provided in current State law and regulations, are described below. They shall be followed unless superseded by future law or regulations. On-line access to the California Code of Regulations is at <http://www.oal.ca.gov/>.

Informal Dispute Resolution Process

In many instances, complaints can be resolved through the informal dispute resolution process, which is designed to resolve code and compliance interpretation disputes stemming from the project's conditions of certifications and other LORS. 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 prerequisite or substitute for it. This informal procedure may not be used to change the conditions of certification as approved by the Energy Commission, although the agreed-upon resolution may result in a project owner proposing an amendment. This dispute resolution process encourages all parties involved to openly discuss the conflict and reach a mutually agreeable solution. If a dispute cannot be resolved by means of the informal dispute resolution process, then the matter must be brought before the full Energy Commission for consideration via the complaint and investigation procedure specified in Title 20, California Code of Regulations, section 1237.

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 conditions of certification. All requests for informal investigations shall be made to the designated CPM.

Upon receipt of an informal investigation request, the CPM will promptly provide both verbal and written notification to the project owner of the allegation(s). All known and

relevant information of the alleged noncompliance shall be provided to the project owner and to Energy Commission staff. The CPM will evaluate the request and the information to determine if further investigation is necessary. If further investigation is warranted, the project owner will be asked to promptly conduct a formal inquiry into the matter and within seven (7) days, provide a written report to the CPM of the investigation results, including corrective measures proposed or undertaken. Depending on the urgency of the alleged noncompliance matter, the CPM may conduct a site visit and/or request the project owner to provide an initial verbal report within forty-eight (48) hours.

Request for Informal Meeting

In the event that either the requesting party or 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. The request shall be made within fourteen (14) days of the project owner's written report filing. 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 meeting's conclusion, promptly prepare and distribute copies to all parties, 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 is not reached, the CPM shall inform the complainant of the formal complaint process and requirements provided under Title 20, California Code of Regulations, section 1237.

Formal Dispute Resolution Procedure

Any person may file a complaint with the Energy Commission's Dockets Unit alleging noncompliance with an Energy Commission Final Decision adopted pursuant to Public Resources Code section 25500. Requirements for complaint filings and a description of how complaints are processed are provided in Title 20, California Code of Regulations, section 1237.

POST-CERTIFICATION CHANGES TO THE ENERGY COMMISSION FINAL DECISION

The project owner must petition the Energy Commission pursuant to Title 20, California Code of Regulations, section 1769, in order to modify the design, operation or performance requirements of the project or linear facilities, or 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 an enforcement action including civil penalties in accordance with Public Resources Code section 25534.

The criteria for determining approval type and the process that applies are explained below. They reflect the provisions of Title 20, California Code of Regulations, section 1769 at the time this condition was drafted. If the Energy Commission modifies this regulation, the language in effect at the time the change 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 design, operation, or performance requirements (including linear facilities). If a proposed modification results in a changed or deleted condition of certification, or makes changes causing noncompliance with any applicable laws, ordinances, regulations, or standards, the petition will be processed as a formal amendment to the Final Decision, requiring public notice, public review of the Energy Commission's staff analysis and approval by the full Commission. 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. 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 (LORS), 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 the CPM files a Notice of Determination of the proposed project modifications, any person may file an objection to the CPM's determination within fourteen (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 the CPM's determination, the petition must be processed as a formal amendment to the Energy Commission's Final Decision and must be approved by the full Commission at a publically noticed business meeting or hearing.

Verification Change

A condition of certification verification may be modified by the CPM without requesting an amendment to the Final Decision if the change does not conflict with the attendant condition of certification and provides an effective alternate means of verification.

FACILITY CLOSURE

Although the HHSEGS project setting does not presently appear to pose any special or unusual closure issues, the Energy Commission cannot reasonably foresee all potential situations in existence when a project's operations temporarily or permanently cease. Therefore, closure provisions must provide flexibility to deal with the specific situation and project setting that exists at that time. Existing LORS pertaining to facility closure are identified in the various technical area sections. The general compliance conditions

of certification build upon these technical requirements to facilitate a comprehensive approach to facility closure. Facility closure procedures will be consistent with the Energy Commission's conditions of certification and the LORS in effect at the time of implementation.

Temporary closure status typically occurs when a project owner anticipates that a facility will remain offline for more than ninety (90) days or for activities that include, but are not limited to, equipment or infrastructure upgrades or repair. Under these circumstances, the project owner must follow the temporary facility closure activities delineated in the Closure Plan (COM-14, below), and, upon CPM review, may be required to initiate a formal amendment procedure. Should a temporary closure continue for more than twelve (12) months (or other timeframe subject to CPM approval) a subsequent submittal of a Final Closure Plan would be required.

Reasons for planned permanent closures include, but are not limited to, the end of a facility's economic or mechanical life or gradual obsolescence. Both temporary and permanent closure planning guidelines are detailed below. Should the project owner essentially abandon a facility, the owner will remain liable for all costs associated with the subsequent contingency planning and permanent closure activities. Although the owner of a temporarily closed facility may have every intention of resuming operations, if the closure continues for longer than three (3) years, unless the project owner can present reasonable evidence of a plan to resume operations, the Energy Commission can assume permanent closure and ask the project owner to begin the closure and restoration process, or access the performance bond funds (COM-15, below) and begin the process itself.

PROJECT COMPLIANCE CONDITIONS OF CERTIFICATION

COM-1: UNRESTRICTED ACCESS

The CPM, responsible Energy Commission Staff, and delegated agencies or consultants are guaranteed and granted unrestricted access to the power plant site, related facilities, project-related staff, and the records maintained on-site to facilitate 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.

COM-2: COMPLIANCE RECORD

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.

COM-3: COMPLIANCE VERIFICATION SUBMITTALS

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 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 number(s), and a brief description of the subject of the submittal.** When submitting supplementary or corrected information, the project owner shall reference the date of the previous submittal and the condition(s) of certification applicable. 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."

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 submittals shall be accompanied by a searchable electronic copy, on an electronic storage medium or by e-mail, as agreed upon by the CPM

All hardcopy submittals shall be addressed as follows:

Compliance Project Manager
(11-AFC-2C)
California Energy Commission
1516 Ninth Street (MS-2000)
Sacramento, CA 95814

COM-4: PRE-CONSTRUCTION MATRIX AND TASKS PRIOR TO START OF CONSTRUCTION

Prior to start of 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 shall be included with the project owner's first compliance submittal or prior to the first pre-construction meeting, whichever comes first and shall be submitted in the same format as the compliance matrix described below.

Construction shall not start until all the following have occurred: submittal of the pre-construction matrix and compliance verifications pertaining to all pre-construction conditions of certification, and the CPM has issued an Authority to Construct letter to the project owner. The lead times for submitting various compliance verifications to the CPM 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 help ensure that project construction proceeds according to schedule. Failure to submit compliance documents within the specified lead-time may result in delayed authorizations to commence various stages of the project.

If the project owner anticipates site mobilization immediately following project certification, it may be necessary for the project owner to file compliance submittals prior to project certification. In these instances, compliance verifications can be submitted in advance of the required lead-times and the anticipated authorizations to commence. The project owner must understand that submitting compliance verifications prior to these authorizations is at the owner's own risk. Any approval by Energy Commission staff prior to project certification is subject to change, based upon the Commission Final Decision.

COM-5: COMPLIANCE MATRIX

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 (e.g., biological resources, facility design, etc.);
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., sixty (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, include the updated language and the date the amendment was proposed or approved.

COM-6: MONTHLY COMPLIANCE REPORT/KEY EVENT LIST

The first Monthly Compliance Report is due thirty (30) days following the docketing of the Energy Commission's Final Decision 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 preconstruction and construction of the project, the project owner or authorized agent shall submit an electronic searchable version of the Monthly Compliance Report within ten (10) days after the end of each reporting month. Monthly Compliance Reports shall be clearly identified for the month being reported. The searchable electronic copy

may be filed on an electronic storage medium or by e-mail, subject to CPM approval. The reports shall contain, at a minimum:

1. a table of contents clearly identifying by title and page number of each section, table, graphic, exhibit or addendum;
2. 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;
3. 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;
4. an initial, and thereafter updated, compliance matrix showing the status of all conditions of certification;
5. a list of conditions that have been satisfied during the reporting period, and a description or reference to the actions that satisfied the condition;
6. a list of any submittal deadlines that were missed, accompanied by an explanation and an estimate of when the information will be provided;
7. a cumulative listing of any approved changes to the conditions of certification;
8. a listing of any filings submitted to, or permits issued by, other governmental agencies during the month;
9. 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;
10. a listing of the month's additions to the on-site compliance file; and
11. a listing of complaints, notices of violation, official warnings, and citations received during the month, a description of the actions taken to date to resolve the issue, and the status of any unresolved actions.

COM-7: ANNUAL COMPLIANCE REPORT

After construction is complete, the project owner shall submit searchable electronic 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. The searchable electronic copy may be filed on an electronic storage medium or by e-mail, subject to CPM approval. Each Annual Compliance Report shall include the AFC number, identify the reporting period, and shall contain the following:

1. a table of contents clearly identifying by title and page number each section, table, graphic, exhibit or addendum;
2. 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);
3. a summary of the current project operating status and an explanation of any significant changes to facility operations during the year;
4. 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;
5. a cumulative listing of all post-certification changes approved by the Energy Commission or the CPM;
6. an explanation for any submittal deadlines that were missed, accompanied by an estimate of when the information will be provided;
7. a listing of filings submitted to, or permits issued by, other governmental agencies during the year;
8. a projection of project compliance activities scheduled during the next year;
9. a listing of the year's additions to the on-site compliance file;
10. 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
11. a listing of complaints, notices of violation, official warnings, and citations received during the year, a description of how the issues were resolved, and the status of any unresolved matters.

COM-8: CONFIDENTIAL INFORMATION

Any information that the project owner designates as 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 deemed confidential pursuant to the Regulations will remain undisclosed as provided for in Title 20, California Code of Regulations, section 2501.

COM-9: ANNUAL ENERGY FACILITY COMPLIANCE FEE

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. The project owner may also contact the CPM for the current fee information. The initial payment is due on the date that the

Energy Commission's Final Decision is docketed. All subsequent payments are due by the first (1st) of July of each year in which the facility retains its certification.

COM-10: SITE CONTINGENCY PLANS

The project owner shall submit a site contingency plan for CPM review and approval. The plan shall be submitted no less than sixty (60) days prior to start of commercial operation (or other timeframe subject to CPM approval). The approved plan must be in place prior to the start of commercial operation and must be kept onsite at all times.

The purpose of the site contingency plan is to ensure that an integrated facility response system exists. Many of the contingency plan's elements will likely draw from the other plans and protocols required by the various technical sections. Plan elements include, but are not limited to:

1. A facility description and corresponding detailed map (with compass heading, bar scale, and key), including licensed activities, on-site and near-site structures with descriptive labels, roads and parking lots on-site and main roads and highways near the site, and site boundaries, including fences and gates;
2. A site description of areas near the site and corresponding map (with compass heading, bar scale, and key), including locations of population centers and sensitive receptors (schools, arenas, stadiums, prisons, care facilities), and emergency response facilities (fire, police, hospitals, clinics, etc.);
3. A description and corresponding detailed map (with compass heading, bar scale, and key) of emergency equipment and critical safety controls including fire suppression, first aid and decontamination/extreme exposure equipment, protective gear, automatic external defibrillators, on-site emergency alert and communication systems, ventilation, shut-off and safety controls, interior and exterior evacuation routes, on- and off-site assembly areas, and traffic control equipment, as applicable;
4. An organizational chart including the name, contact information, photo-identification, certification types(s), and renewal dates for all on-site personnel trained in first response and first aid;
5. A description of reasonably foreseeable hypothetical incidents and accident sequences (on- and off-site), including response procedures and protocols and site security measures to maintain twenty-four (24) hours site security;
6. The nature, extent and status of insurance coverage(s) and major equipment warranties for the facility; and
7. Procedures for maintaining contingency response capabilities including plan review and update schedule, periodic drills and training schedule, critiques and auditing procedures, incident reporting requirements, and inventory and maintenance of contingency plan supplies.

The CPM may require revisions to the site contingency plan over the life of the project. Site contingency review/updates (updated organizational chart, personnel training logs, independent audits, and periodic drill reports, etc.) shall be provided for CPM review and approval in each annual compliance report.

In the event of an unexpected incident requiring emergency response, the project owner shall notify the CPM or the Compliance Office Manager (COM) directly, as well as other responsible agencies, by telephone, fax, or e-mail, within one (1) hour and shall take all necessary steps to implement the contingency plan response scenarios.

For incidents that require facility shut down for more than ninety (90) days, (or other timeframe subject to CPM approval), the site contingency plan shall provide for removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment, and the safe shutdown of all equipment. (Also, see specific conditions of certification for the technical areas of **Hazardous Materials Management** and **Waste Management** sections of this **FSA**).

COM-11: UNEXPECTED INCIDENT REPORTING REQUIREMENTS

In the event of any incident requiring any emergency response, including but not limited to, 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:

- A. Notify the CPM or COM directly within one (1) hour by phone of the circumstances, current status, and expected duration of all accidents, emergencies, and other abnormal incidents at the facility or appurtenant facilities, that have resulted or could result in any of the following situations:
 1. Reduction in the facility's ability to respond to dispatch (excluding forced outages caused by protective equipment or other typically encountered shut down events);
 2. Health and safety impacts on the surrounding population;
 3. Property damage off-site;
 4. Response by off-site emergency response agencies;
 5. Serious on-site injury;
 6. Significant environmental damage;
 7. Filing of bankruptcy by the owner or operator of the facility; and/or
 8. Emergency reporting to any federal, state, or local agency.
- B. Submit to the CPM a detailed report describing the incident and any impacts as described in **section A** within thirty (30) days that shall include, as appropriate to the incident, the following information:
 1. A brief description of the incident including its date, time and location;
 2. A description of cause of the incident, or likely causes if it is still under investigation;

3. The location of any off-site impacts;
 4. A description of emergency response actions associated with the incident;
 5. Identification of responding agencies;
 6. Identification of emergency notifications made to other federal, state, and/or local agencies;
 7. Identification of any hazardous materials released and an estimate of the quantity released;
 8. A description of any injuries, fatalities, or property damage that occurred as a result of the incident;
 9. Fines or violations assessed or being processed by other agencies;
 10. Name, phone number, and email address of the appropriate facility contact person having knowledge of the event; and
 11. Corrective actions or repairs necessary, a proposed schedule, and potential cost to restore the facility to acceptable performance and availability.
- C. Maintain records of the **incident** report(s) described in **sections A and B** for the life of the project. Additionally, the project owner shall submit to the CPM copies of these project reports within twenty-four (24) hours of an email, phone, mail, or in person request.

COM-12: REPORTING OF COMPLAINTS, NOTICES, AND CITATIONS

Prior to the start of construction, the project owner must send a letter to property owners living within one (1) 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 twenty-four (24) hours per day, it shall include automatic answering with a date and time stamp recording. All recorded complaints shall be responded to within twenty-four (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/<project name>/>.

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 ten (10) days of receipt. Complaints shall be logged and numbered. Noise complaints shall be recorded on the form provided in the **Noise and Vibration** conditions of certification. All other complaints shall be recorded on the complaint form (Attachment A).

COM-13: AMENDMENTS, OWNERSHIP CHANGES, STAFF-APPROVED PROJECT MODIFICATIONS AND VERIFICATION CHANGES

The project owner must petition the Energy Commission pursuant to Title 20, California Code of Regulations, section 1769, in order to modify the design, operation or performance requirements of the project or linear facilities, or to transfer ownership or operational control of the facility. The CPM will determine whether staff approval will be sufficient or whether Commission approval will be necessary based upon whether or not the proposed amendment(s) result in a changed or deleted condition of certification or the changes cause noncompliance with any applicable LORS. Section 1769 details the required content of a petition to amend. Only a request to change the verification method of a condition of certification can be submitted in a letter format to the CPM. **It is the responsibility of the project owner to contact the CPM to determine if a proposed project change triggers the requirements of section 1769.**

Implementation of a project modification without first securing Energy Commission, or Energy Commission staff approval, may result in an enforcement action including civil penalties in accordance with section 25534 of the Public Resources Code. If the Energy Commission's rules regarding amendments are amended, the rules in effect at the time the change is requested shall apply.

COM-14: FACILITY CLOSURE PLAN

To ensure that a facility does not become a risk to public or environmental health or safety when a temporary or permanent closure occurs, the project owner shall establish a closure process that demonstrates to the Energy Commission that closure activities and costs are being considered and planned for early in the life of the facility and complies with all applicable COCs and LORS.

For extended, but temporary, closures (exceeding ninety (90) days), the project owner shall submit a Temporary Closure Plan to the CPM for review and approval. The Closure Plan shall be submitted at least sixty (60) days prior to commencing expected closure activities and no later than one-hundred-twenty (120) days after an unplanned closure (or other timeframe, subject to CPM approval). The Temporary Closure Plan shall contain information as specified in Plan Elements 1–9, below, and as specified in additional guidance referenced within this and all other pertinent COCs, as applicable.

In preparation for the eventual permanent closure of the plant, the project owner shall submit for CPM review and approval a preliminary Closure Plan with the first annual compliance report. The Closure Plan shall identify steps necessary to perform partial or final closure of the facility at any point during its active life and to perform final closure at the end of its active life. The Closure Plan shall be updated and submitted for CPM review every five (5) years, or at the time of an unplanned closure event. A searchable electronic copy of the Closure Plan shall be filed on an electronic storage medium or by e-mail, as agreed to by the CPM.

At least two (2) years prior to commencing permanent closure activities (or other timeframe agreed upon by the CPM), the project owner shall submit a proposed final Closure Plan to the CPM for review and approval.

Closure Plan Elements include, but are not limited to:

- 1.) A searchable table of contents clearly identifying by title and page number each section, table, graphic, exhibit, or addendum;
- 2.) The identification of technical experts, including resumes, and detailed descriptions of relevant previous power plant closure experience;
- 3.) A comprehensive scope of work for the temporary or permanent plant closure, detailing all phases of the closure process, including applicable LORS compliance strategies, methodologies to be used, and team members responsible for executing the work;
- 4.) A cost estimate for the various closure phases, including but not limited to, technical expertise, compliance and remediation planning, environmental analysis and permitting, demolition, site clean-up and mitigation and monitoring, and contingencies, as applicable;
- 5.) All relevant existing plans, drawings, inventories, schedules, assessments, and status and compliance reports for the project;
- 6.) A complete historical and existing infrastructure inventory and inspection, a physical site and baseline characterization, an independent review of a final building and under building surveys, and a chemical characterization and process analysis, as well as all site and risk assessments, as applicable;
- 7.) Identification and discussion of any potential impacts and mitigation strategies to address significant adverse impacts associated with the plant closure and conformance with all applicable LORS, conditions of certification, and local/regional plans presently existing. The Closure Plan shall include an integrated schedule of temporary or permanent closure activities for the power plant site, transmission line corridor, and all other appurtenant facilities constructed as part of the project. Additional closure specifications, drawings, and planning considerations shall include, but are not limited to, demolition, salvage, stormwater, waste management, spill prevention, transit and transportation, public health, worker safety, and site security plans, as applicable;
- 8.) A description of the password-protected filing systems and information repositories, both electronic (on-line) and hard copy (on-site), approved by the CPM to allow for streamlined compliance submittals, monitoring, and auditing; and
- 9.) A site disposition plan including refurbishment or redevelopment options, future land-use planning alternatives, stakeholder involvement process, and restoration plan and permitting timelines, as applicable, including the identification and justification for any facilities or equipment remaining on-site after permanent closure.

Two (2) years prior to submittal of the proposed draft Final Closure Plan, a meeting shall be held between the project owner and the CPM to discuss the specific contents and timing of the Closure Plan. Not less than one (1) year prior to facility closure the project owner must send a letter to all interested parties, including the post-certification

mailing list and property owners living within one (1) mile of the facility, notifying them of the intent to close the facility permanently.

In the event there are significant issues associated with the Closure Plan's approval, the CPM will hold one or more workshops, and the Energy Commission may hold public hearings as part of its approval procedure.

As necessary, prior to or during the closure planning process, the project owner shall take appropriate steps to eliminate any immediate threats to public and environmental health and safety, but shall not commence any other closure activities until CPM approval of the facility Closure Plan. For either a temporary or permanent plant closure, the project owner shall comply with the approved Closure Plan and any conditions of closure established by the Energy Commission as a result of the Closure Plan approval process.

COM-15: FINANCIAL ASSURANCE FOR CLOSURE

To ensure that the project owner closes the facility according to the CPM-approved Closure Plan, the project owner shall obtain a surety bond as financial assurance guaranteeing satisfactory performance of all closure and long-term site maintenance activities.

Within one-hundred-twenty (120) days following CPM approval of the preliminary Closure Plan, and periodically updated every five (5) years thereafter, (in conjunction with Closure Plan and Cost Estimate update(s) or at the time of an unplanned closure event), the project owner shall submit, for CPM review and approval, financial assurance in the form of a surety bond guaranteeing performance of closure as specified in the then-current Closure Plan. To ensure the accuracy of the most recent Cost Estimate, to be used in the surety bond, the CPM may require an independent, third-party review of said Estimate. The surety bond shall contain the following language and terms:

PERFORMANCE BOND

Date bond executed:

Effective date:

Principal: [legal name and business address of owner]

Type of organization: [insert "individual," "joint venture," "partnership," or "corporation"]

State of incorporation:

Surety(ies): [name(s) and business address(es)]

Facility name, address:

Total penal sum of bond: Closure Cost Estimate

Surety's bond number:

KNOW ALL PERSONS BY THESE PRESENTS, THAT WE, the Principal and Surety(ies) hereto are firmly bound to the California State Energy Resources Conservation and Development Commission (hereinafter called the Energy Commission), in the above penal sum for the payment of which we bind ourselves, our heirs, executors, administrators, successors, and assigns jointly and severally; provided that, where the Surety(ies) are corporations acting as co-sureties, we, the Sureties, bind ourselves in such sum "jointly and severally" only for the purpose of allowing a joint action or actions against any or all of us, and for all other purposes each Surety binds itself, jointly and severally with the Principal, for the payment of such sum only as is set forth opposite the name of such Surety, but if no limit of liability is indicated, the limit of liability shall be the full amount of the penal sum.

WHEREAS said Principal is required, under state regulations, to have an Energy Commission license in order to own and operate the facility identified above, and

WHEREAS said Principal is required to provide financial assurance for closure of the facility, and

WHEREAS said Principal shall establish a standby trust fund, with the Energy Commission as its Beneficiary, as is required when a surety bond is used to provide such financial assurance;

NOW, THEREFORE the conditions of this obligation are such that if the Principal shall faithfully perform closure, whenever required to do so, of the facility for which this bond guarantees closure, in accordance with the closure plan and other requirements of the license as such plan and license may be amended, pursuant to all applicable laws, statutes, rules, and regulations, as such laws, statutes, rules, and regulations may be amended,

OR, if the Principal shall provide alternate financial assurance and obtain written approval from the Energy Commission of such assurance, within ninety (90) days after the date notice of cancellation is received by both the Principal and the Executive Director of the Energy Commission, or designee, from the Surety(ies), then this obligation shall be null and void, otherwise it is to remain in full force and effect.

The surety(ies) shall become liable on this bond obligation only when the Principal has failed to fulfill the conditions described above.

Upon notification by the Energy Commission that the Principal has been found in violation of applicable closure requirements for which this bond guarantees performance of closure, the Surety(ies) shall either perform closure in accordance with the closure plan and other permit requirements or place the closure amount guaranteed for the facility into the standby trust fund as directed by the Energy Commission.

Upon notification by the Energy Commission that the Principal has failed to provide alternate financial assurance and obtain written approval of such assurance from the Energy Commission during the ninety (90) days following receipt by both the Principal and the Energy Commission of a notice of cancellation of the bond, the Surety(ies) shall place funds in the amount guaranteed for the facility into the standby trust fund as directed by the Energy Commission.

The Surety(ies) hereby waive(s) notification of amendments to closure plans, permits, applicable laws, statutes, rules, and regulations and agrees that no such amendment shall in any way alleviate its (their) obligation on this bond.

The liability of the Surety(ies) shall not be discharged by any payment or succession of payments hereunder, unless and until such payment or payments shall amount in the aggregate to the penal sum of the bond, but in no event shall the obligation of the Surety(ies) hereunder exceed the amount of said penal sum.

The Surety(ies) may cancel the bond by sending notice of cancellation by certified mail to the owner and to the Energy Commission provided, however, that cancellation shall not occur during the one-hundred-twenty (120) days beginning on the date of receipt of the notice of cancellation by both the Principal and the Energy Commission, as evidenced by the return receipts.

The Principal may terminate this bond by sending written notice to the Surety(ies), provided, however, that no such notice shall become effective until the Surety(ies) receive(s) written authorization for termination of the bond by the Energy Commission.

Principal and Surety(ies) hereby agree to adjust the penal sum of the bond when the Principal updates its closure Cost Estimate, as required by the Energy Commission, so that it guarantees a new closure amount, provided that the penal sum does not increase by more than 20 percent in any one year, and no decrease in the penal sum takes place without the written permission of the Energy Commission.

IN WITNESS WHEREOF, the Principal and Surety(ies) have executed this Performance Bond and have affixed their seals on the date set forth above. The persons whose signatures appear below hereby certify that they are authorized to execute this surety bond on behalf of the Principal and Surety(ies).

Principal - [Signature(s)]
[Name(s)]
[Title(s)]
[Corporate seal]

Corporate Surety(ies)
[Name and address]
State of incorporation:

Liability limit:

[Signature(s)]
[Name(s) and title(s)]
[Corporate seal]
[For every co-surety, provide signature(s), corporate seal, and other information in the same manner as for Surety above.]

Bond premium:

KEY EVENTS LIST

PROJECT: _____

DOCKET #: _____

COMPLIANCE PROJECT MANAGER: _____

EVENT DESCRIPTION	DATE
Certification Date	
Obtain Site Control	
Online Date	
POWER PLANT SITE ACTIVITIES	_____
Start Site Assessment/Preconstruction	
Start Site Mobilization/Construction	
Begin Pouring Major Foundation Concrete	
Begin Installation of Major Equipment	
Completion of Installation of Major Equipment	
First Combustion of Gas Turbine	
Obtain Building Occupation Permit	
Start Commercial Operation	
Complete All Construction	
TRANSMISSION LINE ACTIVITIES	_____
Start T/L Construction	
Synchronization with Grid and Interconnection	
Complete T/L Construction	
FUEL SUPPLY LINE ACTIVITIES	_____
Start Gas Pipeline Construction and Interconnection	
Complete Gas Pipeline Construction	
WATER SUPPLY LINE ACTIVITIES	_____
Start Water Supply Line Construction	
Complete Water Supply Line Construction	

**COMPLIANCE TABLE 1:
SUMMARY of COMPLIANCE CONDITIONS OF CERTIFICATION**

CONDITION NUMBER	SUBJECT	DESCRIPTION
COM-1	Unrestricted Access	The project owner shall grant Energy Commission staff and delegate agencies or consultants unrestricted access to the power plant site.
COM-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.
COM-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.
COM-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: <ul style="list-style-type: none"> • Notify property owners • Submit pre-construction matrix identifying conditions to be fulfilled before the start of construction • Completed all pre-construction conditions • CPM has issued a letter to the project owner authorizing construction
COM-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.
COM-6	Monthly Compliance Report / 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.
COM-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.
COM-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.
COM-9	Annual fees	Payment of Annual Energy Facility Compliance Fee

**COMPLIANCE TABLE 1:
SUMMARY of COMPLIANCE CONDITIONS OF CERTIFICATION**

CONDITION NUMBER	SUBJECT	DESCRIPTION
COM-10	On-Site Contingency Plans	No less than sixty (60) days prior to the start of commercial operation the project owner must submit an on-site contingency plan.
COM-11	Unexpected Incident Reporting	The project owner shall notify the CPM within one (1) hour, submit a detailed incident report, maintain records of incident report, and submit public health and safety documents with employee training provisions.
COM-12	Reporting of Complaints, Notices and Citations	Within ten (10) days of receipt, the project owner shall report to the CPM, all notices, complaints, and citations. To ensure public and environmental health and safety are protected in the event of an unplanned temporary closure, the project owner shall submit an on-site contingency plan no less than sixty (60) days prior to commencement of commercial operation.
COM-13	Post-certification changes to the Decision Unplanned Permanent Facility Closure	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. To ensure public and environmental health and safety are protected in the event of an unplanned permanent closure, the project owner shall submit an on-site contingency plan no less than sixty (60) days prior to commencement of commercial operation.
COM-14	Facility Decommissioning and Closure Plans	With the first annual compliance report, the project owner shall submit for CPM review and approval a preliminary facility closure plan (to be updated and reviewed every five (5) years or due to a closure event). For expected temporary closures, a decommissioning plan shall be submitted at least two (2) months prior to decommissioning activities. For unexpected temporary closures, the plan shall be submitted no later than 30 days after a closure incident. At least two (2) years prior to permanent closure the project owner shall meet with the CPM and submit a draft final closure plan for CPM review and approval. One (1) year prior to permanent closure the project owner must send a letter to all interest parties and must conduct public outreach as necessary.

**ATTACHMENT A
COMPLAINT REPORT/RESOLUTION FORM**

COMPLAINT LOG NUMBER: _____ DOCKET NUMBER: _____

PROJECT NAME: _____

COMPLAINANT INFORMATION

NAME: _____	PHONE NUMBER: _____
ADDRESS: _____	

COMPLAINT

DATE COMPLAINT RECEIVED: _____	TIME COMPLAINT RECEIVED: _____
COMPLAINT RECEIVED BY: _____	<input type="checkbox"/> TELEPHONE <input type="checkbox"/> 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?	<input type="checkbox"/> YES <input type="checkbox"/> NO
DATE COMPLAINANT CONTACTED TO DISCUSS FINDINGS: _____	
DESCRIPTION OF CORRECTIVE MEASURES TAKEN OR OTHER COMPLAINT RESOLUTION: _____ _____ _____	
DOES COMPLAINANT AGREE WITH PROPOSED RESOLUTION?	<input type="checkbox"/> YES <input type="checkbox"/> 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)

THE HIDDEN HILLS SOLAR ELECTRIC GENERATING SYSTEM, APPLICATION FOR CERTIFICATION (11-AFC-2)

PREPARATION TEAM

Executive SummaryMike Monasmith

IntroductionMike Monasmith

Project DescriptionMike Monasmith

Environmental Assessment

Air Quality/GHG Jacqueline Leyva, Ph.D

Biological Resources..... Carolyn Chainey-Davis, Chris Huntley, Carol Watson

Cultural Resources..... Thomas Gates, Ph.D

Hazardous Materials Management Geoff Lesh

Land Use.....Christina Snow

Noise and Vibration..... Shahad Khoshmashrab

Public Health.....Ann Chu, Ph.D, Obed Odoemelam, Ph.D

Socioeconomics Jim Adams, Steven Kerr, Richard McCann

Soils and Surface Water Marylou Taylor

Traffic and Transportation.....Candice Hill, John Hope, Gregg Irvin, Ph.D

Transmission Line Safety and Nuisance.....Obed Odoemelam, Ph.D

Visual Resources Melissa Mourkas

Waste Management.....Ellie Townsend-Hough

Water Supply.....Mike Conway

Worker Safety and Fire Protection Geoff Lesh

Engineering Assessment

Facility Design..... Shahab Khoshmashrab

Geology and Paleontology..... Casey Weaver

Power Plant Efficiency Shahab Khoshmashrab

Power Plant Reliability Shahab Khoshmashrab

Transmission System Engineering.....Sudath Edirisuriya

Alternatives Jeanine Hinde

General Conditions Joseph Douglas

Project Assistant Cenne Jackson

DECLARATION OF
J. Mike Monasmith

I, J. Mike Monasmith, declare as follows:

1. I am presently employed by the California Energy Commission in its Siting, Transmission and Environmental Protection Division as a Senior Project Manager.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on the **Executive Summary** and **Project Description** sections of the **Final Staff Assessment** for the **Hidden Hills Solar Electric Generating Station** Application for Certification (AFC), based on my independent analysis of the AFC, supplements, data, documents, analysis and testimony from other staff and reliable sources, and based upon my own professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 6, 2012 Signed: _____

At: Sacramento, California

J. MIKE MONASMITH

EMPLOYMENT HISTORY

California Energy Commission (Sacramento, CA)

Senior Project Manager (November 2007 – present)

Leads, plans, coordinates, prioritizes, monitors, reviews and conducts work activities associated with the permitting of large thermal energy facilities (including solar thermal) in California by means of certified CEQA regulatory program that incorporates applicable environmental laws, ordinances, regulations and standards. Lead multi-disciplinarian teams of engineers, planners, scientists and analysts who review complex, proposed power plant projects. Responsibilities include power plant proceeding schedule; utilization of principles and practices of engineering and environmental impact analyses, including specifics of Federal, State, and local laws (CEQA, NEPA) and regulations relating to energy and industrial facility siting, construction and operation. Conduct analyses of proposed or potential site areas; develop and recommend goals and objectives for a statewide facility siting program; develop, analyze and evaluate alternative facility siting plans; write research reports and prepare progress reports; coordinate and review energy facility siting standards, conditions, and guidelines with other state and federal regulatory agencies, stakeholders, related organizations and the public; conduct and manage large public hearings, workshops and events. Plans, coordinates, prioritize, monitors, guides, reviews and conducts work activities of project teams to ensure assigned work activities successfully contribute to the overall project completion schedule. Develops and maintains clear and concise communications and working relationships with other departments, agencies and members of the public.

Associate Public Adviser (November 2003 – November 2007)

Liaison between the Energy Commission, intervenors, members of the public and community organizations and stakeholders to ensure legally mandated public participation requirements were met in regard to Energy Commission activities, with particular focus on siting activities; advise departmental staff on various local community issues and developments in areas of concern and/or involvement and provide appropriate strategies and recommendations; oversee the development and implementation of community relations plans; organize and conduct public meetings, conferences and hearings regarding community issues; assist community work groups and advisory committees and maintain a close working relationship with these groups, as well as local agencies and elected officials; facilitate and advocate communication and understanding between technical experts, impacted communities and the general public via periodic emails, newsletters, phone calls and meetings in regard to Commission proceedings, decisions and regulations.

California Resources Agency (Sacramento, CA)

Special Assistant to Secretary Mary Nichols (April 2003 - November 2003)

Provided policy and program analysis and advice to California Resources Agency Secretary Mary Nichols. As a gubernatorial (Davis) appointee, provided assistant on key resource management issues, including: forest and fire protection, water resource use and development, parks and recreation priorities, and bonds and grant priorities and utilization.

California Democratic Party (Los Angeles, CA)

Director of Communications (March 2002 – December 2002)

Supervised state-wide Press and Communications staff for the California Democratic Party's 2002 California Coordinated Campaign effort to re-elect Governor Gray Davis, Lt. Governor Cruz Bustamante, Attorney General Bill Lockyer, State Treasurer Phil Angelides, State Controller Steve Westly, Secretary of State Kevin Shelley, Insurance Commissioner John Garamendi and Spt. of Public Instruction Jack O'Connell.

Gore/Lieberman - California Deputy Director (March 2000 – December 2000)

U.S. CONGRESSWOMAN JANE HARMAN (Washington, DC / Los Angeles, CA)

Chief of Staff (September 1997 – November 1998)

As Chief of Staff for U.S. Rep. Harman in 1997-1998, provided a wide-range of staff management, policy and political leadership, strategic political direction and advise to the Congresswoman on local, state and national issues of importance. Managed and was responsible for a staff of 16 policy and political professionals with a combined annual budget of \$2.5 million. As Political Director in 2001, I identified and resolved politically sensitive issues within the Congresswoman's coastal Los Angeles County Congressional district. Worked extensively with the Congresswoman's advisory committees (defense industry retention, education, environment and health care). Coordinated conferences and meetings in DC, the Los Angeles district and elsewhere in California. Provided ongoing analyses of community, economic and political concerns.

Deputy Campaign Manager, Harman for Governor (March 1998 - June 1998)
Political Director (June 2001- December 2001)

STATE CONTROLLER KATHLEEN CONNELL (Los Angeles, CA)

Chief Deputy Controller (December 2000 – June 2001)

As Chief Deputy Controller in 2000-2001, I was the lead staff member responsible for all facets of SCO external affairs, including: training, assigning and directing the work of SCO Executive Office press and communications staff; developing work schedules; assisting staff in resolving long-term and immediate/emergency problems and situations; making recommendations in staff performance appraisals; and reporting problems, concerns and developments directly to Controller Connell. As Press Secretary (CEA 1) in 1995-1996, responsibilities included managing, advancing and planning all outreach projects; served as the media project leader; prepared feasibility studies; developed, conducted and analyzed survey data and created public outreach campaign materials for Controller's goal of performance-based governance principles. Also developed work programs and schedules; managed budget and fiscal aspects of outreach projects; and, developed schedules and facilitated workshops and meetings.

Assistant Deputy Controller, External Affairs (April 1995 – June 1996)

VERIZON COMMUNICATIONS (Thousand Oaks, CA)

Director, Los Angeles Government Affairs (May 1999 – March 2000)

Planned, managed and coordinated GTE/Verizon California's Public Affairs program for the Los Angeles City Council and the Los Angeles County Board of Supervisors. Updated outreach and public affairs publications, and recommended candidate organizations for annual giving by the GTE Foundation. As a member of the Public and External Affairs staff, assisted in the preparation of speeches for public appearances before elected officials. Disseminated information on company activities to schools, government entities, elected/appointed officials and the public at large. Developed and implemented a systematic communications outreach program for ongoing relationship building between company and elected officials and community leaders/members within the company's service territory that provided a means for greater outreach and branding opportunity success.

McCOY & ASSOCIATES (Los Angeles, CA)

Senior Associate (December 1998 - April 1999)

Managed campaigns and special event projects for a variety of public and private sector clients as part of a multi-disciplined consulting firm. Responsible for the complete quality management of client deliverables such as development plans.

U.S. DEPARTMENT OF THE INTERIOR (Washington, DC)

Special Water Assistant, Asst. US Secretary Patricia Beneke (April 1997 – August 1997)

As a Schedule C Presidential appointee (President Clinton), I worked as a confidential adviser to Assistant U.S. Interior Secretary Patricia Beneke at United States Department of Interior in Washington, DC. Served Secretary Beneke in several capacities, including her liaison to US Bureau of Reclamation staff and key BOR field offices in California and Nebraska regarding western water issues (Lower Colorado River Basin issues that involved the state of California, and its 4.4 million-acre feet annual allotment of Colorado River water). For Nebraska, worked on the 3-state Platte River water consultations and the final cooperative water user agreement between the Governors of Colorado, Wyoming and Nebraska that involved farmers, environmental organizations, conservationists, the public and other stakeholders interested in the Platte River.

CLINTON/GORE '96 GENERAL COMMITTEE (Los Angeles, CA)

California Deputy State Director (Southern California Political Lead) (1996)

California Desk Co-Director, Presidential Inaugural Committee (1997)

SHEILA JAMES KUEHL FOR ASSEMBLY (Los Angeles, CA)

Campaign Manager (1994)

LOS ANGELES MAYOR RICHARD RIORDAN (Los Angeles, CA)

Deputy Press Secretary / Mayoral Assistant / Advance Co-Lead (1993-94)

Deputy Field Director / Deputy Director, Advance (Riordan for Mayor) (1993)

DEMOCRATIC PARTY OF ORANGE COUNTY (Santa Ana, CA)

Office Manager / Chief Assistant to the Chairman (1991-92)

UNIVERSITY OF CALIFORNIA, Santa Cruz

Federal Work-study Program Manager, UCSC Student Employment (1990 – 1991)

ICICLE SEAFOODS/TOWA ROE, Inc. (Seward, AK)

Salmon Cannery Production Supervisor “Team Lead” (Summers, 1988-1991)

EDUCATION:

University of California at Santa Cruz

B.A., Environmental Studies/Politics (Policy & Planning), 1990

(Thesis Honors: Resource Management, Tongass National Forest, Alaska)

Case Western Reserve University, Cleveland, Ohio

B.S. candidate, Industrial, Mechanical Engineering, 1985-88

AFFILIATIONS:

Association of Environmental Professionals, Member (2010-present)

Stonewall Democratic Club, Member (1992-present)

Los Angeles Export Terminal, Commissioner (1999-2005)

DECLARATION OF

I, Jacquelyn Leyva Record declare as follows:

1. I am presently employed by the California Energy Commission in the Facilities Siting Office of the Systems Assessments and Facilities Siting Division as an Air Resources Engineer.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on **Air Quality** for the **Hidden Hills Solar Electric Generating System** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony and errata is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and errata and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: Oct. 30, 2012 Signed: Jacquelyn Leyva Record

At: Sacramento, California

Jacquelyn Leyva Record

Experience

March '09 – Present **CA Energy Commission** **Sacramento, CA**

Air Resources Engineer

- Currently authoring staff assessment analyses for the technical area of air quality for the Engineering and Siting Division permitting power plant projects over 50 MW in the state of CA. Worked on renewable ARRA funding projects along with natural gas power projects.
- Reviewing emission compliance reports
- Authored staff analyses for project amendments
- Trained in CEQA and NEPA analysis, along with AERMOD air modeling.

August '08 – March '09 **ERRG, Inc.** **Martinez, CA**

Engineering Assistant

- Assisted with both technical and field duties for a variety of environmental investigations.
- Assisted on an environmental site assessment, preliminary assessments (PA), site inspections, and remedial investigations feasibility studies.
- Field duties performed include groundwater sampling and air sampling

June '07 – March '08 **Tetra Tech EC, Inc** **Santa Ana, CA**

Engineering Assistant Intern

- Working on various Department of Defense projects in environmental engineering.
- Helped assist in 5 year review of remediation approaches.
- Helping assist with a commercial project creating a water reuse/recycle treatment plant.

June '05 – September '05 **SF Regional Water Board** **Oakland, CA**

Contract Work – Special Project

- Wrote a memorandum regarding total petroleum hydrocarbons showing up as false positives in submitted quarterly monitoring reports for NPDES FUEL permit.
- Researched various EPA methods of testing for VOC, and Fuel constituents in water.
- Communicated with consultants from Weiss Associates and state funded laboratories to come to a conclusion for memorandum.
- Site inspections, site reports.

Education

2003-June 2008 University of California Irvine Irvine, CA

- B.S., Chemical Engineering
- MAES (Mexican American Engineers and Scientists) - Vice Chair 2004-2005
- CAMP summer science program participant 2003

June 1999 – September 2003 Las Lomas High School Walnut Creek, CA

- High School Diploma
- Life time member of CSF (California Scholarship Federation).

**DECLARATION OF
Carol Watson**

I, **Carol Watson**, declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Office of the Siting Transmission & Environmental Protection Division as a staff biologist (Planner II).
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on **Biological Resources** for the Hidden Hills Solar Electric Generating System based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 10-30-2012

Signed: 

At: Sacramento, California

**Carol Watson
Sacramento, CA 95816**

WORK EXPERIENCE

California Energy Commission 2/2010 - Present
Sacramento, CA
Siting Transmission &
Environmental Protection
Division

As staff biologist, primary duty analysis of power plants over 50MW: solar thermal, photovoltaic (pending litigation), natural gas, and coal technologies. Analyze applications to permit projects, conduct CEQA-certified regulatory program under the Warren-Alquist Act, perform scoping and coordination with resource agencies, the public, "intervenors" to the applicant's process, formulate and recommend mitigation, and defend analysis under oath before Energy Commission Commissioners. Provide compliance oversight for permitted projects during all stages: construction, operation, and closure, and ensure proper implementation of mitigation. Synthesize developing regulations (REAT agency, DRECP Sec. 10 process among others) and relevant legislation to ensure Energy Commission compliance. Coordinate with— and negotiate— solutions with diverse entities as BLM, USWS, Water Quality Control Board, US Army Corps of Engineers, Governor's Office liaisons to the Energy Commission, private interest groups, and solicitors working on behalf of these interests.

Parsons Corporation 10/2004 - 12/2009
Las Vegas, Nevada

Principal Scientist

Worked in-house with client, Southern Nevada Water Authority. Served as Principal scientist from 11/2008 to 2/2010. Prepared Environmental Species Act Section 7 Permit for the Southern Nevada Water Authority Pipeline Project. Species included desert tortoise and 10 other Mojave and Great Basin aquatic and upland species. Perform general site surveys, spring snail counts, sage grouse telemetry, mist netting for bats, Amargosa toad surveys in Death Valley, Nevada, and assist the Nevada Department of Wildlife with bat telemetry studies. From 2004-2008 served as project scientist. Duties included mapping riverbank vegetation of the Virgin river, from the lower reach in Nevada through the confluence with Lake Mead. Ground-truthed plant assemblages based on aerial imagery and 3-dimensional (stereoscopic) views of vegetation. Familiar with cadastral and rastral imagery analysis. From 9/2005-11/2008 served on consultant basis. Prepared EIS/EIR analysis for impacts to peregrine falcon and special status bat species from the Gerald Desmond Bridge Project, in the Port of Long Beach, California.

Enercon 9/2005-11/2007
Tulsa, Oklahoma

Project Biologist

Fulltime from 7/2008-11/2008, consulting status from 9/2005 to 5/2007. Served as project biologist, performing a range of work from baseline surveys for the Oklahoma Department of Transportation, preparing NEPA documents, preparing and responding to Requests for Proposals and Requests for Qualifications. Representative projects include coordination of environmental studies and preparation of an Environmental Assessment for the Federal Highway Administration, on behalf of Kellogg Engineering, in Rogers County, Oklahoma. Conducted public scoping and agency solicitation, attending county plenary sessions as technical environmental consultant. Prepared an Environmental Information Document for the Environmental Protection Agency for the expansion of the Rural Water District #3 Tacora Water Treatment plant in Rogers County, OK. Conduct protocol surveys for the federally endangered American burying beetle on behalf of clients such as Chesapeake Operating Systems, OKDOT, and Panther Energy Company, surveyed new pipeline routes from Oklahoma through northern Texas for OG&E.

Representative Project: City of Moreno Valley, Riverside Co., California. Prepared Caltrans' Natural Environment Study for improvements to SR-60 at the Moreno Beach Drive and Nason Street interchanges. Studies included oversight of a jurisdictional delineation of wetlands and waters of the U.S., and coordination with project engineers to determine project boundaries and impacts. Developed mitigation in conformance with the Western Riverside County Multiple Species Habitat Conservation Plan.

BonTerra Consulting
Pasadena, California

2/2004 – 10/2004

Wildlife Biologist

Draft RFQ/RFP, perform general biological surveys on behalf of public and private sector clients, and prepare CEQA/NEPA documentation. Representative Project: Plum Canyon Development, Los Angeles Co., California: Conducted salvage (pitfall trapping & grubbing salvage) and relocation of sensitive and local populations of reptiles and amphibians. Species handled included Western spadefoot toad, coastal western whiptail, and silvery legless lizard. Coordinated with CDFG regarding species of special concern, drafting relocation plans, and assisted with developing a protocol to simulate and force spring emergence and subsequent relocation of spadefoot toads prior to grubbing.

Sapphos Environmental
Pasadena, California

12/2000-2/2003

Wildlife Biologist

Responsible for all phases of project management and biological technical work. Responded to and prepared RFP/RFQ, designed and conducted environmental study sufficient to project details (*i.e.* determination and development of appropriate ESA, NEPA, CEQA, Clean Water Act permits); and prepared environmental documentation. Prepared and conducted all public noticing and scoping per regulations, and prepared as technical consultant before the county and city and planning committees of Ventura and Los Angeles.

Representative Project: Ahmanson Ranch, Ventura County, California: Conducted long-term monitoring of a population of California red-legged frog with detailed notes as to location, behavior, and conditions. Assisted permitted biologists in placing passive integrated transponders, or PIT tags, as part of a radio telemetry study designed to aid understanding of habitat use and foraging distances. Assisted with the preparation of a Biological Assessment for an Endangered Species Act Section 7 consultation. Managed the design and creation of enclosed habitat and a captive breeding program. Conducted various studies at the Ahmanson Ranch, including San Fernando Valley spineflower introduction studies, seed counts and collections, and oak tree surveys and assessments.

EDUCATION

M.S. Zoology, Eastern Illinois University **2000**

Focus: environmental ecology;
population dynamics

Paid Teacher's Assistantship
B.S., Biology, Western Michigan University 1998

Chemistry minor

RELEVANT TRAINING

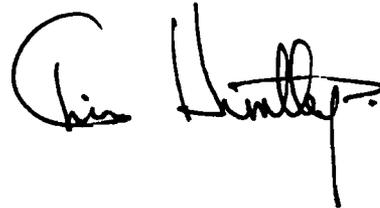
CPR Certified (2011, Energy Commission)
Desert Tortoise Surveying, Monitoring, and Handling Workshop, (2000)
BLM certified to survey for the flat-tailed horned lizard (2001)
California red-legged frog workshop (2001)
Passed U.S. Fish and Wildlife Service survey exam for El Segundo blue butterfly (2002)
American Burying Beetle Bait-away Surveys and Pitfall Trapping (performed under a permitted biologist' supervision), 2006-2007

**DECLARATION OF
Testimony of Chris Huntley**

I, **Chris Huntley**, declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission, Siting, Transmission and Environmental Protection Division, as a **Biological Resource Technical Specialist**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on **Biological Resources** for the **Hidden Hills Solar Electric Generating System Final Staff Assessment** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.



Dated: November 8, 2012

Signed: _____

At: Sacramento, California



Academic Background

Graduate Studies, Biology, California State University Northridge
BA, Biology, University of California at Santa Cruz, 1992

Professional Experience

Mr. Huntley has 14 years of experience with Aspen supporting and managing CEQA/NEPA projects including EIR/EIS, IS/MND, EA, BE/BA, and BA documents. In addition, Mr. Huntley has extensive energy experience including preparing the biological resource sections on several landscape level solar and wind projects. He also has broad experience conducting biological assessments, managing large-scale construction and restoration projects, and supporting agency clients with permitting tasks including compliance with California Department of Fish and Game (CDFG) 1600 and 2081 permits, US Fish and Wildlife Service (USFWS) Section 7 process, Regional Board 401 compliance, and US Army Corps (Corps) 404 permits. Mr. Huntley has extensive experience working on large scale permitting projects in the Mojave and Colorado Deserts. These projects involved extensive 1600, 2081, Section 7 consultation, and coordination with the BLM, CDFG, and USFWS. With over 20 years of experience as a biologist, Mr. Huntley has demonstrated expertise working with the sensitive biological resources that occur in the arid southwest of California, Arizona, and Nevada. Mr. Huntley has completed detailed vegetation mapping, sensitive species surveys including desert tortoise, and developed revegetation plans for projects throughout southern California, Nevada, and Arizona. With practical experience in managing large-scale construction projects, Mr. Huntley has unique experience in resolving conflicts and ensuring compliance with environmental regulations. Supported by a solid background in biological resources, experience in completing BLM procedures, CEQA, NEPA, USDA Forest Service Biological Assessments, sensitive species consultation, and over a decade of construction management experience, he works closely with resource agency personnel, contractors and affected jurisdictions to ensure that projects are constructed on time and in compliance with applicable laws, ordinances, regulations and standards. Some of the relevant projects Mr. Huntley has worked on are described below.

Aspen Environmental Group 1998-present

Energy Experience

- **Calico Solar Project (formerly SES Solar One Project), California Energy Commission, Biologist (2009-2010).** Mr. Huntley prepared the biological resources analysis of the Staff Assessment/EIS for this solar energy project proposed by Calico Solar, LLC. The proposed project would be located in San Bernardino County and includes the construction and operation of an 850-MW Stirling engine solar generation facility, which would include approximately 34,000 SunCatcher solar dish Stirling systems on approximately 8,230 acres. Key issues include potential impacts to desert tortoise, Mojave fringe-toed lizard, Nelson’s bighorn sheep, burrowing owl, and golden eagle, as well as large-scale modifications to existing drainages and interference with regional wildlife movement.
- **Palmdale Hybrid Power Plant, California Energy Commission, Biologist (2009-present).** Mr. Huntley is preparing the biological resources analysis of the Staff Assessment for this power generation project proposed by the City of Palmdale. The proposed project would be located in northern Los Angeles County and includes the construction and operation of a 570-MW hybrid combined-cycle and solar thermal electrical generation facility, which would include an approximate 333-acre plant site and a 35.6-mile transmission line to connect the project to the existing Southern California Edison Vincent Substation, as well as four pipelines to transport water, gas, and wastewater (ranging from 1.5 to

7.4 miles in length). Key issues include potential impacts to Swainson's hawk, desert tortoise, Mojave ground squirrel, and golden eagle.

- **Rice Solar Energy Project, California Energy Commission, Biologist (2009-2010).** Mr. Huntley is contributing to the biological resources analysis of the Staff Assessment/EIS prepared for this solar energy project proposed by Rice Solar Energy, LLC (a wholly owned subsidiary of SolarReserve, LLC). The proposed project would include a 150-MW solar generation facility consisting of up to 17,500 solar-tracking heliostats, a central tower, and associated infrastructure and appurtenant structures. The solar field site would be located on approximately 1,410 acres of privately owned land in eastern Riverside County. In addition, a 10-mile 230-kV generator tie-line would be constructed to interconnect the project with Western Area Power Administration's existing Parker-Blythe transmission line. The new transmission line would traverse lands primarily under the jurisdiction of the Bureau of Land Management (BLM). The new transmission line would also require the construction of a new 4.6-mile access road, also largely located on BLM lands. Key issues include potential impacts to desert tortoise and golden eagle, and potential impacts to birds in general from the solar technology.
- **California Energy Commission Emergency Siting Team, Power Plant Development, Compliance Project Manager.** For two years, Mr. Huntley's duties included management of technical staff for the completion of CEQA equivalent environmental permitting for over nine new emergency power plants, review of applicant submittals, drafting of Memoranda of Understanding with Chief Building Officials, conducting audits of building officials, and coordinating with affected agencies to resolve concerns with potential resource impacts. Other duties included maintaining contractor construction milestones, compliance monitoring and reporting, development of mitigation measures and conflict resolution for power plant compliance issues.
- **California Energy Commission (CEC) Coastal Power Plant Study, Deputy Project Manager/Biologist.** Mr. Huntley conducted biological surveys at 21 coastal power plants as part of the CEC's coastal power plant study. Site visits characterized habitat within the footprint of the power plant, landscaping, and identified potential environmental and permitting issues associated with potential expansion of the power plants.
- **CEC Hydroelectric Power Plant Inventory Study, Deputy Project Manager/Natural Resources Analyst.** Mr. Huntley coordinated a team that collected power and environmental data on over 200 hydroelectric power plants located in California. Physical power data included electrical output, system upgrades, water storage capacity and peaking availability. Environmental information included developing a data base addressing sensitive species issues, fish screens and ladders, monitoring parameters and a map of known hydroelectric facilities and barriers to anadromous fish passage. Mr. Huntley also obtained water use information on thermal power plants in support of the CEC's bi-annual environmental performance report.
- **Topaz Solar Farm EIR, San Luis Obispo County, Issue Area Coordinator/Biologist (2009-2011).** Mr. Huntley is acting as the issue area coordinator for natural resources on this solar energy project proposed by Topaz Solar Farms, LLC (wholly owned by First Solar, Inc.). The proposed project would consist of a 550-MW solar photovoltaic (PV) energy generating facility on approximately 6,200 acres in the Carrizo Plain area of eastern San Luis Obispo County. Key issues include potential impacts to San Joaquin kit fox, jurisdictional drainages, vernal pools, rare plants, and nesting birds.
- **California Valley Solar Ranch EIR, San Luis Obispo County, Issue Area Coordinator/Biologist (2009-2011).** Mr. Huntley is acting as the issue area coordinator for biological resources on this solar energy project. The proposed project involves construction and operation of a 250-MW photovoltaic (PV) solar power plant in the unincorporated portion of eastern San Luis Obispo County. The project would be owned by High Plains Ranch II, LLC, a wholly owned subsidiary of SunPower Corporation

Systems. A 3.5-acre substation and approximately 2.5 miles of 230-kV transmission would be required to connect to the existing PG&E Midway to Morro Bay 230-kV transmission line. The project is one of three solar power plants currently proposed for the Carrizo Plain. Key issues include potential impacts to San Joaquin kit fox, blunt-nosed leopard lizard, and giant kangaroo rat.

- **Panoche Valley Solar Farm EIR, County of San Benito, Biologist (2010-present).** Mr. Huntley is technical support for this large-scale solar energy project. The proposed project would consist of a 420-MW solar energy generation facility on approximately 4,717 acres in the Panoche Valley of southeastern San Benito County. The facility would consist of 1,822,800 solar photovoltaic panels and associated infrastructure. Key issues include potential impacts to California tiger salamander, blunt-nosed leopard lizard, San Joaquin antelope squirrel, giant kangaroo rat, San Joaquin kit fox, San Joaquin coachwhip, mountain plover, golden eagle, northern harrier, burrowing owl, loggerhead shrike, and American badger. In addition, suitable habitat for the following special-status species exists at the project site: vernal pool fairy shrimp, Swainson's hawk, western spadefoot, California horned lizard, merlin, pallid bat, and western mastiff bat.
- **Pacific Wind Energy Project EIR, Kern County, Biologist (2009-2010).** Mr. Huntley oversaw the preparation of the biological resources analysis of this EIR evaluating a proposed 250-MW wind energy generation facility in the Mojave region of Kern County. The proposed project would be located on approximately 8,300 acres in the Tehachapi Wind Resource Area. Key issues include potential impacts to birds and bats from the wind turbines as well as potential impacts to desert tortoise, California condor, Swainson's hawk, and golden eagle.
- **Alta-Oak Creek Mojave Project EIR, Kern County, Biologist (2008-2009).** Mr. Huntley oversaw the preparation of the biological resources analysis of this Initial Study and EIR evaluating a proposed 800 MW wind development in the Tehachapi Wind Resource Area. The proposed project site consists of three distinct land areas comprising a total of approximately 10,750 acres. Key issues include potential impacts to birds and bats from the wind turbines as well as potential impacts to desert tortoise, California condor, Swainson's hawk, golden eagle, and Bakersfield cactus.
- **North Sky River, Jawbone Wind Energy Project, Alta Infill II Project, the Morgan Hills Wind Energy Project, and the Alta East Wind Projects, Kern County, Biologist (2010-2012).** Mr. Huntley oversaw the preparation of the biological resources for these large scale wind farms.
- **Transmission Line Experience**
- **Downs Sub-station and Transmission Line Project IS/MND California Public Utilities Commission (2011-present), Issue Area Coordinator/Biologist.** Mr. Huntley acted as issue area coordinator for biological resources on this transmission line upgrade project to be completed by Southern California Edison in the Mojave Desert. Key issues on this project include the assessment of impacts to desert tortoise and Mohave ground squirrel.
- **Devers-Palo Verde Transmission Line Project No. 2 EIR/EIS, California Public Utilities Commission/Bureau of Land Management (2005-present), Issue Area Coordinator/Biologist.** Mr. Huntley acted as issue area coordinator for biological resources on this 230-mile 500-kV transmission line upgrade to be completed by Southern California Edison. This project crosses key wildlife areas including the KOFA Wildlife Sanctuary, the San Bernardino National Forest, the Mojave and Sonoran Desert habitats, and sections of the Riverside Multiple Species Conservation Area. Currently, Mr. Huntley is supporting the biological monitoring team responsible for implementing CPUC and BLM monitoring requirements during construction of the project and was responsible for assessing desert tortoise mitigation lands in coordination with the CDFG, BLM, and USFWS.

- **Tehachapi Renewable Transmission Project California Public Utilities Commission/US Forest Service (2007-present), Issue Area Coordinator/Biologist.** Mr. Huntley is acting as the issue area coordinator and principal author for biological resources on this 500-kV transmission line project proposed by Southern California Edison in support of wind energy projects. This transmission line is 173 miles in length and includes two separate segments that cross the Angeles National Forest. Some of the key issues on this project include potential impacts to Mojave ground squirrel, desert tortoise, arroyo toads, California condors, spotted owl, and a host of forest sensitive plant and wildlife species. As part of the project, Mr. Huntley mapped over 190 riparian related features and completed extensive surveys of the Angeles National Forest (ANF). Mr. Huntley managed an extensive biological staff and organized the completion of comprehensive botanical surveys for the proposed right-of-way. Other key issues involve the coordination with State Park, Forest, and resource agency staff. Currently, Mr. Huntley and is responsible for assessing desert tortoise mitigation lands in coordination with the CDFG and USFWS.
- **Antelope Transmission Project, Segments 2 & 3 EIR, California Public Utilities Commission/US Forest Service (2006-2011), Issue Area Coordinator/Biologist.** Mr. Huntley acted as issue area coordinator for biological resources on this 500-kV transmission line proposed by Southern California Edison in support of wind energy projects. Key issues on this project include potential impacts to Mojave ground squirrel, California red-legged frog, burrowing owl, and rare plants. As part of this project Mr. Huntley conducted focused surveys for arroyo toads and coordinated ESA compliance with the USFS and USFWS. As part of the project Mr. Huntley completed the BE/BA to comply with the provisions of the ESA and the Management Indicator Species Report for ANF compliance. Currently, Mr. Huntley provides technical assistance to monitoring staff.
- **El Casco Sub-Transmission Project EIR, California Public Utilities Commission (2006-present), Issue Area Coordinator/Biologist.** Mr. Huntley acted as issue area coordinator for biological resources and completed the impact analysis section of the EIR for this 17-mile subtransmission line upgrade to be completed by Southern California Edison. This line is located in the Western Riverside Multiple Species Conservation Area and crosses areas supporting several federally protected species including least Bell's vireo, southwestern willow flycatcher, and Stephens' kangaroo rat. Currently, Mr. Huntley provides technical assistance to monitoring staff.
- **Antelope-Pardee Transmission Project EIR/EIS-BE/BA, California Public Utilities Commission/US Forest Service (USFS, 2005-2010), Issue Area Coordinator/Biologist.** Mr. Huntley was the issue area coordinator for biological resources on this 500-kV transmission line upgrade to be completed by Southern California Edison. Key issues on this project included compliance with the USFS Forest Plan and sensitive species including California condor, burrowing owl, and rare plants. Mr. Huntley reviewed and prepared the Biological Resource Section for the EIR/EIS, developed project alternatives, coordinated with USFS staff, and conducted sensitive species surveys for arroyo toad in support of this project. Currently, Mr. Huntley provides technical assistance to monitoring staff.
- **SCE Valley-Auld Power Line Project, CPUC, Environmental Monitor.** Conducted inspections of construction of this 11-mile power line upgrade for compliance with the project's Mitigated Negative Declaration mitigation measures and compliance plans. Other tasks included review of pre-construction compliance materials, maintaining inspection documentation, and coordination with SCE and its subcontractors. **Sunset Substation IS/MND and Biological Site Assessment, City of Banning (2006-2007), Biologist.** Mr. Huntley prepared the biology section of the IS/MND as a sub-contractor to R. W. Beck. In addition, Mr. Huntley conducted burrowing owl surveys and managed surveys for Los Angeles pocket mouse at select locations along the proposed right-of-way.

- **Viejo System Project IS/MND, California Public Utilities Commission, Biologist.** Conducted biological surveys and completed the biological section of the Initial Study and Mitigated Negative Declaration for the SCE's transmission line upgrade project.

Pipeline Experience

- **Santa Fe Pacific Pipeline, CPUC, Environmental Monitor.** Inspected construction of three petroleum distribution station sites for compliance with approved project mitigation measures and compliance plans.
- **Line 401 PG&E Redwood Expansion Project, CPUC, Lead Environmental Monitor.** Under contract to the California Public Utilities Commission (CPUC), Mr. Huntley acted as Lead Environmental Monitor and supervised two environmental monitors in the field on the implementation of the CPUC's conditions of approval for construction of this 14-mile natural gas pipeline. Responsibilities included: supervision, guidance and development of environmental monitors, onsite field monitoring, compliance review and mitigation development of pre-construction plans, and mitigation compliance documentation. Other duties included review of variance and temporary extra work space (TEWS) requests; recommendations for CPUC issuance of Notices to Proceed with construction and variance approvals; approval of TEWS requests; preparation of weekly reports for all monitoring activity; and coordination with PG&E, construction managers and subcontractors, local municipalities, affected and interested agencies and the public.
- **Horsethief Creek Road Repairs Project, IS/MND and Biological Assessment, California Department of Water Resources (2005-2009), Biologist/Project Manager.** Mr. Huntley prepared the biological resource section and managed the completion of the IS/MND and the BA for construction of an all weather road at Horsethief Creek located near Lake Silverwood in San Bernardino County. Mr. Huntley also assisted DWR through formal consultation with the USFWS. The project was intended to provide an all-weather access to DWR facilities while avoiding impacts to federally endangered arroyo toads. Mr. Huntley also managed and conducted several of the sensitive species surveys required for this project including arroyo toad, two-striped garter snake, and southwestern pond turtles. Mr. Huntley managed the monitoring efforts at the site to comply with permit regulations identified by the Biological Opinion.

NEPA Experience

- **Littlerock Dam and Reservoir Restoration Project EIR/EIS-BE/BA, Palmdale Water District/US Forest Service (2004-present), Deputy Project Manager/Biologist.** Mr. Huntley is currently acting as deputy project manager and project biologist for the sediment removal activities associated with the Littlerock Dam and Reservoir in the Angeles National Forest. Mr. Huntley is working to develop project alternatives for sediment disposal while avoiding impacts to federally endangered arroyo toads. Mr. Huntley is managing the sensitive species surveys for this project and completing the biological resources section of the EIR/EIS, Management Indicator Species Report, and BE/BA.
- **Newhall Ranch Project, California Department of Fish and Game (2005-2009), Biological Coordinator and CDFG Reviewer.** Mr. Huntley provided biological expertise and assisted CDFG staff in reviewing and revising the EIR/EIS for the proposed 6,000-acre Newhall Development Plan EIR/EIS in Santa Clarita. Primary issues concern the land use conversion of several thousand acres of wild lands and agricultural areas located in and adjacent to the Santa Clara River. This region is known to support numerous threatened and endangered species including least Bell's vireo, southwestern willow flycatcher, California condor, arroyo toad, unarmored three-spine stickleback, and San Fernando Valley spineflower. Other concerns associated with the development include wildlife movement corridors, and effects to riparian habitats. Mr. Huntley reviewed, commented and revised the environmental

documents, scheduled and coordinated meetings with resource professionals and agency staff, and provided technical review of the document. Mr. Huntley will be assisting CDFG staff in the response to comments on the Draft EIR/EIS.

- **Matilija Dam Ecosystem Restoration Project EIR/EIS, US Army Corps of Engineers, Biologist.** Mr. Huntley conducted biological surveys and assisted in the completion of the EIS/EIR to assess impacts to sensitive biological resources located on Matilija Creek and the Ventura River downstream of the of the Matilija Dam. The analysis focused on potential impacts associated with dam removal on sensitive species known to occur on the Ventura River and the beneficial impacts of the restoration of spawning territory for the endangered Evolutionary Significant Unit of Southern Steelhead.
- **Fort Irwin Environmental Baseline Survey Reports US Army Corps of Engineers (2005), Project Manager/Biologist.** Mr. Huntley managed the preparation of two Environmental Baseline Survey reports near Fort Irwin, San Bernardino County to support the land acquisition of over 95 parcels by the US Army for the Fort Irwin National Training Center. Mr. Huntley conducted site investigations, documented existing biological conditions and managed the preparation of the report.
- **Matilija Dam Ecosystem Restoration Project EIR/EIS, US Army Corps of Engineers, Biologist (2008).** Under contract to Parsons Brinckerhoff, Mr. Huntley managed a team of biologists and conducted biological surveys at the proposed sediment disposal sites associated with the removal of the Matilija Dam.
- **Patriot Integrated Air Defense Exercise Project Environmental Assessment and Environmental Baseline Survey, Nellis Air Force Base, Nevada (2006-2008), Project Manager/Biologist.** Mr. Huntley managed the preparation of an EA for ongoing military activities conducted on Bureau of Land Management (BLM) lands surrounding Nellis Air Force Base in Lincoln and Nye Counties, Nevada. Mr. Huntley coordinated with the USAF regarding field surveys of the proposed anti-aircraft sites, the assessment of biological and cultural resources, and prepared the DR/FONSI and Right-Of-Way document for the USAF. Mr. Huntley also prepared sections and managed the completion of an Environmental Baseline Report for each of the artillery sites.
- **Joint Red Flag '05 Exercise Environmental Assessment, US Army Corps of Engineers/Bureau of Land Management, Nellis Air Force Base Nevada (2004-2005), Project Manager/Biologist.** Mr. Huntley managed and coordinated the EA process for the ground component of the Joint Red Flag '05 Exercise which was conducted Bureau of Land Management (BLM) lands surrounding Nellis Air Force Base in Lincoln County, Nevada. Mr. Huntley conducted extensive field surveys of the proposed anti-aircraft sites, completed the assessment for biological and visual resources, prepared the DR/FONSI, managed sensitive species surveys, identified and flagged populations of noxious weeds, and prepared of military training guides for the soldiers in the field.
- **March Air Reserve Base Cactus and Heacock Channels Environmental Assessment and Biological Technical Report and EA, US Army Corps of Engineers (2005-2009), Project Manager/Biologist.** Mr. Huntley conducted and managed the preparation of a Biological Technical Report for two channels located along the perimeter of the March Air Reserve Base in Riverside. Mr. Huntley and a team of biologists conducted burrowing owl surveys, vegetation and vernal pool mapping, and documented existing biological conditions at the two channels. As part of this project detailed GIS maps were created to assist the Corps in preparing environmental documents for the area. Mr. Huntley managed the completion of an Environmental Assessment to evaluate impacts of construction of approximately 3 miles of flood control channel located at Cactus and Heacock Drainages. Currently, Mr. Huntley provides technical assistance to Corps staff for this project.

- **Monterey Bay Accelerated Research System (MARS) Cabled Observatory EIR/EIS, California State Lands Commission/Monterey Bay National Marine Sanctuary (2004-2006), Deputy Project Manager.** The MARS project is an advanced cabled observatory in Monterey Bay that would provide a continuous monitoring presence in the MBNMS as well as serve as the test bed for a state-of-the-art regional ocean observatory, currently one component of the National Science Foundation (NSF) Ocean Observatories Initiative (OOI). Mr. Huntley acted as deputy project manager for this project. In addition, his duties involved review of technical data, development of the project description and alternatives, and coordination with state and federal agencies.
- **Lower Colorado Flood Control Project EIR/EIS, US Army Corps of Engineers (2003-2004), Deputy Project Manager/Biologist.** Mr. Huntley conducted reconnaissance surveys and vegetation mapping along a 23-mile section of the Lower Colorado River in Yuma Arizona. In addition, Mr. Huntley updated the biological resource section of the current baseline conditions and is working with a team of State and federal agencies in an effort to determine the future alignment of the Lower Colorado River in this location. As part of this process Mr. Huntley developed project alternatives that met the criteria identified by the United States Boundary Water Commission and State and federal resources agencies.
- **Murrieta Creek Flood Control Project Phase II-IV Revegetation Plan and Sensitive Species Surveys, US Army Corps of Engineers (2006-2007), Project Manager/Biologist.** Mr. Huntley prepared comprehensive vegetation maps and detailed restoration plan for over six miles of riparian habitat located at Murrieta Creek in Riverside California. As part of this task, Mr. Huntley conducted and managed a team of resource experts in completing sensitive plant and animal species within the Murrieta Creek. Prepared detailed vegetation maps, site assessment and impact analysis for the Environmental Assessment, comprehensive revegetation and restoration plan to address project impacts, and developed mitigation for sensitive plant and wildlife species. In addition, Mr. Huntley worked closely with local resource agencies and managed sensitive wildlife surveys and the trapping and relocation of southwestern pond turtles from the project area. Currently, Mr. Huntley is providing technical assistance to the Corps regarding this project.
- **Murrieta Creek Flood Control Project Supplemental EA, US Army Corps of Engineers (2003-present), Deputy Project Manager/Biologist.** Mr. Huntley conducted site surveys for sensitive plant and animal species within the Murrieta Creek. He also prepared detailed vegetation maps, site assessment and impact analysis for the Environmental Assessment, comprehensive revegetation and restoration plan to address project impacts, and developed mitigation for sensitive plant and wildlife species. In addition, Mr. Huntley worked closely with local resource agencies and managed sensitive wildlife surveys and the trapping and relocation of southwestern pond turtles from the project area. Currently, Mr. Huntley is providing technical assistance to the Corps regarding this project.

Other Relevant Experience

- **Level 3 Fiber Optics Network Construction Monitoring and Supplemental Environmental Review Program, CPUC, Environmental Monitor.** Mr. Huntley's duties included inspection of several southern California segments including Santa Barbara to Burbank, San Bernardino, Corona to Atwood, and San Diego to the California/Arizona state line. He provided environmental compliance during construction addressed biological and cultural resource, air and water quality, traffic control, and public utilities. Other tasks included maintaining daily documentation, review of pre-construction mitigation measures, weekly reporting of compliance activities, and coordination with Level 3 personnel and subcontractors, and affected agencies.

- **Salton Sea Debris Removal Project, Los Angeles Department of Water and Power (2007-2008), Project Manager/Biologist.** Mr. Huntley conducted Phase I, II, and III burrowing owl surveys at several sites scheduled for clean-up in the Imperial Valley. Mr. Huntley managed the monitoring of clean-up activities and developed mitigation strategies to comply with State and local permit requirements regarding the protection of this species.
- **Perris Lake Permit Support, California Department of Water Resources (2005/2006), Biologist.** Mr. Huntley prepared a biological technical report to support permitting activities at Perris Lake in Riverside California. Mr. Huntley also reviewed and prepared the Storm Water Pollution Prevention Plan in compliance with Regional Board requirements.
- **Focused Surveys for least Bell's vireo and southwestern willow flycatchers at the Hansen Dam, Los Angeles River, and San Gabriel River, US Army Corps of Engineers (2005), Project Manager.** Mr. Huntley managed the focused surveys and report preparation for this task.
- **Tortoise Monitoring at Las Vegas Wash, US Army Corps of Engineers (2005-2006), Project Manager.** Mr. Huntley managed the survey and report preparation for monitoring activities associated with this task. Monitoring crews conducted work within the Tropicana, Flamingo, and Blue Diamond tributaries as part of the ongoing flood control activities.
- **Pacific Pipeline Project EIR/EIS for the US Forest Service, Angeles National Forest, and the California Public Utilities Commission, Environmental Monitor.** Served as an Environmental Monitor and supervised mitigation monitoring for all sensitive resources for a construction segment along a 132-mile crude oil pipeline within southern California.
- **San Antonio Creek Erosion Repairs Project BA/EA, US Army Corps of Engineers, Biologist.** Mr. Huntley conducted botanical surveys and prepared detailed vegetation maps within San Antonio Creek. Mr. Huntley also prepared the Biological and Environmental Assessments for the project and developed mitigation for sensitive plant and wildlife species.
- **Vista Del Lago Visitor Center Slope and Waterline Repair Biological Evaluation/Biological Assessment, California Department of Water Resources (2006-2008), Project Manager/Biologist.** Mr. Huntley managed the preparation of the Biological Evaluation/Biological Assessment in compliance with the USFS to conduct repairs to a failed slope at the Vista Del Lago Visitor Center at Pyramid Lake. Mr. Huntley also acted as the USFS and CDFG liaison for this project and managed the preparation of regulatory permits for compliance with CDFG, Corps, and Regional Board requirements. Mr. Huntley also managed the biological monitoring for this project.
- **Pyramid Dam Emergency Access Road IS/MND and Biological Evaluation/Biological Assessment, California Department of Water Resources (2005-2008), Project Manager/Biologist.** Mr. Huntley prepared the biology section of the IS/MND and the Biological Evaluation/Biological Assessment in compliance with the USFS to construct an emergency access road from Interstate 5 to Pyramid Lake Dam. Mr. Huntley acted as the USFS and CDFG liaison for this project and managed the sensitive species surveys for the project.
- **Castaic Lake Biotic Assessment, Los Angeles Department of Water and Power (2007), Project Manager/Biologist.** Mr. Huntley managed the preparation of an updated Biological Resource Assessment for the Castaic Power Plant at Castaic Creek. Mr. Huntley managed a team of experts and conducted focused surveys for arroyo toad and other sensitive plant and wildlife species to support LADWP management of the area.
- **Lake Canyon IS/EIR, Ventura, Ventura County Flood Control District, Biologist (2006-2007).** Mr. Huntley conducted biological surveys of this proposed detention basin and prepared the biological resource section of the Initial Study.

- **Piru Creek Restoration of Natural Flows Project EIR, California Department of Water Resources (2004-2005), Biologist.** Mr. Huntley managed resource specialists for completion of sensitive bird surveys along Piru Creek. In addition, he conducted sensitive species surveys for aquatic resources including two-striped garter snake and southwestern pond turtle, and coordinated with technical experts during reconnaissance surveys for arroyo toad. Mr. Huntley completed engineering cross sections of Piru Creek and prepared a comprehensive State jurisdictional riparian delineation for an 18-mile section of middle Piru Creek between Pyramid Dam and Lake Piru. Mr. Huntley prepared the biological resources section and developed environmentally sound alternatives to address impacts associated with restoring natural flows to Piru Creek. Discussions of biological resources focused on the potential beneficial impacts that may occur to southwestern arroyo toad, southwestern pond turtle, red-legged frog and two-striped garter snake.
- **Angeles National Forest Fuels Reduction Project, Biological Evaluation/Biological Assessment, US Department of Agriculture Forest Service (2005/2009), Biologist.** Mr. Huntley reviewed existing documents and assisted staff in responding to comments from USFS staff. Mr. Huntley met with USFS staff and conducted site inspections at several plantation and natural stands. Currently, Mr. Huntley is revising BE/BA's for the ANF.
- **East Branch Extension Project Phase II, California Department of Water Resources (2006), Project Manager/Biologist.** Mr. Huntley managed and conducted sensitive species surveys for DWR in support of the EIR for this aqueduct extension project. In addition, Mr. Huntley acted as an expert witness and provided testimony in the San Bernardino Superior Court to allow access to key areas in support of the surveys. Focused surveys included the slender horned spineflower, Santa Ana River wooly star, California gnatcatcher, least Bell's vireo, and southwestern willow flycatcher.
- **Emergency Storm Repairs Biological Assessment, California Department of Water Resources (2005), Project Manager/Biologist.** Mr. Huntley prepared the Biological Assessment to evaluate potential impacts to sensitive species from emergency storm repairs at two locations at Piru Creek. The BA documented site conditions, identified potential sensitive species habitat and presence in the project area, and addressed specific USFWS requirements associated with arroyo toads.
- **South Adit Access Road Repair Project Biological Evaluation/Biological Assessment, California Department of Water Resources (2005/2006), Project Manager/Biologist.** Mr. Huntley prepared the Biological Evaluation/Biological Assessment in compliance with the USFS to repair storm damage to the existing asphalt road surface and to stabilize the adjacent hillside to maintain access to the South Adit; a Department of Water Resources facility located along the West Branch of the California Aqueduct. Mr. Huntley managed sensitive resource surveys for rare plants and wildlife, conducted pre-construction surveys, and coordinated with the USFS personnel. As part of ongoing construction activities at the site Mr. Huntley provided environmental training and materials, monitored construction at the site, relocated wildlife from the construction area, developed a stream diversion plan and tree removal plan for CDFG review, reviewed the SWPPP, and conducted restoration activities at the site.
- **Creel Census Surveys, California Department of Water Resources (2004-2005), Project Manager/Biologist.** In an effort to obtain information on species composition and angler usage on DWR waterways, Mr. Huntley managed creel census surveys at three locations in southern California. These included Castaic Lake, Pyramid Lake, and Piru Creek. Piru Creek is located in the Angeles National Forest and contains habitat for the endangered arroyo toad. Creel surveys are supporting analysis currently underway to restore natural flows on Middle Piru Creek to benefit populations of arroyo toad in the National Forest.

- **Rare Plant Surveys and Tree Report for the Lower Reach River Supply Conduit, Los Angeles Department of Water and Power (2006), Biologist.** Mr. Huntley managed and conducted rare plant surveys and a comprehensive tree inventory along a 14-mile water pipeline corridor.
- **Owens Gorge Re-watering Project IS/MND, Los Angeles Department of Water & Power (2006), Biologist.** Mr. Huntley prepared the biology section of the IS/MND to address potential impacts to sensitive plants and wildlife along the Owens Gorge near Bishop. This project involves the restoration of flows to a previously de-watered section of the Owens Gorge.
- **Arundel Barranca Habitat Restoration Plan, Ventura County Flood Control District (2005), Biologist.** Mr. Huntley developed a planting schematic for a 3000-foot section of existing flood control channel as part of the proposed Arundel Barranca flood control channel plan.
- **Piru Creek Repairs Project IS/MND, California Department of Water Resources, Biologist.** Mr. Huntley completed sections of the US Forest Service Biological Assessment/Biological Evaluation, and biological technical report for the Piru Creek Repairs Project. In addition, Mr. Huntley has conducted sensitive species surveys and coordinated with CDFG, USFS and RWQCB regarding permits and sensitive species issues.
- **Compliance and Mitigation Development, California Public Utilities Commission, State Lands Commission, California Department of Water Resources, Biologist.** Working with technical experts Mr. Huntley developed mitigation measures for a number of State and federal projects including the Kinder Morgan pipeline, Santa Ana pipeline and Viejo transmission line project.
- **Hollywood Reservoir Pump Station Upgrade IS/MND, Los Angeles Department of Water and Power Biologist.** Mr. Huntley conducted biological surveys of the lower Hollywood Hills pump station as part of a planned upgrade of the Los Angeles water system and completed the biological resource section of the Initial Study and Mitigated Negative Declaration.
- **Lake Skinner Filtration Plant, Metropolitan Water District, Biologist.** Mr. Huntley conducted biological surveys and completed a biological assessment at the Lake Skinner Filtration Plant to assist Metropolitan in obtaining streambed alteration, regional water, and US Army Corps of Engineers permits.
- **Los Angeles County Drainage Area (LACDA), US Army Corps of Engineers, Environmental Monitor & Biological Assessment.** Mr. Huntley conducted inspections of Los Angeles County Drainage Area levee wall expansions for improved flood control. Also conducted Biological Assessments for proposed project changes.
- **Las Virgenes Municipal Water District IS/MND, Biologist.** Mr. Huntley conducted site surveys for sensitive plants and animal species for potential water pipeline expansion. Prepared detailed vegetation maps and site assessment documenting site botany and reviewed Biological Assessment for the site.
- **Dent Drain Permit Support, Ventura River, Ventura County Flood Control District, Biologist.** Mr. Huntley conducted site surveys for sensitive plants and animals and prepared Biological Assessment for proposed construction along the Ventura River.
- **Honda Barranca Permit Support, Ventura County Flood Control District, Biologist.** Mr. Huntley conducted site surveys for sensitive plants and animals and prepared Biological Assessment for two locations proposed for repairs along the Honda Barranca.
- **Arundel Barranca Permit Support, Ventura County Flood Control District, Biologist.** Mr. Huntley conducted site surveys for sensitive species and prepared Biological Assessment for proposed modification to 3000 feet of existing flood control channel.

- **Looking Glass Networks, CPUC, Mitigation Review and Development.** Mr. Huntley's duties included review and development of mitigation measures for installation of a proposed fiber optic interconnects located across California. Technical areas addressed included biology, soil and water, air quality, and cultural resources.
- **Slender Horned Spineflower Survey, US Army Corps of Engineers, Biologist.** Mr. Huntley conducted sensitive species surveys for the slender-horned spine flower covering approximately 5,300 acres in the Santa Ana River Wash, below the Seven Oaks Dam in San Bernardino County, to assess species impact from changes in hydrology once the Seven Oaks Dam is operational. The survey and mapping required extensive use of GPS equipment for the mapping of transects surveyed and the location of spine flower Populations.
- **INS Air Station, Otay Mesa Biological Assessment, US Army Corps of Engineers, Biologist.** Mr. Huntley conducted sensitive plant and animal surveys and prepared biological assessment for proposed and alternative station sites, including preparation of detailed vegetation maps.
- **Visalia Land Fill Biological Assessment, Biologist.** Surveyed potential expansion sites for sensitive biological species including San Joaquin kit fox, burrowing owls, and several endangered plant species. Prepared Biological Assessment for sensitive and plant and wildlife species.
- **Rancho Cucamonga, Biologist.** Mr. Huntley conducted site surveys for sensitive plants species for site suitable for future wetland revegetation. Prepared detailed vegetation maps and site assessment documenting site botany.

Selected Technical Experience/Training and Certifications

- SWPPP trained 2006
- California Energy Commission Outstanding Performance Award, 2001
- CDFG Scientific Collecting Permit for pond turtle and garter snake.
- Certified Caltrans Horizontal Directional Drilling Inspector 2001
- Desert Tortoise Handling Workshop, Ridgecrest California 2001
- CEC Expert Witness Training 2001
- Railroad Right-of-Way Safety Training 2002
- Small boat handling, licensed and certified since 1993
- Research Scuba-diving certification and training since 1989

DECLARATION OF GEOFFREY LESH

I, **Geoffrey Lesh** declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division as a **Mechanical Engineer**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on **Hazardous Materials Management**, on **Worker Safety / Fire Protection**, and on **Appendix BIO1 – Biological Resources Risk Assessment of Avian Exposure to Concentrated Solar Radiation** for the **Hidden Hills Solar Electric Generating System [HHSEGS] (11-AFC-2)** project based on my independent analysis of the Application for Certification and any supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 10/30/2012 Signed: _____

At: Sacramento, California

A handwritten signature in black ink, appearing to read "Geoffrey Lesh", written over a horizontal line.

Geoffrey Lesh, PE

WORK HISTORY

California Energy Commission Mechanical Engineer 2002 - Current

- Analyze siting permit applications for gas-fired and solar-thermal power plants in the technical areas of hazardous materials management, fire safety, security, and worker safety plans
- Provide written and oral expert witness testimony at Commission Hearings on power plant fire protection plans, risk assessments, and adequacy of local fire departments
- Recommend mitigations as needed
- Inspect power plants during construction and operational phases
- Investigate accident, fire, and hazardous materials incidents at power plants

Self-Employed Independent Investor 2000 - 2002

- Wrote market analysis computer software

Read-Rite Corp Wafer Engineering Manager 1994 - 2000

- Designed and developed wafer manufacturing processes for computer data storage systems. Managed team of engineers and technicians responsible for developing wet and dry chemical processes for manufacturing, including process and safety documentation
- Managed product line process and equipment selection for manufacturing processes
- Processes included vacuum processed metals and ceramics, annealing, grinding-polishing, plating, etching, encapsulation, process troubleshooting, and SPC reporting

Dastek Corp (Komag Joint Venture Start-up) Wafer Engineering Manager 1992 - 1994

- Developed wafer processes for new-technology recording head for hard disk drives
- Managed team of engineers and technicians
- This position included start-up of wafer fab, including line layout, purchase, installation, and startup of new process equipment, etc.

Komag, Inc Alloy Development Manager 1989 - 1992

- Developed new vacuum-deposited recording metal alloys
- Responsible for planning and carrying-out tests, designing experiments, analyzing results, managing test lab conducting materials characterizations
- Extensive process modeling, experiment design and data analysis

Verbatim Corp (Kodak) Process Development Manager 1983 - 1989

- Mechanical engineering for computer disk manufacturing, including product, process, and equipment including metal-ceramic-plastic processes for optical disk development
- Production processes included metal plating, metal evaporation, reactive sputtering, laser-based photolithography, injection molding
- Steering Committee Member, Center for Magnetic Recording Research, UC San Diego
- Steering Committee Member, Institute for Information Storage Technology, Santa Clara University

IBM Corp Mechanical/Process Engineer 1977 - 1983

- Product and process development for photocopiers, semiconductors, and computer data tape-storage systems

EDUCATION

Stanford University, Master of Science Degree	Materials Science and Engineering
UC-Berkeley, Bachelor of Science Degree (Double Major)	Mechanical Engineering, Materials Science and Engineering
University of Santa Clara, Graduate Certificate	Magnetic Recording Engineering

PROFESSIONAL LICENSES and CERTIFICATIONS

Registered Professional Engineer, California (PE)	Mechanical #M32576 Metallurgical #MT1940
Certified Safety Professional (CSP)	Board of Certified Safety Professionals
Certified Fire Protection Specialist (CFPS)	Certified Fire Protection Specialist Board (NFPA)
Certified Fire and Explosion Investigator (CFEI)	Board of National Association of Fire Investigators
OSHA 40-hr HAZWOPER Hazardous Materials Incident Training	

PROFESSIONAL ASSOCIATIONS

National Fire Protection Association – member
Society of Fire Protection Engineers – Professional-level member
National Association of Fire Investigators - member

PUBLICATIONS

All-Solid Lithium Electrodes with Mixed-Conductor Matrix, J. Electrochem. Soc. 128, 725 (1981).
Proc. Symp. on Lithium Batteries, H.V. Venkatesetty, Ed., Electrochem Soc (1981), p. 467.

PATENTS

Method of Preparing Thermo-Magneto-Optic Recording Elements, US Patent# 4,892,634, (assigned to Eastman Kodak Co.)

Geoffrey Lesh, PE

WORK HISTORY

California Energy Commission Mechanical Engineer 2002 - Current

- Analyze siting permit applications for gas-fired and solar-thermal power plants in the technical areas of hazardous materials management, fire safety, security, and worker safety plans
- Provide written and oral expert witness testimony at Commission Hearings
- Recommend mitigations as needed
- Inspect power plants during construction and operational phases
- Investigate accident, fire, and hazardous materials incidents at power plants

Self-Employed Independent Investor 2000 - 2002

- Wrote market analysis computer software

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- This position included start-up of wafer fab, including line layout, purchase, installation, and startup of new process equipment, etc.

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- Steering Committee Member, Institute for Information Storage Technology, Santa Clara University

IBM Corp Mechanical/Process Engineer 1977 - 1983

- Product and process development for photocopiers, semiconductors, and computer data tape-storage systems

EDUCATION

Stanford University, Master of Science Degree	Materials Science and Engineering
UC-Berkeley, Bachelor of Science Degree (Double Major)	Mechanical Engineering, Materials Science and Engineering
University of Santa Clara, Graduate Certificate	Magnetic Recording Engineering

PROFESSIONAL LICENSES and CERTIFICATIONS

Registered Professional Engineer, California (PE)	Mechanical #M32576 Metallurgical #MT1940
Certified Safety Professional (CSP)	Board of Certified Safety Professionals
Certified Fire Protection Specialist (CFPS)	Certified Fire Protection Specialist Board (NFPA)
Certified Fire and Explosion Investigator (CFEI)	Board of National Association of Fire Investigators
OSHA 40-hr HAZWOPER Hazardous Materials Incident Training	

PROFESSIONAL ASSOCIATIONS

National Fire Protection Association – member
Society of Fire Protection Engineers – Professional-level member
National Association of Fire Investigators - member

PUBLICATIONS

All-Solid Lithium Electrodes with Mixed-Conductor Matrix, J. Electrochem. Soc. 128, 725 (1981).
Proc. Symp. on Lithium Batteries, H.V. Venkatesetty, Ed., Electrochem Soc (1981), p. 467.

PATENTS

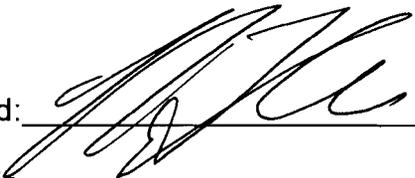
Method of Preparing Thermo-Magneto-Optic Recording Elements, US Patent# 4,892,634, (assigned to Eastman Kodak Co.)

DECLARATION OF RICK TYLER

I, **Rick Tyler** declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division as a **Sr. Mechanical Engineer**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I supervised and or prepared staff's testimony on **Hazardous Materials Management, on Worker Safety / Fire Protection, and on Appendix BIO1 – Biological Resources Risk Assessment of Avian Exposure to Concentrated Solar Radiation** for the **Hidden Hills Solar Electric Generating System [HHSEGS] (11-AFC-2)** project based on my independent analysis of the Application for Certification and any supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 10/30/12 Signed: 
At: Sacramento, California

RICK TYLER

Associate Mechanical Engineer

CALIFORNIA ENERGY COMMISSION

EDUCATION B.S., Mechanical Engineering, California State University, Sacramento. Extra course work in Statistics, Instrumentation, Technical Writing, Management; Toxicology, Risk Assessment, Environmental Chemistry, Hazardous Materials Management, Noise Measurement, and regulations regarding control of toxic substances.

Near completion of course work necessary to obtain a certificate in hazardous materials management from University of California, Davis.

EXPERIENCE

Jan. 1998-
Present

California Energy Commission - Senior Mechanical Engineer
Energy Facility Siting and Environmental Protection Division

Responsible for review of Applications for Certification (applications for permitting) for large power plants including the review of handling practices associated with the use of hazardous and acutely hazardous materials, loss prevention, safety management practices, design of engineered equipment and safety systems associated with equipment involving hazardous materials use, evaluation of the potential for impacts associated with accidental releases and preparation and presentation of expert witness testimony and conditions of certification. Review of compliance submittals regarding conditions of certifications for hazardous materials handling, including Risk Management Plans Process Safety Management.

April 1985-
Jan. 1998

California Energy Commission - Health and Safety
Program Specialist; Energy Facility Siting and Environmental Protection Division.

Responsible for review of Public Health Risk Assessments, air quality, noise, industrial safety, and hazardous materials handling of Environmental Impact Reports on large power generating and waste to energy facilities, evaluation of health effects data related to toxic substances, development of recommendations regarding safe levels of exposure, effectiveness of measures to control criteria and non-criteria pollutants, emission factors, multimedia exposure models. Preparation of testimony providing Staff's position regarding public health, noise, industrial safety, hazardous materials handling, and air quality issues associated with proposed power plants. Advise Commissioners, Management, other Staff and the public regarding issues related to health risk assessment of hazardous materials handling.

Nov. 1977-
April 1985

California Air Resources Board - Engineer (last 4 years Associate level)

Responsible for testing to determine pollution emission levels at major industrial facilities; including planning, supervision of field personnel, report preparation and case development for litigation; evaluate, select and acceptance-test instruments prior to purchase; design of instrumentation systems and oversight of their repair and maintenance; conduct inspections of industrial facilities to determine compliance with applicable pollution control regulations; improved quality assurance measures; selected and programmed a computer system to automate data collection and reduction; developed regulatory procedures and the instrument system necessary to certify and audit independent testing companies; prepared regulatory proposals and other presentations to classes at professional symposia and directly to the Air Resources Board at public hearings. As state representative, coordinated efforts with federal, local, and industrial representatives.

PROFESSIONAL
AFFILIATIONS/
LICENSES

Past President, Professional Engineers in California
Government Fort Sutter Section;
Past Chairman, Legislative Committee for Professional Association of Air Quality Specialists. Have passed the Engineer in Training exam.

PUBLICATIONS,
PROFESSIONAL
PRESENTATIONS
AND
ACCOMPLISHMENTS

Authored staff reports published by the California
Air Resources Board and presented papers regarding
continuous emission monitoring at symposiums.

Authored a paper entitled "A Comprehensive Approach to Health Risk Assessment", presented at the New York Conference on Solid Waste Management and Materials Policy.

Authored a paper entitled "Risk Assessment A Tool For Decision Makers" at the Association of Environmental Professionals AEP Conference on Public Policy and Environmental Challenges.

Conducted a seminar at University of California, Los Angeles for the Doctoral programs in Environmental Science and Public Health on the subject of "Health Risk Assessment".

Authored a paper entitled "Uncertainty Analysis -An Essential Component of Health Risk Assessment and Risk Management" presented at the EPA/ORNL expert workshop on Risk Assessment for Municipal Waste Combustion: Deposition, Uncertainty, and Research Needs.

Presented a talk on off-site consequence analysis for extremely hazardous materials releases. Presented at the workshop for administering agencies conducted by the City of Los Angeles Fire Department.

Evaluated, provided analysis and testimony regarding public health and hazardous materials management issues associated with the permitting of more than 20 major power plants throughout California.

Developed Departmental policy, prepared policy documents, regulations, staff instruction, and other guidance documents and reference materials for use in evaluation of public health and hazardous materials management aspects of proposed power plants.

Project Manager on contracts totaling more than \$500,000.

RES.RT

DECLARATION OF
Christina Snow

I, Christina Snow, declare as follows:

1. I am presently employed by the California Energy Commission in its Siting, Transmission and Environmental Protection Division as a Planner II.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on the **Land Use** section of the **Final Staff Assessment** for the **Hidden Hills Solar Electric Generating Station** Application for Certification (AFC), based on my independent analysis of the AFC, supplements, data, documents, analysis and testimony from other staff and reliable sources, and based upon my own professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 2, 2012 Signed: Christina Snow

At: Sacramento, California

Christina Snow

PLANNING PROFESSIONAL Environmental • Land Use • Transportation

CALIFORNIA ENERGY COMMISSION, SACRAMENTO, CA

2010 to PRESENT

PLANNER II

Review and analyze the Application for Certification (AFC) for projects submitted by applicants in the areas of land use, visual, alternatives and traffic. Prepare staff analysis and provide staff supporting documentation and testimony for proposed projects during the environmental review process. Review submittals for approved projects to determine compliance with the approved AFC and Conditions of Certification.

PLANNER II (2010-2011)

Processed amendments for operational power plants: Included the review of existing Conditions of Certification, preparation of the analysis and other supporting documentation for management and the California Energy Commission. Managed projects and coordinated with applicants, technical specialists and the public to deliver appropriate determination in a timely manner under the CEQA regulatory program. Presented analysis and made recommendations regarding project approval to the Energy Commission at hearings.

PLACER COUNTY, AUBURN, CA

2006 to 2010

SENIOR PLANNER

Process various entitlement applications including use permits, sign permits, design review, and tree and grading permits. Researched and analyzed application materials to determine appropriate project requirements according to County, State and Federal regulations leading to the preparation of environmental documents, regulatory permit requirements, staff reports, PowerPoint presentations, conditions of approval and other supporting documents for public hearings (Zoning Administrator, Planning Commission and Board of Supervisors). Provided environmental analysis assistance to Planning staff. Assisted in the preparation of the Placer County Conservation Plan (Habitat Conservation Plan/Natural Communities Conservation Plan), which included extensive coordination with stakeholders, preparation of agendas and meeting minutes, providing guidance on pertinent issues, coordination of staff and sub-consultants, re-writing portions of the plan, prioritization of work elements and communication with the public and stakeholders.

LSA ASSOCIATES, INC., ROCKLIN, CA

2005 to 2006

SENIOR ENVIRONMENTAL PLANNER

Responsible for managing and writing NEPA/CEQA environmental documents for transportation and development projects (private and public sector). Managed and administered workload to assistant planner(s) and staff biologist. Involved in all aspects of technical reports developed for environmental document and analysis.

CALIFORNIA DEPARTMENT OF TRANSPORTATION, SACRAMENTO, CA

1993 to 2005

ASSOCIATE ENVIRONMENTAL PLANNER/COORDINATOR (2002-2005)

Acted as lead for environmental review and managed the timely completion of project delivery milestones and products essential to the environmental approval phase of transportation projects. Examined assigned transportation projects to determine level of environmental documentation, associated technical studies and other appropriate courses of action in accordance with NEPA and CEQA. Prepared environmental documents for projects, which included researching, gathering and compiling information, analyzing and interpreting data and developing formats to present and display data. Proposed solutions and provided information on environmental issues while working effectively with others in an interdisciplinary team setting. Participated in public workshops, regulatory meetings, external project meetings and internal management meetings regarding environmental information, solutions and other pertinent environmental issues.

- Worked extensively on the final Environmental Impact Statement/Report for the Lincoln Bypass overseeing and participating in completion of significant milestones including: Biological Assessments, NEPA 404/MOU Least Environmentally Damaging Practicable Alternative (LEDPA) concurrence, CWA 404 permit application submittal, FESA Section 7 formal consultation and draft Habitat Mitigation and Monitoring Plan.

ASSOCIATE TRANSPORTATION PLANNER (1999-2002)

Planned, developed, administered, evaluated and monitored transportation plans, programs and projects. Prepared system plans of transportation facilities and services. Participated in environmental review, policy development, implementation strategies and analyzed proposed policies and legislation from other government agencies as it related to the development of the California Transportation Plan. Performed and evaluated transportation planning research. Participated as a departmental representative on transportation planning issues at inter- and intradepartmental meetings and public or private meetings and hearings. Facilitated workshops designed to obtain public input on transportation issues within Los Angeles area for incorporation into the development of the California Transportation Plan.

PROFESSIONAL DEVELOPMENT/EDUCATION

Professional Development/Training:

Alternatives and Cumulative Impacts, Subdivision Map Act, Oak Woodland Planner's Workshop, Design Review, Implementing SB375, Successful CEQA Compliance, Environmental Planning Academy, Project Management, Boundaries of Local Governments, Local Government Planning, Planning Academy, Community Impact Assessment Workshop, Total Quality Management, Managing Yourself on the Job, Arcview, Comprehensive Financial Management Workshop, FHWA Statewide Transportation Planning, Dreamweaver Web Application, Governmental Accounting, Highway Capacity Manual, Intergovernmental Review (IGR/CEQA), and Business Writing.

Relevant Coursework – U.C. Davis Extension:

Environmental Planning and Site Analysis, Financial Aspects of Planning, Planning in California: Overview and Update, Professional Planning Practice and Communication, CEQA compliance, Subdivision Map Act, Design Review.

Education:

Sacramento State University, 1993 - B.S. in Accountancy

**DECLARATION OF
SHAHAB KHOSHMAHRAB**

I, **SHAHAB KHOSHMAHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Siting, Transmission, and Environmental Protection Division as a **SENIOR MECHANICAL ENGINEER**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I participated in the preparation of the staff testimony on **Power Plant Efficiency for Hidden Hills Solar Electric Generating System** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 10/30/2012

Signed: 

At: Sacramento, California

**DECLARATION OF
SHAHAB KHOSHMAHRAB**

I, **SHAHAB KHOSHMAHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Siting, Transmission, and Environmental Protection Division as a **SENIOR MECHANICAL ENGINEER**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I participated in the preparation of the staff testimony on **Facility Design** for **Hidden Hills Solar Electric Generating System** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 10/30/2012

Signed: 

At: Sacramento, California

DECLARATION OF SHAHAB KHOSHMAHRAB

I, **SHAHAB KHOSHMAHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Siting, Transmission, and Environmental Protection Division as a **SENIOR MECHANICAL ENGINEER**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I participated in the preparation of the staff testimony on **Noise and Vibration** for **Hidden Hills Solar Electric Generating System** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 10/30/2012

Signed: 

At: Sacramento, California

**DECLARATION OF
SHAHAB KHOSHMAHRAB**

I, **SHAHAB KHOSHMAHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Siting, Transmission, and Environmental Protection Division as a **SENIOR MECHANICAL ENGINEER**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I participated in the preparation of the staff testimony on **Power Plant Reliability for Hidden Hills Solar Electric Generating System** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 10/30/2012

Signed: 

At: Sacramento, California

Shahab Khoshmashrab
Senior Mechanical Engineer

Experience Summary

Seventeen years experience in the Mechanical, Civil, Structural, and Manufacturing Engineering fields involving engineering and manufacturing of various mechanical components and building structures. This experience includes QA/QC, construction/licensing of electric generating power plants, analysis of noise pollution, and engineering and policy analysis of thermal power plant regulatory issues.

Education

- California State University, Sacramento-- Bachelor of Science, Mechanical Engineering
- Registered Professional Engineer (Mechanical), California

Professional Experience

2001-Current—Senior Mechanical Engineer, Systems Assessment and Facilities Siting—California Energy Commission

Perform analysis of generating capacity, reliability, efficiency, noise and vibration, and the mechanical, civil, and structural aspects of power plant siting cases.

1998-2001—Structural Engineer – Rankin & Rankin

Engineered concrete foundations, structural steel and sheet metal of various building structures including energy related structures such as fuel islands. Performed energy analysis/calculations of such structures and produced both structural plans and detailed shop drawings using AutoCAD.

1995-1998—Manufacturing Engineer – Carpenter Advanced Technologies

Managed manufacturing projects of various mechanical components used in high tech medical and engineering equipment. Directed fabrication and inspection of first articles. Wrote and implemented QA/QC procedures and occupational safety procedures. Conducted developmental research of the most advanced manufacturing machines and processes including writing of formal reports. Developed project cost analysis. Developed/improved manufacturing processes.

DECLARATION OF
Huei-An (Ann) Chu

I, Huei-An (Ann) Chu, declare as follows:

1. I am presently employed by the California Energy Commission in its Siting, Transmission and Environmental Protection Division as an Air Resources Engineer.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on the **Public Health** section of the **Final Staff Assessment** for the **Hidden Hills Solar Electric Generating Station** Application for Certification (AFC), based on my independent analysis of the AFC, supplements, data, documents, analysis and testimony from other staff and reliable sources, and based upon my own professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 2, 2012 Signed: Huei-An Chu

At: Sacramento, California

Huei-An (Ann) Chu

1516 Ninth Street, MS 46, Sacramento, CA 95814
Phone: (916) 6510965, Email: Ann.Chu@energy.ca.gov

EDUCATION

PhD, Environmental Sciences and Engineering, 05/2006
School of Public Health, University of North Carolina at Chapel Hill
Area of Specialization: Environmental Risk Assessment, Environmental Management and Policy, Risk-Based Regulation, Biostatistics, Environmental Epidemiology

MEM, Environmental Management, 05/2000
School of Forestry and Environmental Studies, Yale University, New Haven, CT

MS, Environmental Engineering, 06/1998
National Taiwan University, Taipei, Taiwan

BA, Geography, with honors, 06/1996
National Taiwan University, Taipei, Taiwan

SKILLS

Language: Fluent in Chinese and English.

Computer software and programming skills: HARP, SAS, Stata, Minitab, ArcGIS, ArcView, ArcInfo, Stella, Crystal Ball, ISC, ERMapper, Microsoft Excel, PowerPoint, Word.

WORK EXPERIENCE

Air Resources Engineer, California Energy Commission, 1/12/2012 - Present

- Independently performs responsible, varied analyses assessing air quality and public health impacts of energy resource use and large electric power generation projects in California.
- Model air quality and public health impacts of stationary sources using HARP (Hot Spot Analysis and Reporting Program).
- Identify air quality and public health impacts of stationary sources and measures to mitigate these impacts following California Environmental Quality Act and regulations of US EPA (including the National Environmental Policy Act), ARB, and the Districts.
- Collect, analyze, and evaluate data on the effects of air pollutants and power plant emissions on human health, and the environment.
- Ensure conditions of certification are met and recommending enforcement actions for violations.

Research Associate, Taiwan Development Institute, 10/01/2010 – 12/31/2011

- Provided professional consultation for the environmental risk assessment of Taiwan's techno-industrial development initiatives
- Reviewed the environmental risk assessment reports of Taiwan's techno-industrial development initiatives
- Presented in various distinguished lecturer series about environmental risk assessment

Consultant, Chu Consulting, 08/2007 - 07/2010

- Conducted a cumulative risk assessment to evaluate the risk associated with the emissions of VOCs from a petrochemical plants in southern Taiwan
- Used EPA's ISC3 model (based on Gaussian dispersion model) to simulate the dispersion and deposition of VOCs from this petrochemical plant to the neighboring areas, then used ArcGIS to spatially combine the population data and VOC simulation data (and further calculated risks)

- Built a framework of risk-based decision making to set the emission levels of VOCs to reduce people's exposure and the risk of experiencing health problems
- Presented in conference: SRA 2007
- Awarded: CSU-Chico BBS Faculty Travel Funds (2007)

Environmental Justice Intern, Clean Water for North Carolina (CWFNC), Summer, 2005

- Reviewed and critiqued key state environmental policies and the federal EPA Public Participation Policy.
- Interviewed impacted communities, member organizations of the NC Environmental Justice Network, state policy officials about how those policies are actually implemented.
- Wrote a report about the survey and review of environmental justice needs for key state policies.
- Report Publication: "Achieving Environmental Justice in North Carolina Public Participation Policy" (Aug, 2005).

Volunteer, New Haven Recycles and Yale Recycling, 08/1998 – 05/2000

- Promoted recycling and conservation
- Checked trash cans (chosen randomly) and recycling bins at each entryway of residential college, then gave grades.

Volunteer, Urban Resource Initiative (URI), Summer, 1998

- Planted trees for local community of New Haven for a better and sustainable environment

RESEARCH EXPERIENCE**Postdoctoral Research**

Department of Public Health Sciences, University of California, Davis, 07/01/2010 - present

Research advisor: Dr. Deborah H. Bennett and Dr. Irva Hertz-Picciotto

- Work on two projects: NIEHS-funded ***Childhood Autism Risks from Genetics and Environment (CHARGE)*** and EPA-funded ***Study of Use of Products and Exposure Related Behavior (SUPERB)***.
- Perform statistical and quantitative analyses with SAS to analyze collected house dust data and children's urine concentrations of metabolites.
- Conduct exposure assessment to investigate if pesticides, flame retardants, and phthalates are risk factors for children autism.
- Conduct exposure assessment to explore the relationships between children's exposure to phthalate, benzophenone-3 (oxybenzone), triclosan, and parabens, and the use of personal care products.
- Produce scholarly peer-reviewed publications of methodology and findings, and write the final reports of both projects.

Carolina Environmental Program, University of North Carolina at Chapel Hill, 01/01/2006 – 12/31/2006

Research advisor: Dr. Douglas J. Crawford-Brown

- Applied a framework of risk-based decision-making to perchlorate in drinking water. (Awarded: SRA Annual Meeting Travel Award 2006)
- Conducted a material and energy flow analysis (MEFA) to quantify the overall environmental impact of Bank of America operations, and quantitatively analyze the strategies BOA might adopt to reduce these impacts and achieve sustainability. (Report Publication: "Environmental Footprint Assessment")

Doctoral Research, 08/2000-12/2005

Department of Environmental Sciences and Engineering, School of Public Health, University of North Carolina at Chapel Hill

Research advisor: Dr. Douglas J. Crawford-Brown

- Dissertation topic: "**A framework of Risk-Based Decision Making by Characterizing Variability and Uncertainty Probabilistically: Using Arsenic in Drinking Water as an Example**".
- Conducted risk assessment for arsenic in drinking water.
- Conducted theoretical analysis on the variability and uncertainty issues of risk assessment.

- Conducted a meta-analysis to improve dose-response assessment.
- Conducted analytical and numerical analysis to build a new framework of risk-based decision-making which can be applied coherently across the regulation decisions for different contaminants.
- Presented in conferences: APPAM (2004), SRA (2004, 2005 and 2006), DESE Seminar (2005), CEP Symposium on Safe Drinking Water (2006).
- Awarded: SRA Annual Meeting Student Travel Award (2004 & 2005), UNC-CH Graduate School Travel Grants (2004), UCIS Doctoral Research Travel Awards (2002).

Master's Research

School of Forestry and Environmental Studies, Yale University, 08/1999 - 06/2000

Research advisor: Dr. Xuhui Lee

- Master's project: "**Forest Stand Dynamics and Carbon Cycle**".
- Research project: "Monitoring Forest CO₂ Uptaking"
- Used remote sensing (ERMapper) to investigate the role of forest in the uptake of CO₂.
- Awarded from Teresa Heinz Scholars for Environmental Research Program (2000) and Klemme Award (1999).

Graduate Institute of Environmental Engineering, National Taiwan University, 06/1996 - 06/1998

Research advisor: Dr. Shang-Lien Loh

- Master's thesis: "**The Loads of Air Pollutants from Urban Areas on a Neighboring Dam and its Water Quality**"
- Research Projects: "Research on Air Pollutant Deposition in Urban Areas" and "the Fate and Flow of Recyclable Materials"
- Used Gaussian's Dispersion model (ISC3) to investigate the loads of air pollutants on dam water.

TEACHING EXPERIENCE

Lecturer

Department of Environmental Studies, California State University at Sacramento

- Environmental Politics and Policy, Fall 2011

Department of Geological & Environmental Science, California State University at Chico

- Environmental Risk Assessment, Spring 2009 & 2010
- Applied Ecology, Spring 2008
- Pollution Ecology, Fall, 2007

Department of Geography & Planning, California State University at Chico

- Seminar in Applied Geography & Planning – Environmental Regulation and Policy, Fall, 2007

Department of Forestry and Environmental Resources, North Carolina State University

- Environmental Regulation, Fall, 2006

Teaching Assistant

Department of Environmental Sciences and Engineering, UNC-Chapel Hill

- Environmental Risk Assessment, Spring, 2002
- Introduction to Environmental Science, Fall, 2001
- Analysis and Solution of Environmental Problems, Fall, 2001

Lab Instructor

Department of Environmental Sciences and Engineering, UNC-Chapel Hill

- Biology for Environmental Science, Fall, 2000

Graduate Institute of Environmental Engineering, National Taiwan University

- Water Quality Analysis, Fall, 1997

AWARDS and HONORS

- CSU-Chico BBS Faculty Travel Funds, 2007
- Member of Society of Risk Analysis (SRA), 2006-2008
- SRA Annual Meeting Student Travel Award, 2004-2006
- UNC-CH Graduate School Travel Grants, 2004
- Member of Association for Public Policy Analysis and Management (APPAM), 2004-2005
- UCIS Doctoral Research Travel Awards, 2002
- Graduate Student Teaching and Research Assistantships, 2000-2005
- Teresa Heinz Scholars for Environmental Research Program, 2000
- Yale Forestry & Environmental Studies, Klemme Award, 1999

PUBLICATIONS (SELECTED LIST)

- Huei-An Chu**, Deborah H. Bennett, Irva Hertz-Picciotto, "Phthalates in relation to autism and developmental delay: Exploratory analyses from the CHARGE Study". (In preparation)
- Huei-An Chu**, Deborah H. Bennett, Irva Hertz-Picciotto, "Personal Care Products: Possible Sources of Children Phthalate Exposure". (In preparation)
- Huei-An Chu** and Douglas J. Crawford-Brown, "A Probabilistic Risk Assessment Framework to Quantify the Protectiveness of Alternative MCLs for Arsenic in Drinking Water", *Journal of American Water Works Association*. (Being revised)
- Huei-An Chu** and Douglas J. Crawford-Brown, "Letter to the Editor: Inorganic Arsenic in Drinking Water and Bladder Cancer: A Meta-Analysis in Dose-Response Assessment", *International Journal of Environmental Research and Public Health*, 2007, 4(4), 340-341.
- Huei-An Chu** and Douglas J. Crawford-Brown, "Inorganic Arsenic in Drinking Water and Bladder Cancer: A Meta-Analysis in Dose-Response Assessment", *International Journal of Environmental Research and Public Health* 2006, 3(4), 316-322.
- S.L. Lo and **H.A. Chu**, "Evaluation of Atmospheric Deposition of Nitrogen to the Feitsui Reservoir in Taipei", *Water Science & Technology*, 2006, 53(2), 337-344.
- CSE Consulting and the UNC Carolina Environmental Program (CEP), "Environmental Footprint Assessment", Report for Bank of America, Aug, 2006.
- Huei-An Chu**, "Achieving Environmental Justice in North Carolina Public Participation Policy", Report for Clean Water for North Carolina (CWFNC), Aug, 2005.
- Huei-An Chu**, "Arsenic and its Health Implications", Report for University Center for International Studies Graduate Travel Awards, 2002.

PRESENTATIONS (SELECTED LIST)

- Guest Speaker, "Human Health Risk Assessment – Arsenic in Drinking Water as an Example". Tunghai University, Taichuang, Taiwan. (December 16th, 2010)
- Guest Speaker, "Environmental Problems in Developing Countries", Course Title: Developing Countries, Department of Economics, CSU-Chico (October 31st, 2008)
- "Cumulative Risk Assessment for Volatile Organic Compounds (VOCs) from Petrochemical Plants in Southern Taiwan". Oral Presentation in Society of Risk Analysis (SRA) 2007 Annual Meeting, San Antonio, TX. (December, 2007)
- Guest Speaker, "Arsenic in Drinking Water", Course Title: Environmental Geology, CSU-Chico. (November 13th, 2007)
- "Risk-Based Environmental Regulation for Arsenic in Drinking Water", Oral Presentation in Department of Environmental Health Seminar, East Tennessee State University (February 2nd, 2007)
- "A Framework of Risk-based Decision Making by Characterizing Variability and Uncertainty Probabilistically: Using Arsenic in Drinking Water as an Example", Oral Presentation in Society of Risk Analysis (SRA) 2006 Annual Meeting, Baltimore, MD. (December, 2006)

"A New Policy Tool to Choose Water Quality Goals under Uncertainty", Poster Presentation in Society of Risk Analysis (SRA) 2006 Annual Meeting, Baltimore, MD. (December, 2006)

"A framework of Risk-Based Decision Making by Characterizing Variability and Uncertainty Probabilistically: Using Arsenic in Drinking Water as an Example", Oral Presentation for National Center for Environmental Assessment (NCEA), Environmental Protection Agency (EPA). (October 26th, 2006)

"Probabilistic Risk Assessment for Arsenic in Drinking Water", Poster Presentation in Carolina Environmental Program (CEP) 2006 Symposium on Safe Drinking Water, Chapel Hill, NC. (March, 2006)

"Probabilistic Risk and Margins of Safety for Water Borne Arsenic", Poster Platform Presentation in Society of Risk Analysis (SRA) 2005 Annual Meeting, Orlando, FL. (December, 2005)

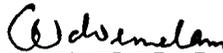
"Using Meta-Analysis in Dose-Response Analysis – Risk Assessment of Arsenic in Drinking Water as an Example", Poster Platform Presentation in Society of Risk Analysis (SRA) 2004 Annual Meeting, Palm Springs, CA. (December, 2004)

DECLARATION OF
Dr. Obed Odoemelam

I, Obed Odoemelam, declare as follows:

1. I am presently employed by the California Energy Commission in its Siting, Transmission and Environmental Protection Division as a Staff Toxicologist.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on the **Transmission Line Safety and Nuisance** section of the **Final Staff Assessment** for the **Hidden Hills Solar Electric Generating Station** Application for Certification (AFC), based on my independent analysis of the AFC, supplements, data, documents, analysis and testimony from other staff and reliable sources, and based upon my own professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 2, 2012 Signed: 

At: Sacramento, California

RESUME

DR. OBED ODOEMELAM

EDUCATION:

- 1979-1982 University of California, Davis, California. Ph.D., Ecotoxicology
- 1976-1978 University of Wisconsin, Eau Claire, Wisconsin. M.S., Biology.
- 1972-1976 University of Wisconsin, Eau Claire, Wisconsin. B.S., Biology

EXPERIENCE:

1987

The Present: California Energy Commission. Staff Toxicologist.

Responsible for the technical oversight of staffs from all Divisions in the Commission as well as outside consultants or University researchers who manage or conduct multi-disciplinary research in support of Commission programs. Research is in the following program areas: Energy conservation-related indoor pollution, power plant-related outdoor pollution, power plant-related waste management, alternative fuels-related health effects, waste water treatment, and the health effects of electric and magnetic fields. Serve as scientific adviser to Commissioners and Commission staff on issues related to energy conservation and transmission line health, safety, and nuisance. Serve on statewide advisory panels on issues related to multiple chemical sensitivity, ventilation standards, electric and magnetic field regulation, health risk assessment, and outdoor pollution control technology. Testify as an expert witness at Commission hearings and before the California legislature on health issues related to energy development and conservation. Review research proposals and findings for policy implications, interact with federal and state agencies and industry on the establishment of exposure limits for environmental pollutants, and prepare reports for publication.

1985-1989 California Energy Commission.

Responsible for assessing the potential impacts of criteria and non-criteria pollutants and hazardous wastes associated with the construction, operation and decommissioning of specific power plant projects. Testified before the Commission in the power plant certification process, and interacted with federal and state agencies on the establishment of environmental limits for air and water pollutants.

1983-1985 California Department of Food and Agriculture.

Environmental Health Specialist.

Evaluated pesticide registration data regarding the health and environmental effects of agricultural chemicals. Prepared reports for public information in connection with the eradication of specific agricultural pests in California.

**DECLARATION OF
James Adams**

I, **James Adams**, declare as follows:

1. I am presently employed by the California Energy Commission in the **Environmental Office** within the **Siting, Transmission and Environmental Protection Division** as a **Planner II**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on **Growth-Inducing Impacts** in the **Socioeconomics** section of the **Hidden Hills Solar Electric Generating Station Final Staff Assessment**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 10/30/12

Signed: James Adams

At: Sacramento, CA

James S. Adams
Environmental Office
Siting, Transmission and Environmental Protection Division
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5504
PH (916) 653-0702, FAX (916) 651-8868
Adams, Jim@energy.ca.gov

5/1999

Present **Environmental Planner II**

Review applications for certification to acquire permits from the California Energy Commission to build electric generating power plants. Specific technical fields include traffic and transportation, land use, socioeconomics, and visual resources. Provide technical analysis when requested for the Energy Commission's Integrated Energy Policy Report.

11/1997

Present **Energy and Resource Consultant**

Provide clients with technical expertise on various issues related to natural resource use and development. Recent activities include providing expert testimony before the California Public Utilities Commission regarding decommissioning issues concerning Humboldt Bay, Diablo Canyon and San Onofre nuclear reactors.

9/1994--

10/1997 **Senior Analyst - Safe Energy Communication Council (SECC)**

Responsible for developing and/or implementing campaigns on various energy issues involving the promotion of energy efficiency and renewable energy and advocating less reliance on nuclear power. Managed educational outreach efforts to newspaper editorial writers throughout the U.S. to encourage coverage of energy issues. Participated in meetings and negotiations with key Clinton administration officials, members of Congress and staff, national coalitions, and grassroots organizations on important energy issues (e.g. U.S. Department of Energy Budget for Fiscal Years 1996-1998). Successfully raised \$140,000 from private foundations to support SECC activities.

6/1978--

12/1992 **Principal Consultant - Redwood Alliance**

Provided consulting services to the Alliance; a renewable energy/political advocacy organization. Major responsibilities included managing and/or participating in several interventions/appearances before the California Public Utilities Commission, California Energy Commission, California Legislature, U.S. Congress and the U.S. Nuclear Regulatory Commission. Issues included electric utility planning options, greater reliance on energy efficiency and renewable energy, nuclear power economic analyses, decommissioning cost estimates, and nuclear waste management and disposal.

2/1983--

8/1986 **Natural Resource Specialist**

Assisted private consulting, firms, non-profit corporations and government agencies in various projects related to the enhancement and protection of national forests in Northern California and Southern Oregon. This included contracts with the U.S. Forest Service, Fish and Wildlife Service, National Park Service, the California Coastal Conservancy, and private landowners.

6/1978--

12/1984 **Consultant/Journalist/Paralegal**

Throughout the period of work outlined above, I have written a considerable amount of news articles and reports connected to ongoing-projects and issues of personal interest. The legal/administrative interventions have required extensive paralegal work to support attorneys, and technical expertise to identify and assist consultants. In addition, many of the projects required consulting services and lobbying, at the local, state and federal level whenever necessary, as well as working with the print and television media as appropriate.

From 1978 through 1984 I served on the Board of Directors for two local non-profit agencies devoted to sustainable community development, Redwood Community Development Council and Redwood Community Action Agency (RCAA). I also was hired on staff at RCAA as a natural resource specialist which is explained more fully above. I am proficient with computers, printers, fax machines and related equipment.

EDUCATION

- M.A. Social Science. Political science and natural resources emphasis. California State University at Humboldt. Graduated December 1988.
- B.A. Political Science. Political and economic aspects of natural resource development, with a particular emphasis in forest ecology and appropriate technology. California State University at Humboldt. Graduated June 1978.

Academic

Honors. Member of PI GAMMU MU Honor Society since 1986.

MILITARY SERVICE

7/1969--

9/1975 U.S. Navy. Air Traffic Controller.
Honorable Discharge.

**DECLARATION OF
Steven Kerr**

I, **Steven Kerr**, declare as follows:

1. I am presently employed by **California Energy Commission** in the **Siting, Transmission, and Environmental Protection Division** as a **Planner I**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on **Socioeconomics**, for the **Hidden Hills Solar Electric Generating System (11-AFC-2)**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: October 30, 2012 Signed: original signed by S. Kerr

At: Sacramento, California

Steven Kerr

Professional Experience:

California Energy Commission
January 2012-Present

Sacramento, CA
Planner I

- Review power plant applications and amendments for socioeconomic, land use, transportation, and visual impacts.
- Evaluate projects in accordance with CEQA, the California Energy Commission siting regulations, and federal, state and local laws, ordinances, regulations, standards (LORS).
- Participate in public workshops regarding proposals.
- Write environmental analysis documents.

Thomas P. Kerr Inc.
August 2011-January 2012

Sacramento, CA
Property Manager

- Management of properties and assets throughout California and Oregon.
- Assist in the preparation of mobile home park closure impact report for Port of San Luis.
- Use various software applications to produce and review billing and financial records.
- Work with local agencies to coordinate infrastructure improvements.

Ground(ctrl)
February 2010-August 2011

Sacramento, CA
Director of Customer Support

- Coordinate and provide customer support for A-list musical artist fan clubs, online stores, e-mail marketing, ticketing, aggressive online marketing, and much more.
- Resolve escalated customer support issues, credit card disputes, and Better Business Bureau cases.
- Supervise and train customer support team members and interns.

City of Sacramento
General Services Department
July 2009-February 2010

Sacramento, CA
Customer Service Representative

- Perform concurrently multiple customer service related duties for all City of Sacramento departments by phone/email.
- Interpret and apply City regulations and procedures as applicable to billing, fees, and collections.
- Learn and explain the organization, procedure and operation details of the City.
- Use a variety of business software applications and assess maps.

City of Sacramento
Development Services Department
February 2007-July 2009

Sacramento, CA
Assistant Planner

- Project manager for various residential, commercial, industrial, and office development projects.
- Assist customers with zoning, design review, preservation, environmental, subdivision code, and sign questions, both at the public counter and by phone/email.
- Provide customers with required entitlement information, fee estimates, and accept applications for proposed development projects.
- Review applications and plans for consistency with City Codes, General Plan, and applicable community plans, specific plans and planned unit development guidelines.
- Present projects at interdepartmental meetings and coordinate project review with other city departments and government agencies.
- Present projects at community meetings and work with neighborhood association leaders on controversial projects.
- Brief city council members on controversial projects.
- Write staff reports and conditions of approval.

- Prepare and post legal notices for public hearings.
- Present projects at Zoning Administrator, Planning Commission, and City Council public hearings.
- Create maps using geographic information systems (GIS) software.
- Research development and entitlement histories of parcels.

City of Atascadero
Community Development Department
March 2005-June 2006

Atascadero, CA
Planning Intern

- Prepare environmental review documents.
- Review business licenses and building permits.
- Draft letters and staff reports.
- Respond to questions from the public on planning and zoning related issues.
- Access and update information in GIS and Excel

Education:

2005-2006 California State Polytechnic University, San Luis Obispo, CA
Coursework toward MS in Public Policy

2000-2005 California State Polytechnic University, San Luis Obispo, CA
Bachelor of Science in City and Regional Planning

**DECLARATION OF
Testimony of Richard McCann**

I, **Richard McCann**, declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission, Siting, Transmission and Environmental Protection Division, as a **Socioeconomic Technical Specialist**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on **Socioeconomics** for the **Hidden Hills Solar Electric Generating System Final Staff Assessment** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 1, 2012

Signed: _____



At: Sacramento, California



Academic Background

PhD, Agricultural and Resource Economics, University of California, Berkeley, 1998
MS, Agricultural and Resource Economics, University of California, Berkeley, 1990
MPP, Institute of Public Policy Studies, University of Michigan, 1986
BS, Political Economy of Natural Resources, University of California, Berkeley, 1981
Dissertation: "California's Evolving Water Management Institutions: Markets and Agricultural Water Districts"

Selected Professional Experience

Dr. McCann specializes in environmental and energy resource economics and policy. He has testified before and prepared reports on behalf of numerous federal, state and local regulatory agencies on energy, air quality, and water supply and quality issues. Dr. McCann has been involved in developing and assessing climate change policies and action plans for two decades. He started with Proposition 128 (a.k.a. "Big Green") in 1990 by compiling and analyzing a comprehensive set of statewide and local reduction measures—the first ever such plan. He has continued to conducted large-scale studies on the costs of meeting GHG reduction targets for California, and proposed alternative policy approaches for addressing global climate change issues. He has compiled GHG and fuel use inventories at the local and statewide level. Most recently, he analyzed the AB 32 Scoping Plan and policies for controlling high global warming potential (HGWP) gases. He also critiqued the proposed low carbon fuel standard (LCFS) proposal. He has been developing a scenario-based analytic method to assess vulnerabilities and opportunities arising from uncertainty and risk for designing climate change and renewable energy policies. He also has analyzed other specific GHG reduction measures, including the pumping engine conversions eventually implemented statewide, vehicle fuel choices, community-based environmental programs and incentive-based programs in numerous settings.

Aspen Environmental Group.....2008-present

Regional Economics and Fiscal Impacts

- **Desert Renewable Energy Conservation Plan, California Energy Commission (2011-present).** Developing estimates for cost of implementing different alternatives for managing the environmental consequences from developing renewable power in southeast California. This analysis involves collecting program and project data on environmental mitigation and habitat conservation efforts, and estimating the cost of acquiring land for habitat restoration and rehabilitation.
- **Hidden Hills Solar Energy Generator Fiscal Impacts, California Energy Commission (2012).** Assessing reasonably expected to occur fiscal impacts in Inyo County from constructing and operating the proposed HHSEGS solar photovoltaic utility-scale power projects. The report will be submitted in the AFC docket on behalf of the Commission Staff.
- **Burning Man Festival Environmental Assessment, Black Rock LLC and Bureau of Land Management (2011-present).** Preparing analysis of the socio-economic impacts and contributions in northern Nevada from the annual Burning Man Festival. The analysis is part of environmental assessment prior to BLM renewing Black Rock LLC's permit for the festival.
- **Diesel Powering the U.S. Economy, Diesel Technology Forum (2011).** Prepared a report and presented results on analysis of how production and use of diesel technology affects the U.S.



economy. The analysis relied on supplementing an IMPLAN regional economic model data set with other data sources and reports.

- **Solar Power Plant Fiscal Impacts, San Benito County Planning Department (2010).** Assessed reasonably expected to occur fiscal impacts from constructing and operating the proposed Panoche Valley Solar Farm solar photovoltaic utility-scale power projects.
- **Solar Power Plants Fiscal Impacts, San Luis Obispo County Planning Department (2010).** Assessed reasonably expected to occur fiscal impacts from constructing and operating the proposed California Valley Solar Ranch and Topaz Solar Farm solar photovoltaic utility-scale power projects.
- **Review of AB 32 Proposed Scoping Plan Economic Modeling, Environmental Defense Fund (2008).** Reviewed economic modeling by the California Air Resources Board Staff used to assess the Proposed Scoping Plan to meet greenhouse gas emission reduction goals specified in AB 32.
- **Review of Economic Analysis of Proposed In-Use On-Road Diesel Fleet Regulations, Construction Industry Air Quality Coalition (2008).** Highlighted key issues in CARB Staff analysis if potential health benefits and costs to complying firms for proposed accelerated scrappage and retrofit program.
- **Habitat Restoration Economic Impacts Analysis, Solano County Water Agency (2008-2009).** Prepared an economic and fiscal impact analysis from proposed wetlands conversion and restoration of productive agricultural lands in the Cache Slough area from agricultural and wetlands use in Solano County. Analysis estimated lost agricultural revenues and activity, and changes in revenues and expenditures for affected reclamation districts.

M.Cubed..... 1993-2008

Regional Economics and Fiscal Impacts

- **Construction Fleet Emission Standard Impacts, Construction Industry Air Quality Coalition (2006-2007).** Reviewed ARB Staff regulatory proposal and analysis. Prepared responding economic impact analysis using the ARB’s emission inventory database of 170,000 pieces of equipment.
- **Socio-economic Impacts of Stationary Engine Air Regulations, San Joaquin Valley Agricultural Industries Association (2005).** Testified before the SJVUAPCD on a proposal to change Rule 4702 which would impose emission controls on existing agricultural pumps and other stationary engines. A cost-effectiveness analysis was conducted based on estimated pump populations and regional agricultural characteristics. IMPLAN was used to estimate the regional economic impacts on incomes and jobs.
- **Proposed Tribal Casino Impacts, Elk Valley Rancheria (2004).** Developed a socio-economic regional impact analysis for the casino proposed by the Elk Valley Rancheria in Del Norte County. The analysis included accounting for local substitution effects on the economy and fiscal impacts on local government..
- **Proposed Tribal Casino Impacts, Analytical Environmental Services (2004).** Developed a socio-economic regional impact analysis for the casino proposed by the Timbisha Shoshone in Hesperia, San Bernardino County. The analysis included accounting for local substitution effects on the economy and fiscal impacts on local government, as well as a portrait of tribal socio-economic conditions.
- **Monterey Amendment EIR, California Department of Water Resources (2003-2007).** Evaluated the potential growth inducing impacts from implementing the Monterey Amendment components. This analysis relied on assessing how retail water rates might change under different scenarios, and then estimating the regional economic impacts from those changes.



- **Water Transfer Impact Analysis, Glenn-Colusa Irrigation District (2004).** Evaluated the socio-economic impacts in Glenn and Colusa counties from a proposed water transfer from GCID to the Metropolitan Water District of Southern California (MWDSC).
- **Diesel Phase-Out Impacts, Californians for Sound Fuel Policy (2000).** Estimated the potential economic impacts from adopting statewide policies to phase-out diesel fuel for natural gas.
- **Property Value Impacts from Powerplants, Calpine Corporation (1999).** Analyzed whether residential property values were affected by the announcement of the proposed power project in the vicinity of the site using residential housing sale data. Estimated fiscal impacts on local governments from construction and operation of a new power plant.
- **Proposed Tribal Casino Impacts, Environmental Science Associates (1999).** Developed a socio-economic regional impact analysis for the casino proposed by the Shingle Springs Band of the Miwoks in El Dorado County (now Red Hawk Casino). The analysis included accounting for local substitution effects on the economy and fiscal impacts on local government, as well as a portrait of tribal socio-economic conditions.
- **Regional Forecasting Uncertainty, Western States Petroleum Association (1997).** Reviewed the forecasts used for developing air quality management plans and regulations and highlighted issues that increase uncertainty in these forecasts.
- **Proposed Landfill Impacts, USA Waste (1997).** Evaluated the economic benefits to Riverside County of siting a regional landfill. Assessed the savings and revenues generated for the local waste management district, and the regional economic impacts. Testified before Riverside County Planning Commission on two proposed landfills' economic impacts.
- **Agricultural Land Preservation Analysis, Save Our Agricultural Land (1997).** Testified before County Board of Supervisors on the significance of maintaining a narrow definition of "agricultural land" under Santa Cruz County's Agricultural Preservation ordinance.
- **NGV Impacts, Southern California Gas Co. (1994).** Evaluated regional economic impacts associated with increased use of natural-gas-fueled vehicles in Southern California.
- **CalEPA Evaluation Guidebook, California Air Resources Board (1994).** Developed a handbook for use by California Environmental Protection Agency staff to evaluate reports submitted to CalEPA boards and departments.
- **Agricultural Waste Burning Alternatives Study, California Air Resources Board (1993).** Evaluated crop residue removal and disposal alternatives, such as energy or fiber production, and assessed farm-level and regional economic impacts using a rice farm production model and a computable general equilibrium (CGE) regional economic model of the Sacramento Valley from a ban on agricultural residue burning.

Foster Associates/Spectrum Economics/QED Research1986-1992

Dames & Moore1985-1986

Professional Affiliations

- American Agricultural Economics Association, Association of Environmental and Resource Economists, American Economics Association, Western Economics Association International.
- Member, City of Davis Citizens Electricity Restructuring Task Force
- Member, Western Manufactured Housing Communities Association Utilities Task Force

**DECLARATION OF
Marylou Taylor, PE**

I, **Marylou Taylor**, declare as follows:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Siting Transmission & Environmental Protection Division as an Associate Civil Engineer.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on **Soils and Surface Water** for the Hidden Hills Solar Electric Generating System based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 2, 2012

Signed: Marylou Taylor

At: Sacramento, California

MARYLOU P. TAYLOR, PE

REGISTRATIONS/LICENCES:

California Professional Engineer License # C64353

EDUCATION:

B.S. Civil Engineering
University of California, Davis

PROFESSIONAL HISTORY:

Associate Civil Engineer 2010 to Present

California Energy Commission, Sacramento, CA

Duties within the Water and Soils Unit of the Engineering Office in the Facilities Siting Division include review and evaluation of applications for certification of thermal power plants within the state of California. The focus of the work is on sensitive project sites that may have issues involving groundwater and surface water resources, soil erosion, flooding potential, water quality and plant-derived waste generation and disposal. In addition, evaluate construction, operation and maintenance of the facilities and conduct investigations to determine if violations of the program's regulations, the Energy Commission's conditions of certification, or the California Environmental Quality Act (CEQA) have occurred.

Transportation Engineer, Civil 2000 to 2010

California Department of Transportation (Caltrans), District 3, Sacramento, CA

As Project Engineer in the Office of Design, identified storm water quality issues along public highways within the Tahoe Lake area and designed appropriate features in an effort to preserve and enhance the unique natural environment; and prepared reports evaluating alternatives and proposing a design concept and scope for development and programming.

Designed drainage systems for highways throughout Northern California to comply with Caltrans standards, including: analysis of site hydrology and hydraulic design; storm water management near impaired water bodies; and preparing layouts and construction details for contract plans.

Also performed engineering inspections of State contract construction projects and enforced contractor's compliance with plans and State specifications. Duties include: assisting Resident Engineer in re-designing areas where the contract plans conflicted with field conditions; performing inspections of construction site activities; and managing problems that develop in the field.

**DECLARATION OF
Candace M. Hill**

I, **Candace M. Hill**, declare as follows:

1. I am presently employed by **California Energy Commission** in the **Siting, Transmission, and Environmental Protection Division** as a **Planner II**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on **Traffic and Transportation**, for the **Hidden Hills Solar Electric Generating System (11-AFC-2)**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 7, 2012, 2012 Signed: 

At: Sacramento, California

CANDACE M. HILL

PROFESSIONAL EXPERIENCE

CALIFORNIA ENERGY COMMISSION - December 2009 – Present

Siting, Transmission and Environmental Protection Division, Sacramento, California

Planner II

- Responsible for researching and writing complex technical analyses assessing land use and traffic and transportation implications per the California Environmental Quality Act (CEQA) and related federal, state and local laws and regulations for solar energy projects and gas-fired energy projects.
- Review and comment on approved energy projects for compliance with adopted conditions of certification's.
- Prepare analysis of proposed amendments for existing projects.
- Site visits to projects.

DEPARTMENT OF TRANSPORTATION (Caltrans) – December 2008 – December 2009

Division of Mass Transportation, Sacramento, California

Associate Transportation Planner

- Administered two Federal Transit Administration (FTA) Grant Programs – Job Access and Reverse Commute (JARC) and New Freedom (NF).
- Reviewed and assessed grant proposals, monitored and prepared weekly and bi-weekly status reports for both Programs, managed the day-to-day operations of the grants and budgets for transportation, capital, operating and mobility management grants administered through the Department of Transportation for District 4 and District 5 which covered 14 counties.
- Responded to inquiries from grant recipients and the general public regarding the grants.

DEPARTMENT OF CONSERVATION - May, 2000 – December, 2008

California Geological Survey, Sacramento, California

Associate Planner

- Met with staff of the planning, building, public works and engineering departments of affected cities and counties throughout the State to explain the requirements and implementation of the California Seismic Hazards Mapping Act in the land use development process such as the General Plan, Zoning Code, building process and the California Environmental Quality Act.
- Analyzed and commented on General Plan Draft Safety Elements to incorporate the Seismic Hazard Zone Maps into the Safety Element.

CANDACE M. HILL

- Presented the Seismic Hazard Zone Maps before the State Mining and Geology Board and coordinated with the public affairs office and legislative office regarding the issuance of the Seismic Hazard Zone Maps.
- Maintained a database of affected cities and counties.
- Point person for outreach events.
- Responded to public inquires regarding Zone Maps.

SACRAMENTO COUNTY PLANNING DEPARTMENT July, 1999– May, 2000

Current Planning, Sacramento, California

Associate Planner

- Researched, analyzed and wrote staff reports for land use development proposals.
- Presented staff reports and recommendations for the land use development proposals to the Sacramento County Planning Commission and Sacramento Board of Supervisors.
- Staff Planner for the Cosumnes Community Planning Advisory Council.
- Supervised one Assistant Planner.
- Assisted the public with zoning, planning and general questions via the public counter and telephone.

STANISLAUS COUNTY PLANNING DEPARTMENT – December, 1996 – July 1999

Current Planning, Modesto, California

Associate Planner

- Researched, analyzed and wrote staff reports for land use development proposals.
- Prepared Initial Studies and associated documents per the California Environmental Quality Act.
- Presented staff reports and recommendations for the land use development proposals to the Stanislaus County Planning Commission.
- Assisted the public with zoning, planning and general questions via the public counter and telephone.

IMPERIAL COUNTY PLANNING AND BUILDING DEPARTMENT - October, 1990 – December, 1996

Current Planning, El Centro, California

Planner III

- Researched, analyzed and wrote staff reports for land use development proposals.
- Prepared Initial Studies per the California Environmental Quality Act.
- Assisted the public with zoning, planning and general questions via the public counter and telephone.

EDUCATION

University of California, Riverside

Bachelor of Arts in Administrative Studies – 1989

**DECLARATION OF
John Hope**

I, **John Hope**, declare as follows:

1. I am presently employed by **California Energy Commission** in the **Environmental Protection Office** of the **Energy Facilities Siting Division** as a **Planner II**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on **Traffic and Transportation**, for the **Hidden Hills Solar Energy project**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 12/20/12

Signed: _____



At: Sacramento, California

JOHN HOPE

1516 9th Street, MS 40
Sacramento, California 95814

(916) 654-7119
john.hope@energy.ca.gov

Land Use and Environmental Planner

John Hope has twelve years experience with current and long-range land use planning and environmental planning. He has served the public interest through evaluating economic, social, and environmental issues in communities. He is a skilled advocate effective in presenting professional planning knowledge to interest groups, the public, and political affiliations.

PROFESSIONAL EXPERIENCE

CALIFORNIA ENERGY COMMISSION, Sacramento, California

Environmental Planner II, December 2011 to Current

As part of the Siting, Transmission and Environmental Protection (STEP) division - Environmental Office, I prepare environmental documentation for proposed energy facilities for the Commission as required by the California Environmental Quality Act (CEQA). Specifically, I write technical analyses for facility siting cases and planning studies in the areas of socioeconomic, environmental justice, land use, traffic and transportation, and visual resources, along with and formulate solutions and mitigation unique to each individual energy facility. I provide expert technical expertise and serve as a member of interdisciplinary team that evaluates potential environmental and socioeconomic effects of proposed power plants, policies, and plans for energy development in order to satisfy the requirements of the Warren-Alquist Act and CEQA.

AECOM, Sacramento, California

Noise Analyst, February 2010 to July 2011

I served as assistant project manager, environmental planner, or air quality/noise analyst for various CEQA/NEPA documents. My work focused on preparing environmental setting and impact analysis sections, such as land use, traffic, public services, for projects related to infrastructure improvements, residential development, fairgrounds, industrial expansion, business parks, mixed-use developments, and economic appraisal. I used various modeling techniques along with SoundPLAN, a software-based noise prediction modeling program, to assess project-generated noise levels in an environment. Through the use of SoundPLAN, I graphically mapped and visually evaluated project-generated noise levels based on principles of acoustics. I also used SoundPLAN to model noise maps, design traffic noise mitigation, and predict combined noise levels. My experience in long-range planning also involved preparation of various elements for general plans and community plans.

EDAW | AECOM, Sacramento, California

Associate Environmental Planner, September 2004 to June 2009

I wrote technical sections and managed environmental documents that analyze and describe to the public the potential environmental impacts of implementing development projects, including needed on-site and offsite infrastructure. I supervised preparation of environmental documents utilizing information from the client (i.e., state, county, city) and other professionals (e.g., air quality consultant, traffic engineers) to conduct environmental impact analysis of development projects. I also wrote sections and conducted research for general plans and specific plans. I worked as part of a team in preparing these documents to meet the requirements of state and federal permit regulations. I diligently maintained budgets and worked within stringent schedules as part of managing preparation of environmental and community planning documents with local agencies, cities and counties, and environmental specialists. I prepared scopes of work and proposals for new work opportunities.

STANTEC CONSULTING, Sacramento, California

Project Planner, July 2002 to August 2004

I was responsible for providing land planning and environmental impact analysis in environmental engineering firms with various environmental remediation projects throughout northern California. I conducted hands-on oversight of remediation projects to assess the onsite environmental impacts and analyzed their successfulness. I provided my proficient writing skills through the preparation of site reports

related to remediation projects. I was relied upon to provide my land planning, environmental impact analysis, and entitlement processing expertise.

I was also responsible for providing assistance to land developers through the entitlement process including preparing development applications, preparing due diligence reports, and representation of the project to the public-at-large. I assisted cities and counties with the preparation of environmental documents and the processing of proposed land development projects. I managed the implementation of land development projects including large residential subdivisions, commercial development, public facilities, and business parks by coordinating efforts being pursued by other associates including surveyors, engineers, environmental specialists, public agencies, and the developer themselves. I also wrote technical sections that analyzed the environmental impacts associated with large infrastructure improvement projects and prepared the environmental document articulating the team's findings. Co-workers relied upon me to provide land use and environmental planning expertise towards a team effort.

PACIFIC MUNICIPAL CONSULTANTS, Rancho Cordova, California
Assistant Planner, July 1999 to July 2002

As part of my work experience I evaluated proposed development projects, provided code enforcement, and assisted the public-at-large. I gained experience in long-range planning from diligent researching, and writing technical sections for General Plans and environmental documents.

As part of a team effort, I was responsible for the expedited review and management of proposed development applications through the entitlement process and conducting environmental review while working as a land use planner for the City of Elk Grove. I was responsible for processing and reviewing current planning projects applications such as subdivision maps, use permits, design review applications, staff level discretionary review, and other entitlements as assigned by the Community Development Director. As part of this process, I evaluated proposed projects with the requirements of the municipal code and General Plan, presented development projects, and portrayed issues surrounding the project to decision makers and the public through writing staff reports and articulating my professionalism to Planning Commissions and City Councils. As time went on, I worked my way up for the opportunity to process larger and more complicated development projects.

In addition, I worked on the City of Elk Grove's first General Plan by writing and analyzing all the quantitative and statistical data for the Housing element and administered public meetings and workshops. I wrote the draft Housing Element, started the State certification process with the Department of Housing and Community Development, and assisted with the preparation of other required elements of the General Plan. I also utilized GIS software for manipulating and visually presenting information related to the community.

I gained experience with the environmental impact review process which resulted from analyzing and comprehending technical studies and incorporating their information by writing technical sections for environmental documents and I coordinated the implementation of mitigation monitoring and reporting programs. As my experience with the environmental review process grew, my work ethic allowed me to increase my responsibilities as related to more environmentally controversial projects.

EDUCATION

California Polytechnic State University, San Luis Obispo
Bachelor of Sciences, City and Regional Planning

This program provided a hands-on experience which allowed me to execute environmental impact assessments and site analysis, create site designs, research planning law and ordinances, present to several public and private groups, create graphic presentations, and conduct hands-on field research for specific projects located along the California central coast. I gained knowledge of various land use design concepts through hands-on draft work with computers and graphic tools.

**DECLARATION OF
Gregg Irvin, Ph.D.**

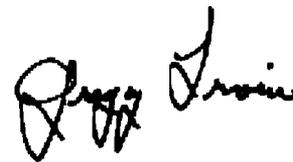
I, Gregg Irvin, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Planner II.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony for the **Visual Resources section** for the **Hidden Hills Solar Electric Generating Station (11-AFC-2)** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: October 30, 2012

Signed: _____



At: Sacramento, CA

GREGG E. IRVIN, PH.D.
 3731 Blossom Heath Road
 Dayton, OH 45419
 937-271-2715

EMPLOYMENT

- 2005-Present President, Spectrus, Ltd.
- 1996-2005 Principal Partner and Director of Operations, Mobium Enterprises, Inc.
- 1994-1997 Executive Director, Assistive Technologies Group
- 1996-2000 Employee Consultant, National Security Studies and Strategies Group,
 Science Applications International Corporation (SAIC), McLean, VA.
- 1993-1996 Assistant Vice President, SAIC, Dayton, OH.
- 1995-1996 Division Manager, Human Systems Technology Division, SAIC
- 1992-1995 Division Manager, Aerospace Systems Division, SAIC
- 1990-1991 Chief Scientist, Human Performance Technology Division, SAIC
- 1989-1990 Senior Scientist, Human Performance Technology Division, SAIC
- 1986-2000 Director, ICON Consultants, Birmingham, AL & Dayton, OH.
- 1985-1989 Senior Research Scientist, Systems Research Laboratories, Dayton, Ohio.
- 1984-1985 Visual Neurophysiologist, Vision Science Research Center,
 University of Alabama Medical School at Birmingham.

EDUCATION

- 1982-1984 National Eye Institute, Postdoctoral Fellow, Electrophysiology,
 Vision Science Research Center, School of Optometry,
 University of Alabama Medical School at Birmingham.
- 1981-1982 Postdoctoral Research Associate, Visual Neurophysiology,
 Department of Physiological Optics, School of Optometry,
 University of Alabama Medical School at Birmingham.
- 1981 Ph.D. Physiological Psychology, Syracuse University.
- 1976 B.A. Psychology, Syracuse University.

AWARDS/FELLOWSHIPS/DISTINCTIONS

- 1995-2003 Adjunct Faculty, Department of Biomedical and Human Factors Engineering,
 Wright State University, Dayton, OH.
- 1982-1984 National Eye Institute, Individual National Research Service Award
- 1979 Behavioral Neurobiology Scholarship, Cold Spring Harbor Research
 Laboratory, Syracuse University School of Engineering, Institute for Sensory
 Research.
- 1978-1980 Graduate Fellowships in Biopsychology (two awards), Syracuse University.
- 1977-1978 Graduate Fellowship in Physiological Psychology, Syracuse University.
- 1976-1977 Research Associate, Visual Psychophysics Laboratory, Syracuse University.

PROFESSIONAL SUMMARY

Dr. Irvin is a sensory neurophysiologist/ psychologist with a multidisciplinary background in visual science related fields including; applied experimental psychology, sensory perception, visual physiology and psychophysics, human systems interface, advanced image processing, human information processing, human perception and performance, mathematical visualization, neurobiology and human factors engineering. Dr. Irvin's focus is on applied technology

development and has 25 years of experience in laser exposure effects and laser hardening technologies.

Dr. Irvin is president of Spectrus, Ltd. Spectrus is a diversified small business providing services in engineering, human factors, neuroscience, physics, chemistry and life sciences. Spectrus develops advanced sensing technologies for indirect view multispectral and hyperspectral applications, which incorporate proprietary spectral mapping principles and (active and passive) frequency agile sensing capabilities. Spectrus also provides sensory modeling, image understanding, computational vision, specialized spectral sampling applications, advanced Human-System Interface development, and multidisciplinary sensing strategy services.

Dr. Irvin has strong leadership and managerial skills with a record of success in leading major research and development programs. This includes Air Force Research Laboratory programs developing physiologically based computer vision systems (stereovision, detection, and texture generation), laser eye and sensor protection, laser optical countermeasures, low-observable technologies, and multispectral adaptive and passive camouflage, concealment and deception technologies. Efforts include developing and interfacing both head-steerable and advanced helmet mounted displays with integrated multisensor fusion capabilities for strategic aircraft, developing imaging architectures, information visualization technologies, and display technologies incorporating specialized chromatic, motion, and texture processing. Contributions to visual science include a model of developmental amblyopia, various models of human visual detection, studies of information transfer to primate visual cortex, and structure-function studies of neuronal morphology and visual information processing. Dr. Irvin's experience and qualifications span basic and applied advanced research and development, and technology transfer and application. Dr. Irvin has been featured in National Geographic "The Sense of Sight" and in a PBS NOVA documentary "The Disguises of War."

EMPLOYMENT EXPERIENCE

Spectrus, Ltd. (2005-Present)

President, Spectrus, Ltd. is an Ohio based Limited Liability Company established in January 2005 and provides consulting services to Government and industry. Dr. Irvin is the president and sole partner in Spectrus, Ltd. Spectrus represents a reorganization of Mobium Enterprises, Inc. and Mobium, Inc., for which Dr. Irvin was the president of both.

Representative Research and Development Efforts at Spectrus:

Visor Laser Eye Protection Ground and Flight Testing Support. (2011-). Program lead to the AFRL Human Effectiveness Directorate, Directed Energy Bioeffects Division, Optical Radiation Branch (RHDO) for the development of all ground and flight testing materials (pre-briefs, pilot questionnaires for visual compatibility and life support equipment compatibility, experimenter materials, eyewear fitting procedures, and data analysis) for the evaluation of laser protection spectacles and visors developed under the Visor Laser Eye Protection, Advanced Technology Demonstration (VLEP ATD) program. Effort includes the testing conduct for the Joint Helmet Mounted Cueing System (JHMCS) LEP visor, the F-35 Joint Strike Fighter LEP visor and spectacle, and the ACC/AMC/AFSOC all-dye daytime and hybrid dye-dielectric nighttime LEP visors.

Security Lighting Development Program. (2011-). Consultant to Acuity Brands Lighting, Inc., Northeast Innovation Center (NEIC) for the development of RGB LED lighting hardware,

software and supporting algorithms for visual, physiological and psychological disruption and disabling human performance effects. Lead developer for strategic architecture design and disruptive algorithm development to support a modular and adaptable security lighting system for a variety of industrial and government applications.

Solar Power Plant Develop for the California Energy Commission. (2010-). Providing analytic and modeling support to Traffic and Transportation, Visual Resources, and Biological Resources for the assessment of the visual impacts of heliostat mirror fields and solar power towers for proposed Solar Electric Generation Facilities (SEGF). Ongoing and past research includes determining the magnitude of visual and thermal effects (e.g., glint, glare, aesthetics, avian mortality), their level of significance, and the development of potential mitigating procedures for the proposed Calico, Rio Mesa, and Hidden Hills SEGFs.

Visor Laser Eye Protection, Advanced Technology Demonstration (VLEP ATD) (2009-). Under the Hardened Materials Research and Survivability Studies (HMRSS) contract developing and integrating advanced laser protection technologies for visors and visor helmet mounted display systems. Efforts include identification and optical performance characterization of laser threat systems and the development of laser hardening goals via engagement modeling and simulation with airborne platforms in representative mission profiles. Supporting absorptive and reflective technology development includes modeling and performance characterization of the absorptive spectra of candidate molecular structures for chemical synthesis, and modeling and analysis of dielectric deposition processes for binocular visor protection performance, stress factors and mechanisms of haze generation. Lead for the development of laser protection designs and their performance evaluation for visors and hybrid visor-spectacle systems with various helmet mounted display systems.

Joint Strike Fighter Field Testing of Laser Eye Protection Devices (2009-2010). Program manager for this effort funded by the Office of the Under Secretary of Defense (Acquisition, Technology & Logistics) OUSD (AT&L) JSF, ASC 640th Aeronautical Systems Squadron under the AFRL/RXPJ Laser Materials Testing contract. Responsibilities included the development and conduct of both laboratory and field testing for JSF LEP spectacle and visor configurations. Laboratory visual psychophysical evaluations included contrast sensitivity, visual acuity and color discrimination. Field evaluations included the development of pre- and de-briefing materials and assessment questionnaires for aircrew in-cockpit evaluations visual compatibility and AFE compatibility and user acceptance. Evaluations were conducted at the Naval Air Station Patuxent River on the F-35 Lightning II STOVL F-35B test jet (BF-4).

Agile Visible and Near Infrared Imaging and Analysis (2011-2012). Program manager for this effort under the Hardened Materials Research and Survivability Studies (HMRSS) contract. Research focused on software and hardware solutions to support the analysis of agile filters and detectors operating in the visible and near-infrared (NIR) spectrums. Component and system characterization for the development and assessment of agile filters and detectors was conducted for filters developed under the Advanced Agile Device Implementation Program (AADI) for uniformity mapping, full aperture optical density, contrast grating MTFs, and haze and scatter measurements. Improved measurement techniques and instrumentation for haze/ scatter classification and assessment were developed. Software development efforts included a variety of image processing and image quality assessment techniques such as the Modulation Transfer Function Area (MTFA), Integrated Contrast Sensitivity (ICS) metric, and the Square-Root

Integral (SQRI) metric. The research effort characterized scatterometry measurements of the cosine corrected Bi-directional transmission functions (BTDF) of various filters for differential scatter distributions. Human visual acuity and contrast sensitivity functions were measured and correlated with the scatterometry distribution classes to establish correlative linkages between human perception and performance and scatter distribution properties.

Hardened Night Vision Goggle Program (2005-2009). As a subcontractor to GDIT designed, performance modeled and field evaluated laser hardening for NVGs. Technologies included Optical Power Limiters (OPLs), Cholesteric Liquid Crystals (CLCs), Complimentary Comb Filters (CCombs), Laser Warning Receivers, and fixed filters including Out-of-Band and Flip-in. An extensive laboratory NVG test bed has been developed at AFRL/RXPJ to characterize laser exposure effect and evaluate various laser hardening technologies both in terms of their laser hardening effectiveness and impact on sensor and human-systems performance. Modeling and analysis was conducted to define candidate integrated System Level configurations capable of laser hardening NVGs against both fixed and agile laser threat systems. Several prototype Systems Level configurations were subsequently field evaluated at the WPAFB Laser Infrared Development (LID) range. The field environment provided an opportunity for mission representative levels of illumination, realistic atmospheric turbulence effects, the recording of real-world calibrated targets, and an opportunity for operator psychophysical performance assessments. The experiments conducted enabled an assessment of the laser protection levels provided by the hardening technologies and an assessment of the performance impacts of the technology without and with laser exposure.

Raytheon CV-22 Helmet Mounted Display. (2011) Subcontract to Raytheon for proposal development and review for the Boeing Defense Space and Security Division CV-22 Helmet Mounted Cueing System (HMCS). Activities included HDM architecture and functional capabilities for HMD interfaces, processing and control equipment, NVG capability, resolution, field of view, eye relief and exit pupil, display brightness and internal contrast ratios, luminance uniformities, and helmet tracking, slew and acceleration rates, latency and readout stability.

Advanced Optical Coatings (2007-2010). Designed, performance modeled and field evaluated distributed (spectacle and visor) laser eye protection for the F-35 Joint Strike Fighter. The Advanced Optical Coatings Monolithic Demonstration (AOC Mono Demo) was a design and manufacturing demonstration for a monolithic (non-laminated) LEP spectacle. Additionally, the AOC Mono Demo addressed the LEP design requirements for the F-35 Joint Strike Fighter. Due to visual compatibility issues with the JSF Helmet Mounted Display System (HMDS) the LEP solution required a hybrid approach in which the LEP is split between the spectacle and a visor. A variety of spectacle and visor designs were developed, manufactured, characterized, and both lab and field evaluated.

All-Dye Daytime Army LEP Spectacle Demonstration (2009). This Demonstration represented the first design and prototype manufacturing initiative for an all-dye spectacle which integrated a new visible dye, TBAF-1, into the laser hardening solution space. The laser hardening and visual performance requirements for an Army LEP acquisition were adopted as the demonstration challenge. An optimized all-dye design was developed for a daytime application and was successfully manufactured and evaluated. The demonstration was successful as a prototype manufacturing initiative for an all-dye spectacle which integrated the new TBAF-1 dye into the laser hardening solution space.

**DECLARATION OF
Melissa Mourkas, ASLA**

I, Melissa Mourkas, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Planner II.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony for the **Visual Resources section** for the **Hidden Hills Solar Electric Generating Station (11-AFC-2)** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: October 30, 2012

Signed: 

At: Sacramento, CA

MELISSA MOURKAS, ASLA

EDUCATION

MASTER OF ARTS, LANDSCAPE DESIGN & PLANNING, 1994

CONWAY SCHOOL OF LANDSCAPE DESIGN, CONWAY, MASSACHUSETTS

Graduate landscape design program providing professional training in site design and land-use planning. Curriculum emphasis is on sustainable landscape planning and design. Graduate projects included: Master Plan for a 45-acre historic resort, original landscape designed by F.L. Olmsted and Performance Standards for a proposed industrial park.

BACHELOR OF ARTS, HISTORY OF ARCHITECTURE & ART, 1981

SCRIPPS COLLEGE, CLAREMONT, CALIFORNIA

Major studies in Art and Architectural History, Urban Development. Senior thesis: documentation and analysis of the innovative residential designs and construction techniques of California modern architect Rudolf M. Schindler. Minor studies in Art and the Humanities.

PROFESSIONAL EXPERIENCE/QUALIFICATIONS

- Licensed Landscape Architect, California #5139, Montana #211
- Qualified Architectural Historian, Secretary of the Interior's Standards for Historic Preservation, Code of Federal Regulations, 36 CFR Part 61.
- Chair, City of Sacramento Preservation Commission

LANDSCAPE ARCHITECTURE:

1994 to Present: Landscape Architecture and Design. Experience in landscape architecture, landscape construction estimating, site planning and landscape master plans. Provide landscape architecture and consulting services to private clients, public organizations, contractors, and design firms. Preparation of Cultural Landscape Reports. Frequent speaker to various groups on landscape design, construction and cultural landscapes. Owner of Landscape Legacy, est.1998.

PLANNING AND HISTORIC PRESERVATION:

April 2010 to Present: Planner II, California Energy Commission, Siting, Transmission and Environmental Protection Division. Provide technical analysis of proposed energy planning, conservation, and development programs. Review of EIR/EIS documents prepared by other agencies under NEPA. Specific tasks include: the assessment of potential impacts of new electric power plants on both visual and cultural (built environment) resources; identification of suitable mitigation measures under CEQA; preparation of written testimony; participation in public workshops; present sworn testimony during evidentiary hearings, and project monitoring to ensure compliance with local, state and federal environmental laws and regulations.

2005 to 2008: Assistant Planner, Historic Preservation Office, City of Sacramento, CA

Responsible for design review and approval for private and public development projects involving rehabilitation, preservation and restoration of historic resources and districts under CEQA. Prepared staff reports for Preservation Commission and Council, and coordinated with other planning staff on concurrent entitlements. Staff liaison on municipal development projects involving historic resources, including buildings, other structures, parks and roadways.

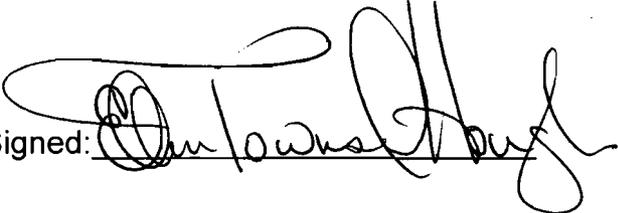
**DECLARATION OF
Ellen Townsend-Hough**

I, **Ellen Townsend-Hough** declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Siting Office of the Energy Facilities Siting Division as an Associate Mechanical Engineer.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on Waste Management for the Hidden Hill Solar Electric Generating System based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: October 31, 2012

Signed: 

At: Sacramento, California

Ellen Townsend-Hough, REA
(Registered Environmental Assessor, REA 1 – 05465)

SUMMARY

I am a chemical engineer with 30 years of experience. My professional career has afforded me many unique growth and development opportunities. I have a working knowledge of the California Environmental Quality Act. My strengths are in analyzing and performing complex environmental engineering analyses, in areas such as Waste Management, Hazardous Materials Management, Worker Safety, and Water Resources. I worked as a policy advisor to a California Energy Commissioner for three years. I am also an US Environmental Protection Agency Environmental Justice trainer.

PROFESSIONAL EXPERIENCE

Technical Analysis and Presentation

- Provide analysis on projects that require compliance with the Resource conservation and Recovery Act (RCRA) Title 40 CFR Subtitle C and Subtitle D, the Comprehensive Environmental Response, compensation and Liability Act, Title 42, USC, Section 9601, the Unified Hazardous Waste and Hazardous Materials Management Regulatory Program, Title 27, the Hazardous Waste and Management Review, Title 22 and the Integrated Waste Management Act, Title 14.
- Performs mechanical engineering analysis of designs for complex mechanical engineering analysis of designs for systems such as combustion chambers and steam boilers, turbine generators, heat transfer systems, air quality abatement systems, cooling water tower systems, pumps and control systems
- Review and process compliance submittals in accordance with the California Environmental Quality Act, the Warren Alquist Act, the Federal Clean Air Act and the California and Federal Occupational Health and Safety Acts to assure compliance of projects
- Provides licensing recommendations and function as an expert witness in regulatory hearings.
- Provide public health impact analysis to assess the potential for impacts associated with project related air toxic/non-criteria pollutant emissions.
- Evaluate the potential of public exposure to pollutant emissions during routine operation and during incidents due to accidents or control equipment failure
- Provide an engineering analysis examining the likelihood of compliance with the design criteria for power plants and also examine site specific potential significant adverse environmental impacts

Technical Skills

- Deal with the aftermath of improper hazardous waste management by overseeing site cleanups.
- Prevent releases of hazardous waste by ensuring that those who generate, handle, transport, store and dispose of wastes do so properly.
- Take enforcement actions against those who fail to manage hazardous wastes appropriately.
- Explore and promote means of preventing pollution and encourage reuse and recycling.
- Evaluate soil, water and air samples taken at sites and develop new analytical methods.

- Practice other environmental sciences, including toxicology, risk assessment, and technology development.
- Establish mitigation that reduces the potential for human exposure to levels which would result in significant health impact or health risk in any segment of the exposed population.
- Assist with on-site audits and inspection to assure compliance with Commission decisions.
- Review and evaluate the pollution control technology applied to thermal power plants and other industrial energy conversion technologies.
- Work with the following software applications: WORD, Excel, and PowerPoint.

Policy Advisor

- Provided policy, administrative and technical advice to the Commissioner Robert Pernell. My work with the Commissioner focused on the policy and environmental issues related to the Commission's power plant licensing, research and development and export programs.
- Track and provide research on varied California Energy Commission (CEC) programs. Prepare analysis of economic, environmental and public health impacts of programs, proposals and other Commission business items.
- Represent Commissioner's position in policy arenas and power plant siting discussions.
- Write and review comments articulating commission positions before other regulatory bodies including Air Resources Board, California Public Utilities Commission, and the Coastal Commission.
- Wrote speeches for the Commissioner's presentations.

Writing

- Write environmental impact reports, negative declarations that require technical evaluation of mechanical engineering and environmental aspects of pollution control systems, environmental impacts, public health issues and worker safety.

EDUCATION

Bachelor of Science, Chemical Engineering
Drexel University, Philadelphia Pennsylvania

Continuing Education

*Hazardous Material Management Certificate, University California Davis
Urban Redevelopment and Environmental Law, University of California Berkley
Analytical Skills, California Department of Personnel Administration (DPA) Training Center
Legislative Process/Bill Analysis, DPA Training Center
Federally Certified Environmental Justice Trainer*

DECLARATION OF
Mike Conway

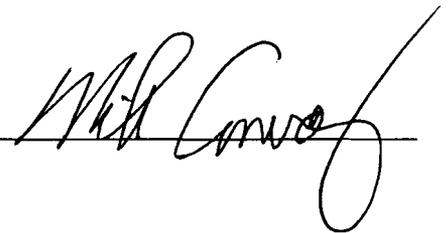
I, Mike Conway, declare as follows:

1. I am presently employed by the California Energy Commission in its Siting, Transmission and Environmental Protection Division as an Engineering Geologist.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on the **Water Supply** section of the **Final Staff Assessment** for the **Hidden Hills Solar Electric Generating Station** Application for Certification (AFC), based on my independent analysis of the AFC, supplements, data, documents, analysis and testimony from other staff and reliable sources, and based upon my own professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 2, 2012

Signed: _____



At: Sacramento, California

Resume For: Mike Conway

Education: Bachelor of Science in Geology, University of California, Davis, August 2003.
Master of Science in Geology, California State University, Sacramento, Spring 2012

Certifications: Geologist in Training (GIT)
Certified Professional in Erosion and Sediment Control (CPESC)
Leadership in Energy and Environmental Design Accredited Professional (LEED AP)

Experience:

Engineering Geologist: California Energy Commission, Sacramento, CA 2009

- Conduct analyses of soil and water resource reports submitted to Commission
- Assess impacts to soil and water resources from construction and operation of energy producing facilities
- Perform onsite evaluations of soil and water resources pre and post-project
- Implement a CEQA-like review of proposed energy projects to evaluate environmental impacts

Environmental Scientist: Central Valley Water Board, Rancho Cordova, CA 2009

- Wrote municipal storm water permits for Phase I communities in the Central Valley
- Reviewed storm water annual reports for Phase I and II municipalities
- Conducted audits of industrial sites for compliance with storm water permits
- Conducted audits of municipalities for compliance with municipal permits
- Help communities better understand how to effectively implement storm water programs
- Represented Water Board in large technical workshops and other public forums

Environmental Consultant: Wood Rodgers, Inc., Sacramento, CA 2006-2009

- Consulted clients on how to comply with Federal, State and local storm water quality and environmental regulations
- Helped public and private sector clients gain State Water Resources Control Board (SWRCB) permit coverage under Large and Small MS4 General Permits, NPDES Permits, CWA Section 401 Permits
- Consulted clients on Army Corps of Engineers, 404 Permitting
- Developed a storm water quality manual for Yolo County
- Prepared Caltrans environmental documentation and design for all project phases
- Prepared Storm Water Management Plans (SWMP) and Storm Water Pollution Prevention Plans (SWPPP)
- Drafted water pollution control exhibits using both AutoCAD and MicroStation
- Prepared Caltrans Storm Water Data Reports including cost estimates
- Designed landscaping plans for Caltrans' Modesto Ramp Rehabilitation Project
- Prepared Spill Prevention Control and Countermeasure (SPCC) plans
- Created Hazardous Materials Business Plan for City of Fort Bragg, California
- Prepared proposals for outgoing environmental quality project bids
- Performed field visits to evaluate Best Management Practice (BMP) effectiveness in reducing erosion and sedimentation
- Facilitated multiple storm water quality training workshops for groups up to 20 plus

Storm Water Quality Consultant: Envirosafety Services, Elk Grove, CA 2004-2006

- Wrote site specific SWPPPs to include guidance specific to city, county, and geographical constraints
- Designed BMP exhibits using AutoCAD
- Conducted inspections at construction sites throughout the Central Valley for (SWPPP) compliance
- Resolved storm water compliance issues in cooperation with site superintendents, county and city inspectors
- Researched current storm water protection regulations to best protect clients

Post-Graduate Researcher: Dept. of Land, Air, and Water Resources, U.C. Davis, CA 2003

- Studied the effects of irrigation practices on wetland ecology and water quality
- Independently organized monthly analyses and data processing of selenium contaminated invertebrate, algae, and water samples from the Tulare Lake Drainage District
- Managed concentrated acids, carcinogenic solutions, and final fluorescence measurements
- Compiled research data and presented findings to a team of eight colleagues

Lab Technician: Raney Geotechnical Laboratory, West Sacramento, CA 2001

- Conducted moisture density, unconfined compression tests, Atterburg Limit, curve, plasticity tests, and basic calculations for soil samples
- Administered load tests on concrete cylinders and mortar samples
- Performed percolation tests and Dynamic Cone Penetrator (DCP) tests in the field and gathered water samples for environmental analysis

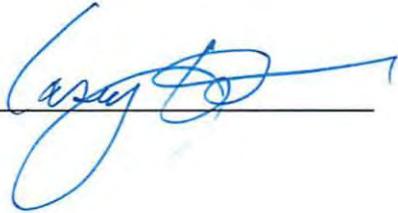
**DECLARATION OF
Casey Weaver**

I, **Casey Weaver** declare as follows:

1. I am presently employed by the California Energy Commission in the **Engineering Office** of the Energy Facilities Siting Division as an **Engineering Geologist**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on **Geology and Paleontology**, for the **Hidden Hills Solar Electric Generating Station** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 12/12/2012

Signed: 

At: Sacramento, California

CASEY W. WEAVER, PG, CEG
1621 Delta Drive
Woodland, CA 95695
(530) 662-0482

SUMMARY OF EXPERIENCE:

Certified Engineering Geologist with over 20 years of environmental and geotechnical consulting experience. Experience includes remedial investigations and feasibility studies (RI/FS), groundwater investigations, corrective action plans, landfill studies (SWATs, siting, closure), preliminary environmental site assessments (PESA, Phase I), regulatory compliance (RCRA/CERCLA), geotechnical investigation/evaluation, geologic hazard evaluations, active fault evaluations, seismic studies, landslide evaluation/repair, foundation suitability studies, personnel management and business development.

EDUCATION:

B.S. Geology, Humboldt State University, Arcata, CA, 1981
University of California, Davis Extension Courses

REGISTRATIONS/LICENCES/CERTIFICATIONS:

Certified Engineering Geologist, California
Registered Geologist, California, Oregon, Arizona
Registered Environmental Assessor
OSHA 1910.120 Hazardous Waste Operations and Emergency Response - 40hr
OSHA 1910.120 Hazardous Waste Operations and Emergency Response -
Supervising Operations at Hazardous Waste Sites.

PROFESSIONAL HISTORY:

2008 to Present

Engineering Geologist
California Energy Commission, Sacramento, CA

Duties within the Water and Soils Unit of the Environmental Office in the Facilities Siting Division include review and evaluation of applications for certification of thermal power plants within the state of California. The focus of the work is on sensitive project sites that may have issues involving groundwater and surface water resources, soil erosion, flooding potential, water quality and plant-derived waste generation and disposal. In addition, evaluate construction, operation and maintenance of the facilities and conduct investigations to determine if violations of the program's

regulations, the Energy Commission's conditions of certification, or the California Environmental Quality Act (CEQA) have occurred. Selected as the Energy Commission's seismic expert and representative on the multi-jurisdictional Independent Peer Review Panel reviewing seismic evaluations conducted for California's nuclear power plants.

2001 to 2008

Engineering Geologist

State Water Resources Control Board, Headquarters, Sacramento, CA

With the UST Enforcement Unit, under direction from the State Attorney General's Office, conducted inspections of UST systems to evaluate compliance with 1998 upgrade requirements. This work culminated in the largest settlement of its kind in the nation's history. In addition, conducted surveillance of unlawful discharges from remediation systems and conducted investigations of UST Fund fraud cases.

With the USTCF Technical Review Unit, evaluated the technical elements of USTCF claims.

With the Division of Financial Assistance, assisted with the development of program policy for the Agricultural Water Quality Grant Program (\$46 million) and the Integrated Water Quality Grant Program (\$380 million), participated in stakeholder workshops, contributed to multijurisdictional work groups for program development and implementation.

With the Office of Enforcement, conducted investigations of operator misconduct, wrote enforcement investigation reports and prepared disciplinary letters.

1998 to 2001

Senior Engineering Geologist

BSK & Associates, Rancho Cordova, CA

Designed and directed hydrogeologic investigations for use with environmental remediation projects. Supervised field personnel installing groundwater monitoring wells, conducting aquifer tests & SVE pilot tests, reviewed reports and workplans, and conducted business development.

Conducted review of Alquist-Priolo active fault hazard reports as county geologist for Kern County.

1993 to 1998
Leader

Senior Geologist, Geoscience Team Leader and RI/FS Task

LAW Engineering and Environmental Services, Inc., Sacramento, CA

As Geoscience Team Leader, responsible for career development, training and personnel management of ten employees. This group consisted of 3 senior-level geologists, 4 project level geologists and scientists, 2 junior level geologists and 1 technician.

As RI/FS Task Leader, responsible for the development of cost estimates/budgets, preparation of Work Plans and Sampling and Analysis Plans, management of field activities, data collection and documentation associated with the investigation of 15 Installation Restoration Program sites at Beale Air Force Base awarded under several Delivery Orders with combined project budgets of \$18 million. Also responsible for aerial photographic interpretations associated with a basewide (23,000 acres), Preliminary Assessment, and preparation of a basewide Hydrogeologic Evaluation Report.

1990 to 1993

Senior Project Manger/General Manager

Earthtec, Ltd., Roseville, CA

Management of Environmental Department, business development, preparation of cost estimates and proposals, client and regulatory agency interface, supervision and training, report writing, technical review, budget management, and quality control. Initiated and supported the development of company's wetland and wildlife departments. Typical projects included preliminary site assessments, soil vapor studies, detailed hydrogeologic evaluations, waste plume delineations, and development of remediation alternatives associated with landfills, service stations, bulk oil facilities and other potentially contaminated sites.

1981 to 1990

Project Geologist

SHN Group, Inc. Eureka, CA

Managed project work directed toward solving environmental issues at variably contaminated sites and provided geotechnical information for land development and construction. Responsibilities included development of cost estimates/budgets, planned and supervised field operations, collected and interpreted subsurface information, evaluated areas traversed by Alquist-Priolo Special Studies Zones and sites subject to slope stability hazards. Typical projects included geotechnical evaluations and geologic hazard studies for major subdivisions, hospitals, schools, lumber companies, run-of-the-river hydroelectric projects, underground storage tank sites, and solid waste landfills.

1979 to 1981

Geologist/Seismologic Technician
Woodward-Clyde Consultants, San Francisco, CA

Designed and operated a laboratory model to study surface effects of thrust faulting in connection with seismic evaluation studies for the PG&E Humboldt Bay nuclear reactor. In addition, installed and operated field seismographs in the Humboldt Bay region.

**DECLARATION OF
Sudath Edirisuriya**

I, **Sudath Edirisuriya**, declare as follows:

1. I am presently employed by **California Energy Commission** in the **Siting, Transmission and Environmental Protection Division** as an **Electrical Engineer**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on **Transmission System Engineering**, for the Hidden Hills Solar Electric Generating Station System, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 10/30/2012 Signed: Sudath Edirisuriya

At: California Energy Commission.

Sudath Edirisuriya
1916 Ackleton Way
Roseville CA 95661

Phone 916-654-4851

EDUCATION:

Bachelor of Science in Electrical Engineering at California State University Fullerton

ATTAINMENTS:

Member of the Professional Engineers in California Government

Vice President Electrical Engineering Society-California State University Fullerton.

EXPERIENCE:

November-2001 to Present: - Electrical Engineer, System Assessment and Facilities Siting Division, California Energy Commission.

Working in the Transmission System Engineering unit on licensing generation projects. Work involves evaluating generation interconnection studies (SIS and FS), their reliability and environmental impacts on transmission system, preparing staff assessment reports, presenting testimony. Perform reliability studies and coordinating data and technical activities with utilities, California ISO and other agencies. Conduct and perform planning studies and contingency analysis including power flow, short-circuit, transient, and post-transient analysis to maintain reliable operation of the power system. Understanding of regulatory and reliability guidelines, WECC and NERC planning and operation criteria, CPUC and FERC requirements. Review technical analyses for WECC/CA ISO/PTO transmission systems and proposed system additions; and provide support for regulatory filings.

June-1998 to November-2001: - Project Electrical Engineer, Design Electrical Engineering Section, Department of Transportation, California.

Electrical Engineering knowledge and skills in the design, construction and maintenance of California state work projects involving all the public work areas; contract administration, construction management, plan checking, field engineering and provide liaison with consultants, developers, and contractors. Plan review in facility constructions, highway lighting, sign lighting, rest area lighting, preparation of project reports, cooperative agreements, review plans for compliance of construction and design guide lines for national electrical code, standards and ordinance. Review process included breaker relay coordination, detail wiring diagrams, layout details, service coordination, load, conductor sizes, derated ampacity, voltage drop calculations, harmonic and flicker determination.

June-1993 to May-1998:- Substation Electrical Engineer, City of Anaheim, California.

Performed protective relay system application, design and setting determination in Transmission & Distribution Substation. Understanding of principles of selective coordination system protection and controls for Electric Utility Equipment. Understanding of Power theory and Analysis of symmetrical components. Ability to review engineering plans, specifications, estimates and computation for Electrical

Utility Projects. Practices of Electrical Engineering design, to include application of Electro-mechanical and solid state relays in Electrical Power Systems. Software skills in RNPDC (Fuse Coordination Program), Capacitor Bank allocation program, and GE Power Flow Program. Design projects using CAD, Excel spread sheets including cost estimates, wiring diagrams, material specifications and field coordination.

Performed underground service design 12kV and 4kV duct banks; pole riser; getaway upgrade; voltage drop calculation, ampacity calculation and wiring diagrams. Design and maintenance of substations in City Electrical Utility System. Upgrade Station Light and power transformers; upgrade capacitor banks; replacement of 12kV-4kV power circuits; Breakers at Metal Clad Switchgear. Design one-line diagrams; three line diagrams; grounding circuits; schematics; coordination of relay settings; conduit and material list preparation. Calculation of derated ampacity; inrush current, short circuit current.

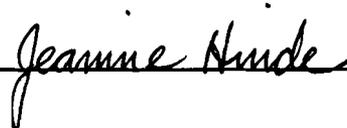
DECLARATION OF
Jeanine Hinde

I, Jeanine Hinde, declare as follows:

1. I am presently employed by the California Energy Commission in its Siting, Transmission and Environmental Protection Division as a Planner II.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on the **Alternatives Analysis** for the **Hidden Hills Solar Electric Generating System** Application for Certification (AFC), based on my independent analysis of the AFC, supplements, data, documents, analysis and testimony from other staff and reliable sources, and based upon my own professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 2, 2012

Signed: 

At: Sacramento, California

JEANINE M. HINDE

Professional Experience

Planner II

February 2010–Present

California Energy Commission, Sacramento, CA

Environmental Office of the Siting, Transmission, and Environmental Protection Division

Generalist skilled in research and analysis and preparing environmental assessments for siting of a variety of power plant projects filed with the Energy Commission. Analyzes project-related impacts on land use, agricultural resources, and visual resources. Evaluates project conformance with applicable laws, ordinances, regulations, and standards and recommends appropriate mitigation measures to reduce project effects on environmental resources. Prepared the alternatives analysis for a proposed 500-megawatt (MW) solar power tower project in the eastern Mojave Desert. Prepared the land use analyses for a 159-MW geothermal power plant in Imperial County and a 174-MW electrical generating plant in Ceres. Preparing the visual resources analysis for the Huntington Beach Energy Project, a 939-MW natural gas-fired plant that is proposed to replace the AES Huntington Beach Generating Station.

Environmental Analyst and Project Coordinator

2004–2009

EDAW-AECOM, Sacramento, CA

Coordinated preparation of environmental studies to satisfy the California Environmental Quality Act (CEQA) and the National Environmental Policy Act and related permitting and regulatory requirements. Contributed to the preparation of regulatory compliance documents for projects addressing flood protection, wastewater management, water quality, habitat restoration, and urban development. As an assistant project manager, contributed to the preparation, technical review, and distribution of a variety of environmental compliance documents for projects that included a levee repair project on the Feather and Yuba Rivers, a levee seepage project on the San Joaquin River near the Sacramento-San Joaquin Delta (Delta), a wastewater treatment plant improvement project in Atwater, and a habitat restoration project adjacent to the middle Sacramento River. As an analyst, prepared environmental impact analyses for resource topics that included land use; agricultural resources; visual/aesthetic resources; public services, utilities and service systems; hazardous materials; recreation; and geology, soils, and mineral resources. Prepared mitigation monitoring and reporting program documents and assisted with fulfilling CEQA noticing and filing requirements.

Environmental Analyst, Independent Consultant

2003–2004

Sackheim Consulting, Fair Oaks, CA

Researched and wrote the aesthetics analyses for the CEQA documents on related neighborhood electrical distribution projects in the Natomas and Elkhorn areas of Sacramento. Prepared a similar analysis for a project in Elk Grove. Assisted with the analyses addressing potential impacts on cultural resources and issues related to hazards and hazardous materials.

Environmental Specialist II

1986–1997

Jones & Stokes Associates, Sacramento, CA

Evaluated impacts on land use, visual resources, and recreation for several state and federal projects, including a water supply management program in the East Bay, a project addressing long-term management of resources in the Delta and Suisun Marsh, and a military operations project at Camp Roberts. Provided technical review and coordinated preparation of report sections prepared by staff, and assisted with research and documentation of required federal, state, and local permits and approvals for inclusion in regulatory compliance plans.

Education

B.A. Geography, California State University, Chico

**DECLARATION OF
Testimony of Joseph Douglas**

I, **Joseph Douglas**, declare as follows:

1. I am presently employed by the California Energy Commission, Siting, Transmission and Environmental Protection Division.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony on **General Conditions** for the **Hidden Hills Solar Electric Generating System Final Staff Assessment** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: October 31, 2012 Signed: _____

At: Sacramento, California

Joseph Douglas

Experience

November 2008 – Present

State of California, California Energy Commission

Sacramento, CA

Siting, Transmission & Environmental Protection, Compliance Project Manager

- Coordinate and manage multi functional environmental and engineering team in reviewing and processing complex and controversial renewable energy facility projects.
- Review, edit, and evaluate regulatory/commission reports, testimony, briefs, and position papers.
- Publish project documents including Commission program reports, and Environmental Impact Reports and Initial Studies/Negative Declarations.
- Coordinate with Bureau of Land Management, U.S. Department of Energy, and U.S. Environmental Protection Agency to write and process Environmental Impact Statements for large renewable energy projects.
- Organize and conduct public workshops and meetings among energy staff, energy facility developers, regulatory agencies, government agencies, and the public to discuss siting concerns.
- Oversee the construction of licensed power plants.
- Plan and lead environmental and engineering team in the review of complex and controversial project amendments during construction.
- Represent staff at energy commission business meetings, make presentations, and answer questions from commissioners.

March 2003 – November 2008

State of California, Department of Transportation

Oakland, CA

Office of Environmental Analysis, Environmental Project Manager

- Oversight of large transportation projects with state and federal involvement
- Writing and processing of environmental documents with specific time deadlines requirements
- Coordination with multiple agencies including: Federal Highway Administration, U.S. Fish and Wildlife Service, Army Corps of Engineers, EPA, State Historic Officer, Homeland Security, California Highway Patrol
- Partnership with local governments to implement growth/environmental strategies
- Organized multi-functional teams to determine project cost, scope, risk, impacts, and benefits in order to meet funding and programming deadlines
- Participated in Value Analysis studies and made recommendations regarding least environmentally damaging alternative
- Establish purpose and need of project to justify benefits of future capital cost expenditures
- Quality assurance and quality control for state and federal compliance of environmental regulations
- Participated in field studies to determine project impacts

May 2000 - March 2003

State of California, Department of Transportation

Oakland, CA

Right of Way Office, Cost and Impact Estimation

- Determination of community impacts of large transportation projects
- Estimated costs, and time needed for acquisition of parcels, and relocation assistance
- Coordination with multiple disciplines within the Department including: engineering, survey, legal, and environmental to forecast cost
- Investigation of Assessors Parcel Numbers, Right of Way data maps, and property databases
- Research of city and county zoning codes, general plan, and property records
- Identified utility conflicts and estimated time and cost of relocation
- Property management services

APPENDIX RTC

The following letters were received during the Hidden Hills Solar Electric Generating System (11-AFC-2) Preliminary Staff Assessment (PSA, published May 24, 2012) comment period, and the Supplemental Staff Assessment (SSA, published June 15, 2012) comment period. These comment periods both concluded on July 23, 2012.

1	Inyo County
2	Bureau of Land Management
3	National Park Service
4	The Nature Conservancy
5	Amargosa Conservancy
6	Basin & Range Watch
7	Pahrump Paiute Tribe
8	Richard Arnold, Pahrump Piahute Tribe
9	Big Pine Tribe of Owens Valley
10	Intervenor Cindy MacDonald
11	Intervenor Center for Biological Diversity
12	Intervenor, Old Spanish Trail Association
13	Applicant, BrightSource Energy, Inc.

Following their submission, staff bracketed these letters in order to highlight the pertinent questions and issues for purposes of subsequent review and to provide “Response to Comment” in the Final Staff Assessment (FSA). For every technical section in this **FSA** where comments were received, there is an appendix or table that lists the Response to Comments.

All of the above letters follow in their “bracketed” form, except for those submitted by Intervenor Cindy MacDonald and Applicant, BrightSource Energy, Inc. Those two letters are not attached, as they were submitted in numbered format, precluding the need to manually bracket. They can be reviewed online here:

Cindy MacDonald (Comment Letter #10) along with all other PSA comment letters:
http://www.energy.ca.gov/sitingcases/hiddenhills/documents/others/psa_comments/

BrightSource Energy, Inc. (Comment letter #13):
http://www.energy.ca.gov/sitingcases/hiddenhills/documents/applicant/2012-07-23_Applicants_Comments_on_the_PSA_Set_2_TN-66319.pdf



BOARD OF SUPERVISORS COUNTY OF INYO

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July 17, 2012

Commissioner Karen Douglas, Presiding Member
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

RE: Comments on the Hidden Hills Solar Energy Generating System Preliminary Staff Analysis and Resolution 2012-29 of the Inyo County Board of Supervisors

Dear Commissioner Douglas:

The County of Inyo (County) appreciates the opportunity to provide comments and indicate necessary changes to the Preliminary Staff Analysis (PSA) submitted by the California Energy Commission (CEC) staff for the Hidden Hills Solar Energy Generating System (HHSEGS) in order that the proposed project be consistent with Inyo County ordinances, regulations and standards ("LORS"). The County, as an active participant in the licensing process, is grateful to the CEC staff for addressing many of our concerns and attempting to bring the proposed project into conformance with the County's LORS, specifically its land use policies and Title 21 of the Inyo County Code governing renewable energy facilities.

Comment 1

Notwithstanding CEC staff's efforts, the PSA falls short in a number of areas including: (1) visual impacts, (2) proposed groundwater monitoring and reporting; (3) the impacts to County roads and a mechanism to enforce travel restrictions; (4) a detailed facility closure plan; (5) the lost opportunity cost impact of the project (both with and without the inclusion of proposed mitigation lands); and, (6) the socioeconomic impacts to County services. In addition to discussing each of these areas below, the County has submitted with this letter *A Resolution Of The Board Of Supervisors Of The County Of Inyo, State Of California, Adopting The Findings And Conditions Of Certification For The Proposed Hidden Hills Solar Electric Generating Station (California Energy Commission Application For Certification No. 11-AFC-2,) ("Resolution 2012-29")* which sets out the additional or modified Conditions of

Certification, to those recommended by CEC staff in the PSA and to those contained in the Gruen, Gruen + Associates report, attached hereto. These are conditions of certification that the County would impose on the project owners but for the exclusive jurisdiction granted to the Energy Commission under the provision of the Warren-Alquist Act (Pub. Resources Code § 25500). In addition to Resolution 2012-29, and also in order to assure compliance with the County's LORS pursuant to Public Resources Code section 25525, a matrix indicating the proposed project's compliance or non-compliance with the County's General Plan is attached.

It should be noted that on July 10, 2012, the Inyo County Board of Supervisors approved an agreement with the project applicant, BrightSource Energy, Inc., LLC (BSE) to process an application for the adoption of a general plan amendment and zoning reclassification. If the application is approved by Inyo County, the project would be consistent with the County of Inyo General Plan and Zoning Ordinance; however, approval of the application will not resolve the site control requirements set forth in the proposed conditions of certification or the other land use issues previously addressed by the County and referenced in the PSA, such as the merger of the numerous lots on which the project is proposed to be built and the abandonment of public roads.

Along with project conformance to the County's land use policies, there remain several areas of the PSA that continue to promote undue uncertainty for the County's welfare. Following are the primary areas of concern which are addressed by Resolution 2012-29 through additional or modified conditions of certification in order that the proposed project is deemed consistent with County LORS, in particular Title 21.

1. VISUAL IMPACTS

A chief unresolvable concern for the County and its residents is the visual impact of the proposed project on the adjacent residential community. Although the applicant maintained during the June 14, 2012 workshop in Pahrump, Nevada that the proposed project would not create a significant visual impact, such a claim is unfathomable. If the proposed project is licensed and constructed then residents will live as close as 600 feet from a heliostat field replete with approximately 170,000 mirrors encircling two, 750-foot, towers as their neighbor.

Comment 2

The County concurs with CEC staff that this significant visual impact cannot be mitigated. However, the County does not believe the proposed mitigation of an interpretative center is sufficient to off-set the vast changes being imposed on these residents. Since the impacts cannot be fully mitigated, the residents should reap some benefit from the project that they will live with daily. Title 21 requires for the mitigation of impacts to the County, including by compensating for the impact by replacing or providing substitute resources or environments. (See, Title 21, Section 21.08.040.) The County believes the idea of the interpretative center is a good start, but under Title 21 additional mitigation directed at reducing or off-setting the impacts to the local residents is required. To that end, Resolution 2012-29 requires the construction of a community center, for use by the local community and service providers. In addition, in this era of high speed communication, these residents live without reliable phone service or high-speed internet.

The proposed project includes in its design a telecommunications tower and that tower should be made available to cellular telecommunication operators to bring cellular and internet service to the proposed project's neighbors. Every attempt should be made to alleviate the significant impact imposed on those residents through enhanced essential service delivery and basic amenities.

Comment 3

2. GROUNDWATER MONITORING AND REPORTING

The County has a long history of monitoring and managing the use of its groundwater resources. The County is dedicated to protecting this fragile resource and has enacted a number of ordinances to achieve that goal, including Title 21. When evaluating a proposed project's request to use groundwater, the County insists that the project proponent avoid impacts to not only the groundwater basin but also to the groundwater dependent biological resources. The County's unprecedented experience in this area has led to the establishment of detailed monitoring and mitigation plans designed specific to each proposed project. Addressed as a separate memo and attached to this comment letter is a memo addressing specific comments on the Water Supply sections of the PSA by Robert Harrington, Ph.D., R.G. of the Inyo County Water Department. Therein he outlines the requirements mandated under Title 21. The Water Supply conditions of certification should include the same level of monitoring as outlined in the Air Quality, Biological Resources and Cultural Resources portions of the PSA. In order to achieve that end and comply with Title 21, Resolution 2012-29 includes such as a condition of certification, together with other conditions necessary to bring the proposed project into compliance with the County's LORS.

Comment 4

Comment 5

On a related topic, the proposed project will trigger the groundwater monitoring and reporting requirements mandated by SBX7-6, adopted by the California Legislature in 2009 and Chaptered as Water Code section 10920 et seq. As detailed in the *Responses to the May 2012 "Socioeconomic and Fiscal Impacts of the Hidden Hills Solar Electric Generating System on Inyo County"* prepared by Gruen Gruen + Associates, absent a requirement that the proposed project owners and/or their operators report groundwater activities at the project site to the County it will result in the County failing to comply with the mandates of SBX7-6. According to the statutory provisions, failure to comply with the monitoring mandates results in a loss of grant funds. The County simply cannot risk forfeiting future grant funding. Resolution 2012 requires as a condition of certification that the project owner provide the groundwater pumping information necessary for the County to comply with Water Code section 10920 et seq.

Comment 6

3. OLD SPANISH TRAIL AND ENFORCEMENT

The County appreciates and supports the CEC staff's inclusion as a condition of certification the prohibition on the project owner and its contractor(s) and subcontractors from allowing truck traffic to access the project site by using Highway 127 and Old Spanish Trail. However, due to the extensive damage that use by even a few errant trucks would have on that route, the County is concerned that the condition contains no process by which the project owner would be fined. Again, Title 21 mandates that the County recover any costs caused by a project. For that reason, and to bring the proposed condition into compliance with Title 21, Resolution 2012-29 establishes a penalty for any errant truck and an obligation for the project owner to either repair damage caused by any errant truck using Old Spanish Trail and Highway 127 west of the project site or to reimburse the County for the costs of such repairs.

4. FACILITY CLOSURE PLAN

Title 21 of the Inyo County Code specifically requires the project owner to submit to the County a reclamation/revegetation plan and to post an adequate financial assurance, based on estimated costs, should the project owner fail to comply with the plan upon closure. (See, Inyo County Code, Sections 21.20.030 & 21.20.040.) Resolution 2012-29 requires both the plan and the financial assurances so as to protect its citizens from bearing the costs of dismantling a large scale renewable energy project should the project be abandoned after full and/or partial construction

and for reclaiming the underlying land. Similar requirements are required by the County in both the area of mining and telecommunication towers. In addition, for the reasons noted above, the Bureau of Land Management and a number of other counties impose similar requirements for large scale renewable facilities.

Comment 7

Resolution 2012-29 requires the submission of the reclamation plan and its estimated costs prior to the commencement of construction, in order to establish the amount of financial assurances required under Title 21 and under proposed Condition of Certification LAND-2. The provision of financial assurance is an important guarantee; without such assurance, there can be no expectation that a project owner will have either the interest or the funds to reclaim the proposed industrial site.

5. MITIGATION LANDS

Throughout the PSA, staff recommends biological and cultural mitigation in the form of the retirement of lands from economic use in perpetuity. Most of the requirements for the retirement of lands for mitigation fall within the Biological Resources (BIO) section of the PSA. However, it was noted at the July 2, 2012 PSA workshop in Sacramento by CEC staff members that the Cultural Resources analysts may include the retirement of lands to mitigate the cultural impacts caused by the project. In some instances, it appears that mitigation lands must be located within the State of California and, in at least one condition (BIO-22) the land is required to be located in California and in the Pahrump Valley. For the reasons stated below, the County objects to using any private lands within Inyo County for mitigation purposes.

Comment 8

Inyo County is unique in that less than 2% of its total land is privately owned, thus severely limiting its revenue base. The project applicant holds an option for nearly 10,000 acres of private land. The project site is 3,277 acres, leaving more than 6,000 acres subject to the project applicant's option. Should the full 10,000 acres under option be utilized as the project site and as mitigation, this single proposed project would encompass nearly 10% of the total private land holdings in the County. Moreover, even the CEC's Fiscal Consultant (Consultant) concedes that the proposed project will result in few financial benefits to the County due to its remote location and close proximity to larger services in the State of Nevada. In a County with so few opportunities to encourage the use of private lands for the economic benefit of the County and its residents, removing private lands in perpetuity for mitigation will result in a significant impact.

Comment 9

If private land within the County must be retired from beneficial use for mitigation purposes, Title 21 requires that the economic impact resulting from the removal of those lands be accounted for and further mitigated. The Consultant acknowledged at the June 27, 2012 PSA workshop that he did not include in his analysis the lost economic opportunity costs which the County would suffer as a result of the proposed mitigation lands. That analysis is essential should any of the mitigation occur on private lands in the County. Resolution 2012-29 requires that analysis as a condition of certification in order to comply with Title 21. Furthermore, if mitigation lands are to be identified after certification of the project, the resolution imposes as a condition of certification that the analysis be conducted prior to the selection of such lands for mitigation and, if such lands are selected, that appropriate mitigation be imposed to offset any identified adverse impacts to the County or to the environment.

6. SOCIOECONOMIC ANALYSIS

The *"Socioeconomic and Fiscal Impacts of the Hidden Hills Solar Electric Generating System on Inyo County"* report prepared by the Consultant fails to accurately or adequately analyze the socioeconomic impacts the County will experience should the proposed project be approved without inclusion of additional conditions. Although a thorough discussion of the Consultant's report and methodologies is included in the attached *Responses to the May 2012 "Socioeconomic and Fiscal Impacts of the Hidden Hills Solar Electric Generating System on Inyo County"*, prepared by Gruen Gruen + Associates and submitted as part of these comments, it is important to highlight the most glaring errors and why many of the Consultant's conclusions should not be accepted.

Comment 10

The Consultant's report begins on a false premise – that the construction workers, totaling nearly 1,100, will commute from their homes to the project site. The project applicant has stated a number of times that the project will likely be constructed under the terms of a project labor agreement as was Ivanpah. Under such an agreement, California union employees will be given a hiring preference. That preference will most certainly result in employees commuting from Southern California or the Inland Empire for the work week as happened with Ivanpah. Although the Consultant stated during the June 27, 2012 workshop that the analysis contained in his report would apply regardless of the residence of the actual employees (California vs. Nevada), that is simply untrue. Since the most direct route to the project site from the Inland Empire is through Inyo County, employees from

the Inland Empire would likely travel through Inyo County, rather than through Nevada. As a result, and unlike the Ivanpah project where workers traveling home to the Inland Empire do so using Interstate 15, workers traveling home to the Inland Empire or other parts of California from the HHSEGS jobsite will create demands for additional County services along the way. Service demands associated with this commuting workforce are likely to include but are certainly not limited to additional unstaffed public trash receptacles to minimize illegal dumping; enforcement of sewage discharge regulations from recreational vehicles; and traffic safety enforcement and response. In addition, the towns of Shoshone and Tecopa are both much closer to the Inland Empire than Pahrump, so a higher percentage of employees are likely to stay in Inyo County, with a correspondingly higher cost of services to be provided by the County.

Comment 11

The Consultant's analysis does not account for employee-related housing impacts and, in fact, extrapolates from its incorrect assumption that there is no basis for the County's anticipated increased service costs caused by construction-related housing. Had the Consultant more fully reviewed the potential impacts from anticipated construction-related housing he would have learned that during the construction of the Ivanpah project, Clark County, Nevada experienced a 30% increase in calls for service in Primm, where most of the Ivanpah employees resided during the work week. Moreover, had the Consultant actually visited the HHSEGS proposed project site, he would have discovered that unlike in Ivanpah, the HHSEGS proposed site is surrounded by privately owned property and that illegal "camping" on private land has at times been a problem in the area. The County maintains that it is not unreasonable to anticipate that a number of construction employees will engage in dry camping in the vicinity of the project site, or will elect to reside in the nearby communities of Tecopa or Shoshone, thereby increasing the number of employees residing in Inyo County as opposed to the State of Nevada. As shown by Clark County, there will be an increase in the demand for County services, in particular law enforcement services.

Comment 12

The County has provided an extensive estimate of the additional costs that will be incurred by the County if the project is approved. The Consultant discredits nearly every one of the anticipated impact costs provided by the County, thus substituting the Consultant's judgment for that of the County and that of its elected and appointed officials. The CEC should not disregard the judgment of the very elected and appointed officials charged with providing services to the project while accepting the conclusions of the Consultant which are based upon estimates from the project

Comment 13

proponent. When asked why he did not question the project applicant's estimate that 5% of the construction costs (\$9.5 million) would be spent in Inyo County, in light of the remote location of the project and lack of retail establishments, the Consultant simply indicated that the number "seemed reasonable". It is disheartening to the County that the Consultant would not only substitute his judgment for the Inyo County Sheriff's, but would accept estimates from the project proponent that defy reality.

The fact is that the County is in the best position to estimate the potential impacts of the project to its provision of services. The County has experienced the ebbs and flows of mining, snowbirds and other events which have caused both temporary and seasonal growth in its most remote areas. This is not the first, nor the last, time the County will need to anticipate an increased need for services in its remote regions. For these reasons, the CEC should disregard the Consultant's analysis, and adopt the County's anticipated impact costs along with an annual inflationary escalator.

Comment 14

Regardless of which estimate of the impact costs of the project is utilized, the Consultant concludes that the County will be made whole through its receipt of sales and use tax derived from the project's construction. The Consultant assumes the project owner will enter into an agreement with the County to designate the project site as the point of sale for sales and use tax purposes. The Consultant states that the basis for this assumption is that the project owner entered into such an agreement with San Bernardino County on the Ivanpah project. There is no sales tax agreement regarding Ivanpah; the parties are just now negotiating that agreement and there is no reason to simply assume such an agreement between the County and applicant will be a certainty or will cover all of the County's costs. For Inyo County, realizing an increase in revenues to offset the increased costs resulting from the project is of vital importance. The people of Inyo County are not in a position to subsidize this project. In the absence of a CEC condition requiring a letter of credit or other financial assurance in the amount of \$84.5 million dollars, the Consultant's assumption that those revenues will flow to the County is nothing short of cavalier.

Comment 15

The Consultant expresses uncertainty as to whether the project owner might seek an exclusion from sales and use tax through the California Alternative Energy and Advanced Transportation Financing Authority (CAEATFA). However, the Consultant notes that the applicant claims that such an exclusion was not sought for

its Ivanpah project and thereby opines that such an exclusion would not be sought for HHSEGS. However, while it is true that CAEATFA's own legal analysis makes it doubtful that the project would qualify under the current criteria, as recently as February 2011 the CAEATFA Board, during a regularly scheduled meeting, discussed developing a sales and use tax exclusion program for renewable energy generation projects. BSE was in attendance and during the public comment period expressed their concern on proposed project caps of differing types and emphasized the need for such a program. Therefore it is neither inconceivable that this option would still be forthcoming through CAEATFA or that BSE's project operator(s) would be encouraged to take advantage of such a program thereby only elevating the need for a condition of certification that a form of financial assurance be provided for the direct government service costs incurred by the County during the life of the project.

Comment 16

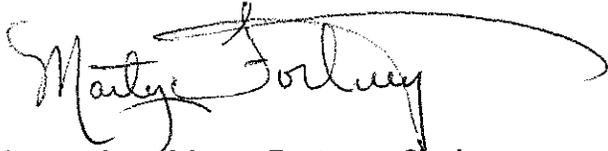
It would be irresponsible for Inyo County or the CEC to assume that the costs for service impacts caused by the proposed project will be addressed by a voluntary agreement that the project owner may or may not chose to execute or that such agreement would be sufficient to cover the County's costs. Title 21 of the Inyo County Code mandates that the County recover its increased costs for providing services to the proposed project. Therefore, Resolution 2012-29 requires as a condition of certification, that the project owner must require all applicable contractors and sub-contractors to exercise their option to obtain a State Board of Equalization sub-permit to designate the project site as the point of sale for purposes of allocating all sales and use taxes to the County of Inyo, and guarantee, through the use of a consultant with expertise in the area of sales and use tax, that the project owner and its contractor(s) and subcontractors take all necessary actions to ensure that this occurs through compliance with applicable rules and regulations. It is only through such a condition that the CEC will strive to ensure that the costs of the service impacts to the County may be recovered and conform to the economic impact requirements of Title 21. Furthermore, in support of such a condition, Resolution 2012-29 imposes a condition of certification that requires the project owner to establish financial assurances of \$84.5 million that would guarantee that the County will directly receive the consultant's estimated sales and use tax during the period of construction.

Comment 17

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Lastly, while there were inconsistencies in the PSA, most could be resolved through adequate financial assurances, appropriate conditions of certification and proper monitoring of natural and cultural resources. We are confident that the CEC and its staff are working toward providing energy solutions that will sustain the state while balancing the need for adequate revenues for a subdivision of the state that is mandated to provide essential services.

Sincerely,

A handwritten signature in cursive script, reading "Marty Fortney". The signature is written in black ink and is positioned above the typed name and title.

Supervisor Marty Fortney, Chairperson
Inyo County Board of Supervisors

Attachments(4):

1. Resolution No. 2012-29
2. General Plan Consistency Matrix
3. Memorandum from Dr. Robert F. Harrington, Ph.D., R.G.
4. Gruen Gruen + Associates Report

RESOLUTION NO. 2012-29

**A RESOLUTION OF THE BOARD OF SUPERVISORS OF THE COUNTY OF INYO,
STATE OF CALIFORNIA, ADOPTING FINDINGS AND CONDITIONS OF CERTIFICATION FOR
THE PROPOSED HIDDEN HILLS SOLAR ELECTRIC GENERATING STATION
(CALIFORNIA ENERGY COMMISSION APPLICATION FOR CERTIFICATION NO. 11-AFC-2)**

WHEREAS, Inyo County supports and encourages the responsible utilization of its natural resources, including the development of its solar and wind resources for the generation and transmission of clean, renewable electric energy; and

WHEREAS, Inyo County encourages the increased use of solar radiation and wind to generate and transmit clean, renewable electric energy as a benefit not only to the citizens of Inyo County, but also to citizens of California and the United States; and

WHEREAS, the County has been participating in a variety of renewable energy planning efforts, including, but not limited to, the Renewable Energy Transmission Initiative (RETI), the Bureau of Land Management's (BLM) Transmission Corridor, Wind, Geothermal, and Solar Environmental Impact Statements, the Desert Renewable Energy Transmission Plan, the California Transmission Planning Group, and a variety of renewable energy initiatives in the neighboring State of Nevada; and

WHEREAS, on August 17, 2010 the Inyo County Board of Supervisors adopted Ordinance No. 1158, which amended the Inyo County Code by adding Title 21, the Inyo County Renewable Energy Ordinance, to encourage and regulate the development of renewable energy resources within Inyo County; and

WHEREAS, Title 21 regulates applicants that propose to construct and operate renewable energy facilities, and requires an Applicant to obtain a permit from the County or to enter into a development agreement with the County for the project; and

WHEREAS, Title 21 requires an Applicant to identify and mitigate impacts to the ecological environment of the County as well as impacts to the social, aesthetic and economic environment, including impacts to the quality of life within the County, that will result from the renewable energy project; and

WHEREAS, Title 21 requires an Applicant to mitigate impacts on the County's water resources which may be depleted by the use of water for cooling and other operational purposes which may affect vegetation, wildlife and habitat; and

WHEREAS, Title 21 requires the County to impose upon an Applicant with such reasonable and feasible mitigation measures as it finds to be necessary to protect the health, safety and welfare of the County's citizens and the County's environment, including its public trust resources, and to ensure that the County and its citizens do not bear an undue financial burden from the project; and

WHEREAS, Title 21 mitigation encompasses the following: (1) Avoiding the impact altogether by not taking a certain action or parts of an action; (2) Minimizing impacts by limiting the degree or magnitude of the action and its implementation; (3) Rectifying the impact by repairing, rehabilitating, or restoring the impacted environment; (4) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action, and; (5) Compensating for the impact by replacing or providing substitute resources or environments; and

WHEREAS, Title 21 requires any person who submits an application for a renewable energy permit to submit a plan for reclamation/revegetation of the site of the facility once the facility is decommissioned or otherwise ceases to be operational and to post financial assurances to ensure completion of reclamation; and

WHEREAS, the Warren-Alquist Act (Public Resources Code Section 25000 et seq.) vests the California Energy Commission (CEC) with exclusive certification jurisdiction over siting power generation plants greater than 50 megawatts (MW), amongst other powers; and

WHEREAS, on August 5, 2011, Hidden Hills Solar Holdings, LLC, submitted an Application for Certification to the CEC to construct and operate the Hidden Hills Solar Electric Generating System (HHSEGS), a solar thermal power plant greater than 50 MW, in Charleston View in Inyo County; and

WHEREAS, Inyo County would be the lead agency for the project if not for the CEC's exclusive jurisdiction; and

WHEREAS, the CEC transmitted a request for agency participation in its certification process for the proposed HHSEGS to Inyo County on August 19, 2011; and

WHEREAS, California Government Code Section 65300 et seq. indicates that the legislative body of each county shall adopt a comprehensive, long-term general plan for its physical development, including the following seven required elements: (1) land use, (2) circulation, (3) housing, (4) conservation, (5) open space, (6) noise, and (7) safety; and

WHEREAS, the proposed HHSEGS is on lands designated by the Inyo County General Plan Land Use Element as Open Space and Recreation (OSR) and Resort/Recreational (REC), and

WHEREAS, the OSR designation provides for public parks, ball fields, horse stables, greenbelts, and similar and compatible uses and the REC designation provides for a mixture of residential and recreational commercial uses, and the proposed HHSEGS is inconsistent with these designations; and

WHEREAS, General Plan GOAL GOV-10 (Energy Resources) and Policy Gov-10.1 (Development) indicate that development of energy resources on both public and private lands be encouraged with the policies of the County to develop these energy resources within the bounds of economic reason and sound environmental health, and therefore, the Board supports the following policies: (a) The sound development of any and all energy resources, including, but not limited to geothermal, wind, biomass, and solar, (b) The use of peer-reviewed science in the assessment of impacts related to energy resource development, (c) The development of adequate utility corridors necessary for the transmission of newly generated energy, (d) Maintenance of energy opportunities on state and federal lands maintaining and expanding access, (e) Treating renewable energy sources as natural resources, subject to County planning and environmental jurisdiction; (f) Considering, accounting for, and mitigating ecological, cultural, economic, and social impacts, as well as benefits, from development of renewable energy resources; and, (g) Considering development of environmental and zoning permitting processes to ensure efficient permitting of renewable energy projects while mitigating negative impacts to county services and citizens, with a goal of ensuring that citizens of the County benefit from renewable energy development in the County; and

WHEREAS, Inyo County staff, citizens, and elected officials have been participating in the CEC's certification process for the HHSEGS, including attending CEC meetings, hearings, and workshops on the following dates: September 26, 2011, October 28, 2012, November 3, 2011, November 18, 2011, January 12, 2012, January 18, 2012, January 24, 2012, February 22, 2012, April 3, 2012, April 26, 2012, May 9, 2012, June 4, 2012, June 14, 2012, June 27, 2012, July 2, 2012, and, July 9, 2012; and

WHEREAS, Inyo County representatives have provided written correspondence to the CEC and the applicant on numerous occasions providing input into the process and germane issues, including on November 29, 2011, February 16, 2012, February 23, 2012, February 27, 2012, and March 9, 2012; and

WHEREAS, the applicant attended the Inyo County Board of Supervisors meeting on March 13, 2012, presented the proposed project to the Board, and engaged in dialogue with the Board, including representing that an application for a General Plan Amendment (GPA) would be submitted; and

WHEREAS, CEC Staff issued a Preliminary Staff Assessment (PSA) on May 25, 2012 and a Supplemental PSA on June 15, 2012; and

WHEREAS, the PSA and Supplemental PSA do not adequately address the issues raised by Inyo County previously in the proceedings, or the provision of Title 21 of the Inyo County Code; and

WHEREAS, pursuant to Public Resources Code section 25523(d), following public hearing(s), the CEC must prepare a written decision which must include findings regarding the conformity of the proposed site with "...other applicable local, regional, state and federal standards, ordinances or laws"; and

WHEREAS, in this resolution, as required of it by Title 21 of the Inyo County Code, the Inyo County Board of Supervisors identifies the findings and conditions of certification (COC) that are in addition to, or supplement, those provided in the PSA and Supplemental PSA.

THEREFORE BE IT RESOLVED, that based on all of the information received to date including but not limited to the written and oral comments and input received at the March 13, 2012 and July 17, 2012 Board of Supervisors meetings, staff reports and presentations and the applicant's representations, the Inyo County Board of Supervisors makes the following findings and establishes conditions of certification upon the project, as required of it by Title 21 of the Inyo County Code, in addition to or in lieu of those provided in the PSA and Supplemental PSA.¹

BE IT FURTHER RESOLVED that this Board of Supervisors therefore provides the CEC with the following findings and COCs for the proposed HHSEGS, that are in addition to or in lieu of those findings and COCs provided in the PSA and Supplemental PSA, for inclusion in the final staff assessment and final certification.

Comment 17

Biological Resources – New or Revised Findings of Fact

A. Add the following new finding: Less than two percent of Inyo County remains in private ownership, and every acre restricted for the purpose of compensatory mitigation results in a significant impact. Biology-related compensatory mitigation proposed for the project exceeds 6,000 acres, including requirements to encumber private lands in Inyo County with a conservation easement in perpetuity. If private lands within Inyo County are utilized for compensatory mitigation, there will be significant impacts to the economic environment in Inyo County.

¹ Modified text is indicated with ~~strikeout~~ and underline.

Comment 18

Biological Resources – New or Revised Conditions of Certification

A. Add the following new COC: The applicant and the CEC in coordination with the County shall investigate and implement means to enhance degraded public lands (including lands designated Wilderness), rather than utilizing private lands in Inyo County for biology-related compensatory mitigation, including investigating and advocating for means to quantify restoration activities on public lands in lieu of direct compensatory mitigation.

Comment 19

Revise COC BIO-22 subparagraph 1(a)(i) to read: Selection Criteria. Compensation lands for impacts to state waters shall meet the following criteria: i. Located in California and within the Pahrump Valley. If the project owner demonstrates that suitable compensation lands are not available within Pahrump Valley, lands may be acquired in California Valley, or the California portions of Sandy (Mesquite) Valley and Stewart Valley. The applicant and the CEC shall investigate means to enhance degraded public lands, including lands designated Wilderness as an alternative to utilizing private lands in Inyo County as compensatory mitigation.

Comment 20

Add the following new COC: If private lands within Inyo County are to be used as compensatory mitigation for impacts of the project, whether such lands are selected before or after certification of the project, prior to the selection of such lands, the CEC will conduct a study of the lost economic opportunity costs which the County would suffer as a result of the conversion of the private lands to mitigation lands and of the environmental impacts that would result from such conversion and, if any such lands are selected, the CEC will impose appropriate mitigation to fully offset any identified adverse impacts to the County and/or to the environment.

Comment 21

Revise BIO-18, subsection 6 to read: Compensate Local Agencies for Increased Weed Monitoring and Abatement. The project owner and the Inyo/Mono Agricultural Commissioner shall coordinate with local agricultural commissioner(s) to establish an amount for a fee to be paid annually by the project owner to the local agency(ies) for increased offsite monitoring and abatement costs resulting from the construction and operation of the project.

Comment 22

Revise BIO-23, subparagraph 2, to read: Definitions. "Less than significant effect" shall be defined as less than 20 percent change from the baseline condition or values in any of the vegetation attributes monitored that indicates a decline in the health of the mesquite and other groundwater-dependent species. The "baseline" for groundwater levels shall be as defined in WATER SUPPLY-6 and includes pre-project water levels and background trends. Baseline, or pre-project values for vegetation attributes shall be established at the GDE plots and offsite reference plots prior to the start of groundwater pumping. A "statistically significant decline" in groundwater elevation shall be defined as a drawdown that exceeds the background decline by 0.5 feet as described in WATER SUPPLY-6. "Normal seasonal variation" in vegetation attributes shall be established by comparing attributes in vegetation between the peak growing season and the hottest and driest time of year for Pahrump Valley to the baseline data.

Comment 23

Replace BIO-23 subparagraph 3, with the following: Based on the results of inventory of groundwater-dependent and groundwater-influenced habitat and resources produced under BIO-23, subparagraph 13, an amount of water table drawdown that would cause a significant impact to GDEs shall be identified. Using drawdown curves calculated using representative aquifer parameters applied to the Theis method, determine the maximum pumping rate that will not exceed the threshold of significant drawdown at GDEs over the life of the project. Using this pumping rate and these aquifer parameters, determine the maximum drawdown that could occur within each monitoring well located between the project and the GDEs without exceeding the threshold of significant drawdown for any GDE. If drawdown in any monitoring well exceeds the drawdown that corresponds to a threshold of significant drawdown for any GDE, the project owner shall have 90 days to provide evidence to the CPM that the drawdown is not a result of groundwater pumping by the project. If after reviewing the evidence provided by the project

Comment 23, cont'd

owner and other relevant evidence, the CPM, in consultation with BLM Nevada and California state leads for Soil, Water, Air and Riparian Programs, the BLM Southern Nevada District Hydrologist and Botanist and the Inyo County Water Department concludes that the drawdown is due to groundwater pumping by the project, the CPM shall notify the project owner that its groundwater pumping is to cease.

Subsequently, the project owner may resume pumping if the CPM, in consultation with BLM Nevada and California state leads for Soil, Water, Air and Riparian Programs, the BLM Southern Nevada District Hydrologist and Botanist and the Inyo County Water Department concludes that the exceedance of the drawdown trigger(s) was due to factors other than the project's pumping, and that the project's groundwater pumping did not contribute to the trigger exceedance, or the water table recovers to baseline levels.

Comment 24 Revise BIO-23, Subparagraph 13 to read: The Vegetation Monitoring Plan shall include an inventory of groundwater-dependent or groundwater-influenced habitat and resources that may be potentially affected by the Project. The inventory should identify and describe habitat and resources that are dependent on or influenced by groundwater, including spring flow, base flow to streams and rivers, phreatophytic meadows, phreatophytic scrub, and riparian areas. At a minimum, baseline data shall be collected at all monitoring sites and reference sites twice annually between project approval and the start of pumping. Vegetation data collected at the GDE plots within the first two years following the start of pumping may also be used to improve the baseline dataset if corresponding monitoring wells detect no statistically significant water table drawdown at those sites. Subject to approval by the CPM, in consultation with BLM Nevada and California state leads for Soil, Water, Air and Riparian Programs, and the BLM Southern Nevada District Hydrologist and Botanist and the Inyo County Water Department, if groundwater pumping ceases or is replaced by other water sources, vegetation monitoring shall continue until groundwater levels have returned to baseline levels.

H. Revise the first two paragraphs of BIO-24 to read: Thresholds for remedial a **Comment 25**
defined in **BIO-23** and **WATER SUPPLY-6**, are designed to avoid impacts to the mesquite woodlands and other groundwater-dependent ecosystems (GDEs) near the project before they result in a loss of resources, or a significant impact to habitat functions and value. ~~If monitoring detects project related impacts to any groundwater dependent ecosystems (GDEs) that meet or exceed the thresholds, the project owner shall determine which project well(s) are the source of the impact and stop pumping, modify or reduce pumping at that well(s) as necessary to restore the groundwater elevation to pre-threshold levels. As provided in BIO-23, if drawdown in any monitoring well exceeds the drawdown that corresponds to threshold of significant drawdown for any GDE, the project owner shall have 90 days to provide evidence to the CPM that the drawdown is not a result of groundwater pumping by the project. If after reviewing the evidence provided by the project owner and other relevant evidence, the CPM, in consultation with BLM Nevada and California state leads for Soil, Water, Air and Riparian Programs, the BLM Southern Nevada District Hydrologist and Botanist and the Inyo County Water Department concludes that the drawdown is due to groundwater pumping by the project, the CPM shall notify the project owner that its groundwater pumping is to cease. Pumping shall cease until the project owner has provided evidence, subject to approval by the CPM in consultation with the BLM Nevada and California state leads for Soil, Water, Air and Riparian Programs, and the BLM Southern Nevada District Hydrologist and Botanist, that a reduction or modification in pumping would restore the groundwater elevation to pre-threshold levels, as demonstrated by a statistical trend analysis, refined by the most recent annual monitoring data as described in **WATER SUPPLY-6**, that compares actual to predicted water level declines due to project pumping. This provision is not a replacement for the acquisition and retirement of water rights prescribed in **WATER SUPPLY-2** to offset the project's contribution to the basin imbalance.~~

Comment 25, cont'd

Subsequently, the project owner may resume pumping if the CPM, in consultation with BLM Nevada and California state leads for Soil, Water, Air and Riparian Programs, the BLM Southern Nevada District Hydrologist and Botanist and the Inyo County Water Department concludes that the exceedence of the drawdown trigger(s) was due to factors other than the project's pumping, and that the project's groundwater pumping did not contribute to the trigger exceedence or that modifying or reducing pumping will restore the groundwater elevation to pre-threshold levels.

Comment 26

Revise the first two paragraphs of BIO-24, Verification to read: ~~If monitoring data demonstrate that the threshold for remedial action is met or exceeded, the project owner shall stop pumping and notify the CPM within 48 hours of detection.~~

The project owner may resume pumping only if the CPM has reviewed and approved evidence, in consultation with the BLM Nevada and California state leads for Soil, Water, Air and Riparian Programs, and the BLM Southern Nevada District Hydrologist and Botanist and the Inyo County Water Department, that modifying or reducing pumping will restore the groundwater elevation to pre-threshold levels.

Comment 27

Revise BIO-26, Verification to read: At least 120 days prior to the start of any project-related site disturbance activities, the project owner shall submit to the CPM and to the Inyo County Planning Department a preliminary draft plan for review and approval. The project owner shall incorporate all required revisions and submit a final preliminary plan to the CPM no less than 60 days prior to the start of ground disturbing activities. At least 30 days prior to the start of ground disturbing activities, the project owner shall submit to the CPM and to Inyo County for review and approval evidence of a financial assurance mechanism (i.e. bond, letters of credit, trust funds, etc.) to ensure sufficient financial assurances are in place to fully restore the project site to pre-project conditions in accordance with the final preliminary plan.

At least one year prior to planned closure and decommissioning, the project owner shall submit to the CPM and to the Inyo County Planning Department for review and approval, in consultation with the Inyo County Planning Department, a draft final closure plan. The project owner shall incorporate all required revisions and submit a final plan to the CPM no less than 90 days prior to the start of ground disturbing activities associated with project closure and decommissioning activities. At least 90 days prior to the start of ground disturbing activities associated with project closure activities, the project owner shall submit to the CPM and to Inyo County for review and approval, evidence of a financial assurance mechanism (i.e. bond, letters of credit, trust funds, etc.) to ensure sufficient financial assurances are in place to fully restore the project site to pre-project conditions in accordance with the final plan.

Any modifications to the plan shall be made only after consultation and approval of the CPM and with the Inyo County Planning Department. The project owner shall notify the CPM and the Inyo County Planning Department no less than 90 days before implementing any proposed modifications to the plan.

Within 30 days after completion of project construction for each phase of development, the project owner shall provide to the CPM and the Inyo County Planning Department a written report identifying which items of the Closure, Revegetation and Reclamation Plan have been completed, a summary of all modifications to mitigation measures made during the project's construction phase, and which items are still outstanding.

Land Use – Revised Conclusions and Recommendations

Comment 28

Revise the last paragraph of the Conclusions and Recommendations section to read: The applicant has responded to staff's data requests regarding land use inconsistencies by stating that they would work with Inyo County to determine appropriate land use entitlements. On July 10, 2012, the applicant submitted an application for a general plan amendment and

Comment 28, cont'd

zoning reclassification. If the application is approved by Inyo County, the project would be consistent with the County of Inyo General Plan and Zoning Ordinance; however, approval of the application will not resolve the issue of placing of project structures on public roads nor will it resolve the placing of project structures across lot lines or provide the required ~~To date the applicant has not submitted applications to the county in order for the county to provide input to staff for development of appropriate conditions of certification. Staff has recommended two conditions of certification related to the Subdivision Map Act and financial assurances under Title 21, the Renewable Energy Ordinance.~~

Land Use – New or Revised Findings of Fact

Comment 29

- A. Add the following new finding: The HHSEGS proposes placing structures within public roads, which are property rights held by the public, and across property lines.
- B. Add the following new finding: The HHSEGS would not be consistent with the Inyo County Subdivision ordinance or California statutes without the proposed COCs.
- C. Add the following new finding: The Inyo County Board of Supervisors holds exclusive authority to abandon public roads and the take land use actions, such as merging lots or reverting acreage.

Land Use – New or Revised Conditions of Certification

Comment 30

A. Revise LAND-2 to read: At least 30 days prior to the start of any project-related site disturbance activities, the project owner shall submit evidence of a financial assurance mechanism or proposal agreement to the CPM and Inyo County for review and approval (i.e. bond, letters of credit, trust funds, etc.) to ensure sufficient financial assurances are in place to fully restore the project site to pre-project conditions in accordance with the preliminary plan required by BIO-26. Additionally, at least 90 days prior to the start of ground disturbing activities associated with planned project closure activities in accordance with the final closure plan required by BIO-26, the project owner shall submit to the CPM and to Inyo County for review and approval, evidence of a financial assurance agreement (i.e. bond, letters of credit, trust funds, etc. to ensure sufficient financial assurances are in place to fully restore the project site to pre-project conditions in accordance with the final plan.

The agreement shall allow the CEC Energy Commission to use the decommissioning fund to restore the property to pre-project conditions in the event that the project owner, or its successors or assigns, do not properly decommission the project or restore the property to pre-project conditions within a reasonable time following the cessation of business operations or the abandonment of the project or property for whatever reason.

The agreement shall provide that the amount of the decommissioning fund shall be calculated to fully implement the decommissioning activities as described in the preliminary and the final closure plans for the HHSEGS project and the property. The project owner shall pay for the County to retain a third party expert to review the preliminary and final closure plans and confirm about the adequacy of the decommissioning fund. The decommissioning fund shall be adjusted for inflation (every three years) and for any updates to the final closure plans.

With regards to the inflationary adjustment, the agreement shall specify either a process or the most appropriate inflationary index(es) to capture the actual costs to perform the necessary decommissioning work. The agreement also shall provide that, in the event that the decommissioning fund is inadequate to fully decommission the project or restore the property, the project owner, its successors or assigns, shall be liable for any amount expended by the CEC or by the County over the decommissioning fund balance and shall provide for termination of the decommissioning fund upon the completion of implementation of the final closure plan.

Verification: At least 30 days prior to the start of construction and prior to any Notice to Proceed with construction issued by the CPM, the project owner shall provide the CPM with documentation of an approved financial assurance or agreement satisfactory to Inyo County and CPM, and at least 90 days prior to the start of ground disturbing activities associated with planned project closure activities in accordance with the final closure plan required by BIO-26, the project owner shall provide the CPM with documentation of an approved financial assurance or agreement satisfactory to Inyo County and CPM.

Comment 31

B. Add the following new COC: The project owner shall comply with the provisions of Title 16, Subdivisions, Inyo County Code of Ordinances and Streets and Highway Code Section 8310 et seq. to ensure that public roads within the project site have been abandoned by the Inyo County Board of Supervisors.

Verification: At least 30 days prior to construction of the HHSEGS project, the project owner shall submit evidence to the CPM, indicating that the Inyo County Board of Supervisors has abandoned such public roads on the project site as necessary to allow construction of project facilities in the former public roads.

Socioeconomics – New or Revised Findings of Fact

Comment 32

Insert the following language and findings of fact: Staff concludes that HHSEGS would cause a significant adverse, direct, indirect, or cumulative socioeconomic impact to the County of Inyo as a result of the increased need to provide County services directly relating to the construction and operation of the proposed project, specifically the increased services necessary from the following County departments: Sheriff's Department, Health and Human Services, Integrated Waste Management, Motor Pool, Inyo/Mono Agriculture Commissioner, Water Department, Information Services, and Assessor, based on the following proposed findings of fact:

Comment 33

1. The HHSEGS is located more than 200 miles from the Owens Valley, the population center of the County and is expected to be constructed on approximately 3,200 acres of privately owned land in the Charleston View area of the County. The project applicant holds an option to lease the HHSEGS site and other privately owned lands adjacent to the site, which, when combined with the HHSEGS site, totals nearly 10,000 acres;

Comment 34

2. Less than two percent of Inyo County remains in private ownership, and every acre restricted for the purpose of compensatory mitigation results in a significant impact. Biology-related compensatory mitigation proposed for the project exceeds 6,000 acres, including requirements to encumber private lands in Inyo County with a conservation easement in perpetuity. If private lands within Inyo County are utilized for compensatory mitigation, there will be significant impacts to the economic environment in Inyo County.

Comment 35

3. The residential area commonly referred to as Charleston View, located directly south of the HHSEGS site across Old Spanish Trail, is occupied by approximately 65 residents;

Comment 36

4. The closest communities to the HHSEGS site within which the County of Inyo provides County services to residents and visitors are the communities of Tecopa and Shoshone, located approximately 30 miles west of the HHSEGS site;

Comment 37

5. Approximately 181 residents reside in the communities of Tecopa and Shoshone and Charleston View;

Comment 38

6. The County provides non-law enforcement services to the HHSEGS site with limited local staff, primarily staffed in Tecopa, and supplements those services with staff from the County offices located in Lone Pine, Independence and Bishop;

Comment 39

7. General law enforcement services are provided through the Inyo County Sheriff's Department through two resident deputies residing in Shoshone in County-owned housing. The patrol area for the deputies patrolling the HHSEGS site encompasses 3200 miles, consisting of both paved and unpaved roads.

Comment 40

8. During construction of the HHSEGS, additional County services will be required in order to address the service needs due to the anticipated construction workforce, which will peak at nearly 1,100 employees.

Comment 41

9. The HHSEGS is anticipated to be constructed under the terms and conditions of a project labor agreement with the Kern, Inyo and Mono Trades Council, which agreement would provide hiring preferences to union employees residing in Kern, Inyo and Mono counties. If the proposed project's construction workforce needs are not met by union employees in those counties, hiring preferences will be extended to union employees residing in California. Due to the remote location of the HHSEGS site and the fact that there is not a large California union labor pool residing within a two-hour commute of the HHSEGS site, the majority of the construction workforce will commute from areas within California remote from the project site.

Comment 42

10. The HHSEGS site's close proximity to the Nevada community of Pahrump and the city of Las Vegas will result in sufficient temporary housing stock for the construction workforce. Limited temporary housing is available in Inyo County in the communities of Tecopa and Shoshone, mostly in the form of campsites. In addition, the HHSEGS site is surrounded by numerous vacant privately owned parcels upon which illegal, onsite usage, or "squatting", has occurred in the past. The applicant estimates that five percent (5%) of the construction workforce, approximately 55 employees, will reside in Inyo County. That will result in a 30% increase in the total population in the communities surrounding the HHSEGS.

Comment 43

11. The temporary increase in population will result in an increase in County services to the south east portion of the County currently served with limited resources. Local law enforcement in Clark County Nevada, the agency responsible for general law enforcement in Primm, Nevada, experienced a 30% increase in service calls in Primm during the construction of the Ivanpah project. It is likely that similar increases will be seen in both Inyo County and neighboring counties in Nevada from the increase in residents resulting from temporary construction housing.

Comment 44

12. The County estimates that the increased cost for services resulting from the HHSEGS is \$11,129,466 during the construction period and \$1,713,735 during the operation of the project. Specifically, those costs are estimated, based on the information available to the County as of February 16, 2012, as follows:

Comment 45

<u>Agency/Department</u>	<u>Initial/Construction</u>	<u>Ongoing Annual</u>
Health & Human Services		\$188,115
Assessor	\$120,000	\$120,000
Sheriff	\$2,130,666	\$1,269,120
Public Works	\$8,157,000	\$78,500
Information Services	\$237,600	
Agricultural	\$150,000	\$50,000
Waste Management	\$156,000	
Motor Pool	\$33,200	
Water Department	\$145,000	\$8,000
Total	\$11,129,466	\$1,713,735

Comment 46

The increased costs identified by the County will not be off-set by the estimated increase in property tax. In addition, due to the location of the HHSEGS in a remote area of the County and the HHSEGS site's close proximity to large communities in Nevada, the County is not expected to benefit from other economic benefits which generally flow from projects similar to the HHSEGS.

Comment 47

13. Title 21 of the Inyo County Code sets forth the policy and permitting requirements of the County for renewable energy facilities. Title 21 governs the siting, licensing and construction of the proposed project. Title 21 includes a definition of "environment" which exceeds that contained in the California Environmental Quality Act and includes economic environment of the County. One of the stated purposes of Title 21 is "to recover the costs of increased services" resulting from the construction of a facility such as the proposed project. Mitigation measures mandated by Title 21 include those necessary to "ensure that the County and its citizens do not bear an undue financial burden from the project."

Comment 48

14. The estimated cost of construction of the HHSEGS exceeds \$5,000,000 and, as such, the local sales and use taxes from the construction contractors may be allocated to the local jurisdiction of the specific construction jobsite by the contractor and subcontractors. The designation of the HHSEGS jobsite for purposes of sales and use tax would result in the County receiving revenues to off-set the economic impacts resulting from the increased service costs caused by the HHSEGS.

Comment 49

15. The applicant indicated a willingness to maximize the tax benefits to the County. (Data Request Set 2-F, Response 194). In order to maximize such benefits it is necessary that the County retains a consultant with expertise in the area of sales and use tax, which consultant should be funded by the project owner, so as to assure the proper procedures and designations are met.

Comment 50

16. The May 12 Socioeconomic and Fiscal Impacts of the HHSEGS on Inyo County, prepared by the CEC, has unequivocally stated that the County of Inyo will receive in excess of \$84.5 million in sales and use tax during the three-year construction period for the HHSEGS.

Socioeconomics – New or Revised Conditions of Certification

Comment 51

A. Add the following new COC: SOCIO 2 (Local Sales and Use Tax)

1. The project owner shall require that all qualifying contractors and subcontractors exercise their option(s) to obtain a Board of Equalization sub-permit for the HHSEGS jobsite and allocate all eligible sales and use tax payments to the County of Inyo. Prior to commencement of any construction activity on-site, the project owner will require that the contractor or

Comment 51, cont'd

subcontractor provide to the County of Inyo a copy of the contractor's or subcontractor's State of California Board of Equalization (BOE) account number(s) and sub-permit(s), or a statement that use tax does not apply to their portion of the project. To accomplish this, project owner shall either cause its construction contractor to treat the project in accordance with Title 18 CCR Sections 1521(b)(2)(B), 1521(c)(13)(B) and 1826(b), for sales and use tax purposes or form a "Buying Company" as defined in the State of California BOE Regulation 1699(h), or take such other action as directed by the consultant and County. The project owner can adopt an alternate methodology to accomplish this goal if such methodology is approved by the County prior to commencement of construction.

Comment 52

2. The project owner shall be required to reimburse the County for all costs associated with any expenses it incurs for consultants with expertise in sales and use tax allocation, hired by the County, to assist the project owner and its contractor and subcontractors to complete and submit all documents necessary to register the HHSEGS project site as the source of all sales and use taxes in conformance with the laws and regulations of the BOE. The consultant may set out the necessary procedures which the project owner, its contractor and all qualifying subcontractors shall follow in order to maximize the County's receipt of sales tax.

Comment 53

3. If project owner receives an exclusion of applicable sales and use tax payable to the County under Senate Bill 71 under the State Public Resources Code (Section 26003 et seq.) and the California Alternative Energy and Advance Transportation Financing Authority (CAEATFA), project owner shall pay to the County of Inyo \$84.5 million, which represents the estimated amount of the sales tax which would have been received if project owner had not obtained such exclusion, as set forth in the "Socioeconomic and Fiscal Impacts of the Hidden Hills Solar Electric Generating System on Inyo County" dated May 2012.

Comment 54

4. Within five (5) days of certification, project owner shall deliver to the County a letter of credit, which may be drawn upon as expressly set forth below. The amount of the letter of credit shall be \$84.5 million.

Comment 55

5. The letter of credit may be reduced annually to an amount equal to the then amount of the letter of credit minus the then cumulative total amount of Local Sales and Use Tax attributable to construction of the proposed project that the BOE records indicate were allocated to the County of Inyo. Project owner may replace the existing letter of credit with a new letter of credit in an amount equal to the new amount required as determined using the calculation method described above.

Comment 56

6. Within 30 days after the completion of construction of the proposed project, the consultant, project owner and County shall review the BOE records to determine if the cumulative Local Sales and Use Tax attributable to construction of the proposed project and allocated by the BOE to the County is less than the estimated \$84.5 million; if so, the project owner shall pay such difference within sixty (60) days of the date the County notifies the project owner of the deficiency. If the project owner fails to pay such difference within such time period, the County of Inyo may draw upon the letter of credit in an amount equal to the deficiency. Any disputes between project owner and the County shall be resolved by the CEC.

Comment 57

7. Upon payment in full of the amount of the \$84.5 million (whether through allocations from the BOE, direct payments under this section, and/or draws upon the letter of credit), or upon abandonment of the proposed project, the letter of credit shall be returned to the project owner.

Comment 58

8. The letter of credit is intended as mitigation required under Title 21 of the Inyo County Code by way of requiring security to the County for the receipt by the County of Local Sales and Use Tax, which is anticipated to provide revenue necessary to the County to off-set the increased service costs caused by the proposed project when combined with the anticipated increase in property tax revenue from the project site. In the event the proposed project is not constructed, is only partially constructed, or is reduced in size, the letter of credit obligation and the obligation to pay the County of Inyo any deficiency with respect to the \$84.5 million shall be reduced in size, the letter of credit obligation and the obligation to pay County any deficiency with respect to the \$84.5 million shall be reduced accordingly through a revised estimate established by the consultant. Project owner shall provide the information needed by the consultant and County to make this revised estimate.

Verification: The project owner shall further provide proof of the establishment of the letter of credit in the amount of \$84.5 million and shall further provide confirmation from Inyo County of the hiring of a consultant at project owners' expense.

Comment 59

B. Add the following new COC: SOCIO-3 (Economic Mitigation on Private Lands within Inyo County)

1. The applicant and the CEC, in coordination with the County, shall investigate and implement, means to enhance degraded public lands (including lands designated Wilderness), rather than use private lands in Inyo County for compensatory mitigation, including investigating and advocating for means to quantify restoration activities on public lands in lieu of direct compensatory mitigation.

Comment 60

If private lands within Inyo County are to be used as compensatory mitigation for impacts of the project, whether such lands are selected before or after certification of the project, prior to selection of such lands, the CEC should cause a study of the lost economic opportunity costs which the County would suffer as a result of the conversion of the private lands to mitigation lands and the environmental impacts what would result from such conversion and, if any such lands are selected, that the CEC impose appropriate mitigation, including economic mitigation mandated by Title 21 of the Inyo County Code of Ordinances, to fully offset any identified adverse impacts to the County and/or to the environment.

Traffic and Transportation – New or Revised Conditions of Certification

Comment 61

A. Revise COC TRANS-2 (Right-of-Way) as follows: Prior to any ground disturbance, improvements, or obstruction of traffic within any public road, the project owner shall dedicate to the County of Inyo 24 feet of right-of-way along Old Spanish Trail Highway for the length of HHSEGS site. The configuration of driveways into the HHSEGS site do not allow for rights-of-way for traffic transitions within the limits of the HHSEGS site. The drive locations shall be reconfigured to accommodate traffic transitions within the limits of the property boundaries or additional right-of-way beyond the HHSEGS site shall be acquired and dedicated to Inyo County along the Old Spanish Trail Highway.

Revise Verification: Prior to the start of construction, the project owner shall provide evidence to the CPM that the dedication of right-of-way to and accepted by Inyo County has been completed.

Comment 62

Add the following new COC TRANS-2A (Pavement Preparation/Widening) as follows: Prior to any ground disturbance, other improvements, or other obstruction of traffic within any public road, the project owner shall apply for and receive an encroachment permit from Inyo County for the construction and completion of construction of an asphalt concrete overlay on Old Spanish Trail Highway and pavement widening including transitions to accommodate the turning movements along Old Spanish Trail Highway into and out of the HHSEGS site.

Add Verification: Prior to the start of onsite construction, the project owner shall provide evidence to the CPM that the construction of asphalt concrete overlay and turn lanes into and out of the HHSEGS site have been accepted by Inyo County.

Comment 63

C. Revise Verification of COC TRANS-3 to read: Prior to the start of site mobilization, the project owner shall photograph or videotape all of the affected public roads, easements, right-of-way segment(s), and/or intersections (including the portion of the Old Spanish Trail located to the west of project). The project owner shall provide the photographs or videotape to the CPM and the affected jurisdictions (California Department of Transportation (Caltrans), Nevada Department of Transportation (NDOT), and Inyo County). The purpose of this notification is to request that these jurisdictions consider postponement of any planned public right-of-way repair 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.

If damage to public roads, easements, or rights-of-way is identified by the project owner or the affected jurisdiction occurs during construction, the project owner shall immediately notify the CPM and the affected jurisdiction(s) to identify the section of the public right-of-way to be repaired. At that time, the project owner shall apply for, receive and comply with all conditions of an encroachment permit from the affected jurisdiction and establish a schedule for completion and approval of the repairs. Following completion of any public right-of-way repairs, the project owner shall provide the CPM letters signed by the person authorized to accept the repairs in the affected jurisdiction(s) stating their satisfaction with the repairs. If, in the opinion of the affected jurisdiction(s), the project owner is not timely in completing the required repairs, the jurisdiction(s) can, at its discretion, complete the repairs with its own staff or contract with an independent contractor to complete the repairs at the expense of the project owner. The project owner will reimburse the affected agency(ies) for the expense of the repairs.

Comment 64

Revise COC TRANS-4 (Truck Route) as follows: The project owner shall require all construction truck traffic use State Route 160 for all access to and from the project site. Throughout the construction and operation of the project, the project owner shall document, that all trucks access the project site using Nevada State Route 160 and shall investigate, evaluate, and attempt to resolve all project truck-related complaints. The project owner or authorized agent shall:

- Use the Traffic Complaint Resolution Form (below), or a functionally equivalent procedure acceptable to the CPM, to document and respond to each traffic complaint;
- Attempt to contact the person(s) making the traffic complaint within 24 hours;
- Conduct an investigation to determine the transportation company in the complaint and;
- Submit a report documenting the complaint and actions taken.

The report shall include: a complaint summary, including the final resolution and, if obtainable, a signed statement by the complainant stating that the truck route problem has been resolved to the complainant's satisfaction.

The project owner will pay a \$10,000 penalty to Inyo County for each truck that accesses the site using the portion of the Old Spanish Trail Highway to the west of the project. This penalty shall be in addition to the restoration of any damage to the portion of the Old Spanish Trail to the west of project caused and addressed in accordance with TRANS 3.

Verification: The project owner shall include this specific route in its contracts for truck deliveries and provide the CPM with a copy of the transmittal letter to the contractors specifying the truck route.

Comment 65 Revise COC TRANS-5 (Traffic Control Plan, Heavy Hauling Plan, and Parking/Staging Plan) as follows: Prior to the start of construction of the HHSEGS, the project owner shall prepare a Traffic Control Plan (TCP) for the HHSEGS'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 9 office, Nevada Department of Transportation (NDOT) and Inyo County in the preparation and implementation of the Traffic Control Plan (TCP). The project owner shall submit the proposed TCP to Caltrans District 9, NDOT, and Inyo County 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 Traffic Control Plan (TCP) shall include:

- 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), Nevada Department of Transportation (NDOT)~~ other state or federal agencies, and/or the affected local jurisdictions;
- Location and details of construction along affected roadways at night, where permitted;
- 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 Inyo and NDOT) to ensure access during temporary lane/road closures;
- Access to residential and/or commercial property located near construction work and truck traffic routes;
- Insurance 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;
- A plan for monitoring LOS during construction on SR 160 and Old Spanish Trail Highway. The applicant shall report LOS findings to the ~~Energy Commission~~ CEC's CPM as necessary;
- Assessment and implementation, if needed, of coordinated work hours and arrival/departure times outside of peak traffic;
- A coordinated park-and-ride program or rideshare program designed to transport construction workers to the project site via a van or bus service.
- Identification of safety procedures for exiting and entering the site access gate;
- Parking/Staging Plan (PSP) for all phases of project construction and for project operation.

For any activity on public roads, the project owner shall apply for, receive and comply with all conditions of an encroachment permit from the affected jurisdiction.

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, and a copy of the encroachment permit issued by the affected agency for any activities on a public road.

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.

Comment 66

Visual Resources – New or Revised Conditions of Certification

A. Add the following new COC: The applicant/project owner shall provide a community center with parking. A detailed plan shall be developed.

Verification: At least 120 days before project commencement a detailed plan shall be submitted to the CPM for review and approval, and to Inyo County, affected Tribes and other stakeholders for review and comment. Plan details shall include:

- a.) Parking and visitor area surface treatments;
- b.) Landscape planting and irrigation plan;
- c.) Parking area plan indicating lighting, parking striping, ingress and egress;
- d.) Structural elements material finishes and details.

(a-b-c-d above may all be incorporated into the landscape plan required in VIS-2 and lighting plan required in VIS-3).

Water Supply – New or Revised Findings of Fact

Add the following new finding: With the proposed COCs, the project will protect the County of Inyo's citizens and environment from impacts related to groundwater pumping.

Water Supply – New or Revised Conditions of Certification

Comment 67

A. Revise the first paragraph of WATER SUPPLY-6 to read: The project owner shall submit a Groundwater Level Monitoring, Mitigation, and Reporting Plan to the CPM and to the Inyo County Water Department for review and approval in advance of construction activities and prior to the operation of onsite groundwater supply wells. The Groundwater Level Monitoring, Mitigation, and Reporting Plan shall provide detailed methodology for monitoring background and site and off-site groundwater levels. The monitoring period shall include pre-construction, construction, and Project operation. The plan shall establish pre-construction and Project-related groundwater level trends that can be quantitatively compared against predicted trends near the Project pumping wells and near potentially impacted resources.

Comment 68

B. Revise WATER SUPPLY-6, A.1 to read: A well reconnaissance shall be conducted to investigate and document the condition of existing water supply wells located within 3 miles of the project site, provided that access is granted by the well owners. The reconnaissance shall include sending notices by registered mail to all property owners within a 3 mile radius of the project area, shall identify the owner of each well, and shall include the location, depth, screened interval, pump depth, static water level, pumping water level, and capacity of each well. The plan should include, as feasible, agreements from the owner of each well approving monitoring activities.

Comment 69

Revise the first paragraph of WATER SUPPLY-8 to read: The project owner shall submit a Groundwater Level Monitoring, Mitigation, and Reporting Plan to the CPM and to the Inyo County Water Department for review and approval in advance of construction activities and prior to the operation of onsite groundwater supply wells. The Groundwater Level Monitoring, Mitigation, and Reporting Plan shall provide detailed methodology for monitoring background and site and off-site groundwater levels. The monitoring period shall include pre-construction, construction, and Project operation. The plan shall establish pre-construction and Project-related groundwater level trends that can be quantitatively compared against predicted trends near the Project pumping wells and near potentially impacted resources. The plan shall include a model for predicting changes in the groundwater flow system resulting from the Project which

Comment 69, cont'd

has the capability to assess changes in hydraulic head, flow rate, flow direction, and water budget and shall include model runs which predict effects of the planned groundwater pumping by the Project on GDEs and predictions of the level of groundwater pumping that will cause significant impacts on such habitats and resources. The Project Owner shall also use the model to provide an evaluation of the sustainability of the water supply for the life of the project, including the cumulative sustainability when considered with other pumping occurring or projected to occur in the groundwater basin.

~~This condition proposes a threshold for significant impacts to groundwater-dependent vegetation caused by water level decline due to Project groundwater pumping. This condition also proposes mitigation that would, if initiated, reduce the impact to a level that is less than significant.~~

The plan shall also include:

- i. Provisions for initiation of water level monitoring as soon as wells are available and results will be publicly available;
- ii. A plan for logging and aquifer testing of all new production wells;
- iii. A plan for verifying the predictive tools described above and for revising or recalibrating the tools as necessary.
- iv. A plan for revising thresholds as dictated by new data concerning system response to Project operation.
- v. In cooperation with U.S. BLM and if permission is granted by BLM, the applicant shall fund and construct a monitoring well approximately ½ mile west of the Stump Springs ACEC for inclusion in the monitoring well network.
- vi. An enforceable commitment based on monitoring data and significance thresholds, to implement mitigation measures as necessary.

Comment 70

Revise WATER SUPPLY-6.C.4 and WATER SUPPLY 8.C.5 to read: After the first five-year operational and monitoring period the CPM shall evaluate the data and determine if the monitoring program for water level measurements should be revised or eliminated. Revision or elimination of any monitoring program elements shall be based on the consistency of the data collected. The determination of whether the monitoring program should be revised or eliminated shall be made by the CPM. Groundwater elevations shall be measured throughout the life of the project at least twice per year, and reported to the CPM and to the Inyo County Water Department. The County will report these data to the California Department of Water Resources as part of the California Groundwater Elevation Monitoring Program.

Comment 71

Revise the Verification section of WATER SUPPLY-8 in each instance where a report or information is to be submitted to the CPM to read: ...to the CPM and to the Inyo County Water Department.

NOW, THEREFORE, BE IT FURTHER RESOLVED that, based on the information available to date and with incorporation of the findings and COCs delineated above, this Board of Supervisors finds that that the proposed HHSEGS minimizes potential social, economic, and environmental impacts to the extent feasible, and that the reclamation plan, financial assurances, and other conditions incorporated herein adequately safeguard the health, safety, and welfare of the County's citizens, the County's environment (including its public trust resources), and the County's financial well-being.

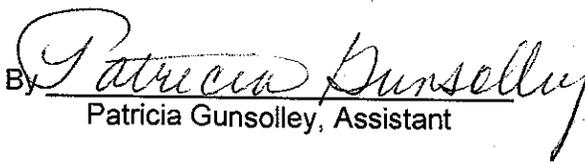
BE IT FURTHER RESOLVED that, based on the information available to date and with the incorporation of the findings and COCs delineated above, along with the findings and COCs set out in the PSA, this project would comply with Title 21 of the Inyo County Code.

PASSED AND ADOPTED this 17th day of July, 2012 by the following vote of the Inyo County Board of Supervisors:

AYES: Supervisors Arcularius, Cash, Pucci, Fortney and Cervantes
NOES: -0-
ABSTAIN: -0-
ABSENT: -0-


Chair, Inyo County Board of Supervisors

ATTEST: Kevin Carunchio
Clerk of the Board

By 
Patricia Gunsolley, Assistant

Comparison of the Hidden Hills Solar Energy System to Applicable Goals & Policies of the Inyo County General Plan

Inyo County General Plan Goal or Policy	Analysis of Proposed Project's Consistency as Condition in PSA	Identified by PSA as LORS?
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GOVERNMENT ELEMENT		
<p>Goal GOV-1: Work with Agencies, Utilities, and Native American Tribes to promote consistency with the County's General Plan</p> <p>AND</p> <p>Policy GOV-1.1/Plans for Agencies, Districts, Utilities, and Native American Tribes: The County shall work with federal and state agencies, local districts, utilities (e.g., LADWP), and Native American tribes to ensure that they are aware of the contents of the County's General Plan and work with them to ensure that their plans are consistent with the County's General Plan to the greatest extent possible.</p>	<p>Consistency: Compliant. A number of public hearings on the project have been held in 2011-2012.</p>	No.
<p>Goal GOV-2: To ensure planning decisions are done in a collaborative environment and to provide opportunities of early and consistent input by Inyo County and its citizens into the planning processes of other agencies, districts, and utilities.</p>	<p>Consistency: Compliant. A number of public hearings on the project have been held in 2011-2012.</p>	No.
<p>Policy GOV-2.2/Public Participation: The County shall work with federal and state agencies, local districts, utilities (e.g., LADWP), and Native American tribes to ensure that the County and the public are involved early in any planning processes and that routine feedback and public input is requested.</p>	<p>Consistency: Compliant. A number of public hearings on the project have been held in 2011-2012.</p>	No.
<p>Policy GOV-3.1/No Net Loss: The County shall work with federal and state agencies, local districts, utilities (e.g., LADWP) and Native American tribes to ensure that land exchanges do not result in a net loss to the</p>	<p>Consistency: Non-compliant. Preliminary assessment of the project suggests mitigation in the form of acquisition of off-site lands for habitat/habitat enhancement. However,</p>	No.

Inyo County General Plan Goal or Policy	Analysis of Proposed Project's Consistency as Conditioned in PSA	Identified by PSA as LORS?
County's tax base or revenues.	such mitigation would result in a net loss of County land. Compliance could be met based on the addition of the County's Conditions of Certification.	
<p>Policy GOV-3.2/Private Land Increase: The County shall work with federal and state agencies, local districts, and utilities to find opportunities to expand private land ownership in the County through land transfers and other mechanisms.</p>	<p>Consistency: Non-compliant. Preliminary assessment of the project suggests mitigation in the form of easements on off-site lands for habitat/habitat enhancement. However, such mitigation would result in a net loss of private land. Compliance could be met based on the addition of the County's Conditions of Certification.</p>	No.
<p>Goal GOV-4.1/Federal Land Disposition & Acquisitions: It is the policy of the Board that the design and development of all federal and state land dispositions and acquisitions, including land adjustments and exchanges, be carried out to the benefit of the citizens of the planning area to ensure the following:</p> <ul style="list-style-type: none"> a. That the County property tax base shall be maintained unless the Board determines there is an overriding benefit to the County. b. That the private property interests including, but not limited to, land patents, drilling rights, mining claims, easements, rights-of-way and forage rights are protected and enhanced. c. That residents within the planning area shall suffer no adverse aggregate economic impacts. d. That incentives be developed to provide an increase in local economic development by increasing, where possible, the amount of private and non-federal and non-state land within the planning area. e. That private use of federal and/or state controlled land within the planning area be increased in order to enhance opportunities for local economic development. f. That federal and/or state land agencies are discouraged from acquiring any private lands or rights in private lands within the planning area without first coordinating with the County. g. That federally and/or state managed lands that are difficult to manage or which lie in isolated tracts, or that could contribute to orderly expansion of existing communities 	<p>Consistency: Non-compliant. Comment 72 Preliminary assessment of the project suggests mitigation in the form of easements off-site lands for habitat/habitat enhancement. However such mitigation would result in a net loss of County land. Compliance could be met based on the addition of the County's Conditions of Certification.</p>	

<p style="text-align: center;">Inyo County General Plan Goal or Policy</p>	<p style="text-align: center;">Analysis of Proposed Project's Consistency as Conditioned in PSA</p>	<p style="text-align: center;">Identified by PSA as LORS?</p>
<p>should be considered for exchange or sale to private ownership.</p> <p>h. That the County be notified of, consulted about, and otherwise involved in all federal and state land adjustments in the planning area. The Board may review all proposed changes to determine if the proposals are in the best interest of the County.</p> <p>i. The Board may review and make recommendations on proposed public land withdrawals for hazardous and non-hazardous waste storage as well as the types of such waste.</p> <p>j. That before federal and state agencies change land uses, impact studies on land uses are conducted at the expense of the agency proposing the change and necessary mitigation measures adopted in coordination with the County. Impact studies should address community stability, local custom and culture, flood prone areas, access, or any other issue identified as a concern to the County.</p> <p>k. Due to the extensive state and federal ownership in the County, it is noted that the management of these areas should include: provision for continued and improved access through and within the County; continued provision of public recreational facilities and access; multi-use management where applicable; and interconnection or coordination of state, federal, and local facilities and programs when possible.</p>		
<p>Goal GOV-5/Protection & Development of Water Resources</p> <p>AND</p> <p>Policy GOV-5.1/Water Management: It is the policy of the County to be part of the planning, development and management of its water resources in coordination with federal, state, and any water managing districts. Resolution 99-43 sets forth the County policy on extraction and use of its water resources. That policy is to protect the County's environment, citizens and economy from adverse effects caused by activities relating to the extraction and use of water resources and to seek mitigation of any existing or future</p>	<p>Consistency: Non-compliant.</p> <p>Preliminary assessment of the project indicates that the project could exacerbate overdraft conditions, contribute to water level decline for groundwater dependent vegetation, and substantially lower water levels in neighboring domestic wells. However, with implementation of mitigation measures designed to ensure adequate water availability - to include acquiring and retiring water rights and a structured program of water level monitoring – such potential impacts to water resources should be maintained at less than significant levels. Compliance could be met based on the addition of the County's Conditions of Certification.</p>	<p>No.</p>

Inyo County General Plan Goal or Policy	Analysis of Proposed Project's Consistency as Conditioned in PSA	Identified by PSA as LORS?
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adverse effects resulting from such activities.		Comment 73
<p>Goal GOV-7/Provide for Recreational Activities</p>	<p>Consistency: Unknown. The County has prepared a socio-economic study to document the likely impacts and needs created by the project's influx of construction workers (+1,000 workers) and subsequent solar plant workers. It is unresolved how the project proposes to subsidize facilities such as parks/recreation facilities that such a large and temporary increase in population will require.</p>	No.
<p>Goal GOV-8/Wildlife & Fisheries</p> <p>AND</p> <p>Policy 8.1/Management of Wildlife & Fisheries: Management of wildlife, including fish, game animals, non-game animals, predatory animals and Threatened, Endangered, Sensitive, Candidate or Management Indicator Species, under all jurisdictions, must be grounded in peer-reviewed science and local input. Wildlife management plans should identify and plan for mitigation of negative impacts to the project area's economy and environment and to private property interests and customary usage rights of its citizens. Therefore, the following are the policies of the County:</p> <p>a. The County should cooperate with federal and state agencies who oversee the protection and recovery of federal and state listed threatened, endangered, sensitive or candidate species and their habitat.</p> <p>b. The County may adopt local recovery plans as allowed under the Endangered Species Act.</p> <p>c. Federal and state agencies shall prepare a plan in coordination with the County before the introduction or re-introduction of any species onto public or private land that is likely to impact the planning area.</p> <p>d. The County supports wildlife management that:</p> <ol style="list-style-type: none"> 1. Enhances populations of game and non-game species native to the project area. 2. Recognizes that enhancing non-native game and non-game species may negatively impact 	<p>Consistency: Compliant. Preliminary assessment indicates the project will have significant impacts on a number of species. However, mitigation has been developed for the project that will decrease impacts to less than significant levels and satisfy regulating agencies such as Bureau of Land Management (BLM) and Department of Fish & Game (DFG). However, such mitigation measures include off-site mitigation, which at this time is still being investigated. Should such mitigation prove unworkable, then impacts may be significant and immitigable.</p>	No.

Inyo County General Plan Goal or Policy	Analysis of Proposed Project's Consistency as Conditioned in PSA	Identified by PSA as LORS?
<p>native species and rangeland ecosystems.</p> <p>3. Increase wildlife numbers where practicable that is not in conflict with existing economic uses or ecosystem health.</p> <p>4. Recognizes that large game animals compete for forage and water with other economic uses.</p> <p>5. Supports the need for a private property compensation program for certain wildlife damages.</p>		
<p>Goal GOV-10/Energy Resources</p> <p>AND</p> <p>Policy GOV-10.1/Development:</p> <p>Development of energy resources on both public and private lands be encouraged with the policies of the County to develop these energy resources within the bounds of economic reason and sound environmental health. Therefore, the Board supports the following policies.</p> <p>a. The sound development of any and all energy resources, including, but not limited to geothermal, wind, biomass, and solar.</p> <p>b. The use of peer-reviewed science in the assessment of impacts related to energy resource development.</p> <p>c. The development of adequate utility corridors necessary for the transmission of newly generated energy.</p> <p>d. Maintain energy opportunities on state and federal lands maintaining and expanding access</p> <p>e. Treat renewable energy sources as natural resources, subject to County planning and environmental jurisdiction. Consider, account for, and mitigate ecological, cultural, economic, and social impacts, as well as benefits, from development of renewable energy resources. Consider developing environmental and zoning permitting processes to ensure efficient permitting of renewable energy projects while mitigating negative impacts to county services and citizens, with a goal to ensuring that citizens of the County benefit from renewable energy development in the County.</p>	<p>Consistency: Unknown. The project is a renewable energy project that makes use of the County's abundant solar resources. However, the tie-in structure of the electrical and gas pipeline components of the project are such that no additional electricity or gas from the project would be available within the immediate area of the project site, but would be diverted to the east to sub-stations where it will be dispersed to wider areas within Nevada and California. Preliminary assessment of the project indicates that provision of such additional electrical and gas resources could have growth-inducing impacts within the larger Pahrump Valley/ Charleston View area or other development in more distant parts of Nevada and California, resulting in economic and social impacts. As a result, the project appears non-compliant with subsection e. of this policy. Compliance could be met based on the addition of the County's Conditions of Certification.</p>	<p>Yes.</p>

Inyo County General Plan Goal or Policy	Analysis of Proposed Project's Consistency as Conditioned in PSA	Identified by PSA as LORS?
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<p>Goal GOV-11/Access & Transportation</p> <p>AND</p> <p>Policy GOV-11.1/Balanced Transportation: It is the policy of the County to develop and maintain a transportation system that optimizes accessibility and that minimizes the cost of movement within the planning area and connecting corridors consistent with County, state and federal roadways and travel ways; therefore, it is the policy of the County that:</p> <p>a. Any and all proposed route closures should be coordinated with the County and be highlighted in the appropriate environmental document.</p> <p>b. Most railroad rights of way have been abandoned. Any remaining railroad right of way being considered for conversion to a different use should be reviewed by the County to determine that the use is temporary and not preclude future railroad use or that it is not viable for future railroad or other transportation use.</p> <p>c. All routes causing no actual resource damage should remain open.</p> <p>d. All off-road closure policies must contain adequate exemptions for administrative, management and public functions. These should include but not be limited to:</p> <ol style="list-style-type: none"> 1. Agency administration. 2. Livestock management. 3. Scientific research. <p>e. Interagency Notification – The County, when affected by land use planning on public lands, shall be consulted and coordinated with in accordance with all applicable state and federal laws. Federal and state agencies shall coordinate with the County for the purpose of planning and managing lands within the geographic boundaries of the planning area or within the socio-economic sphere of the County.</p>	<p>Consistency: Unknown. Preliminary assessment of the project's likely transportation impacts has resulted in the development of a number of mitigation measures designed to decrease project impacts to less than significant levels. However, the project proposes to develop within public roads and mitigation is proposed to close public roads.</p>	<p>No.</p>
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LAND USE ELEMENT

<p>General Plan Land Use Designations: The project site is designated both as Resort/Recreational (REC), which is</p>	<p>Consistency: Non-compliant. The proposed use of the site for a renewable energy project (solar plant) is not an</p>	<p>Yes.</p>
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Inyo County General Plan Goal or Policy	Analysis of Proposed Project's Consistency as Conditioned in PSA	Identified by PSA as LORS?
described in Policy LU-3.4 as providing "for a mixture of residential and recreational commercial uses," and as Open Space & Recreation (OSR), which is described in Policy LU-5.1 as providing for "existing and planned uses such as public parks, ball fields, horse stables, greenbelts, and similar and compatible uses."	allowed use under either of these land use designations.	
Goal LU-1/General Land Use: Create opportunities for the reasonable expansion of communities in a logical and contiguous manner that minimizes environmental impacts, minimizes public infrastructure and service costs, and furthers the countywide economic development goals. Guide high-density population growth to those areas where services (community water and sewer systems, schools, commercial centers, etc.) are available or can be created through new land development, while providing and protecting open space areas.	Consistency: Non-compliant. The project – particularly the 29 months of the construction phase – will result in increased population in the area that will create a need for services and infrastructure that the area currently cannot provide and the County cannot fund. Compliance could be met based on the addition of the County's Conditions of Certification.	No.
Policy LU-1.1/Community Expansion: The County shall encourage community expansion to occur in a logical and orderly manner.	Consistency: Non-compliant. The project's construction phase will last up to 29 months and, at its peak, include more than 1,000 workers, which will result in need for services and infrastructure that the nearest community of Charleston View cannot absorb or provide, and which the County cannot fund. Compliance could be met based on the addition of the County's Conditions of Certification.	No.
Policy LU-1.2/New Growth: The County shall plan to concentrate new growth within and contiguous to existing communities (e.g., Bishop, Big Pine, Independence, Lone Pine) and expand infrastructure as needed to serve these areas. As a secondary priority, the County shall plan to accommodate new growth in existing rural residential communities (e.g., Olancho, Charleston View, Mustang Mesa, Starlite Estates) and ensure the appropriate expansion of existing infrastructure as needed to serve these areas:	Consistency: Non-compliant. The project proposes development adjacent to the community of Charleston View, with a peak influx of over 1,000 construction workers, followed by a new population of workers at the solar plant. It is unresolved how the project proposes to subsidize the housing, services and infrastructure such a large and temporary increase in population will require. Compliance could be met based on the addition of the County's Conditions of Certification.	No.
Policy LU-1.3/Southeast Area Growth: The County shall consider the economic impact on County resources of projects in the southeast	Consistency: Non-compliant. The County has prepared a socio-economic study to document the likely impacts and	No.

Comment 74

Comment 75

Inyo County General Plan Goal or Policy	Analysis of Proposed Project's Consistency as Conditioned in PSA	Identified by PSA as LORS?
part of the County along the Nevada border. Such growth may require additional fiscal analysis by applicants for subdivisions to demonstrate the level of fiscal impact. Such growth shall not require extensive County subsidies in providing necessary services.	needs created by the project's influx of construction workers and subsequent solar plant workers. It is unresolved how the project proposes to subsidize the housing, services and infrastructure such a large and temporary increase in population will require. Compliance could be met based on the addition of the County's Conditions of Certification.	
Policy LU-1.5/Pahrump Valley Growth: The County shall consider the economic impacts on County resources of projects in the Pahrump Valley. Such growth may require additional fiscal analysis by applicants for subdivision to demonstrate the level of fiscal impact. Such growth shall not require extensive County subsidies in providing necessary services.	Consistency: Non-compliant. The County has prepared a socio-economic study to document the likely impacts and needs created by the project's large influx of temporary construction workers and subsequent permanent solar plant workers. It is unresolved how the project proposes to subsidize the housing, services and infrastructure such a large and temporary increase in population will require. Compliance could be met based on the addition of the County's Conditions of Certification.	No.
Policy LU-1.14/Buffers: As part of new development review, the County shall require that residential development/districts are protected from non-residential uses by use of buffers or other devices. Landscaping, walls, building/facility placement, and other similar aesthetically pleasing devices are acceptable for this purpose. This does not include residential in mixed-use commercial designations.	Consistency: Non-compliant. Preliminary review has indicated that additional setbacks may be required for the project from the adjacent residential community of Charleston View. The current designation and zoning of the site does not allow for the use of a solar plant (i.e., designations of Open Space Recreation (OSR) & Resort/Recreation (REC), and zoning of Open Space, 40-acre minimum (OS-40)). The applicant has submitted an application to bring the project into compliance with the General Plan and zoning. Compliance could be met based on the addition of the County's Conditions of Certification.	No. <div style="border: 1px solid red; padding: 2px; display: inline-block;">Comment 75a</div>
Goal LU-3: Provide Commercial land uses that adequately serve the existing and anticipated future needs of the community and surrounding environs.	Consistency: Non-compliant. The current designation and zoning of the site does not allow for the use of a solar plant (i.e., designations of Open Space Recreation (OSR) & Resort/Recreation (REC), and zoning of Open Space, 40-acre minimum (OS-40)). The applicant has submitted an application to bring the project into compliance with the General Plan and zoning. Compliance could be	Yes.

Inyo County General Plan Goal or Policy	Analysis of Proposed Project's Consistency as Conditioned in PSA	Identified by PSA as LORS?
	met based on the addition of the County's Conditions of Certification.	
<p>Policy LU-3.4/Resort/Recreational Designation (REC): This designation provides for a mixture of residential and recreational commercial uses, such as resorts, recreational facilities, motels, campgrounds, trailer parks, restaurants, general stores, service stations, and similar and compatible uses. This designation is oriented toward tourist use, however, it also permits permanent residential use and public and quasi-public uses. The FAR shall not exceed 0.40. The base residential density shall be 1 du/2.5 acres. Clustering of residential units is encouraged, with density of developed areas allowed up to 24 du/net acres.</p>	<p>Consistency: Non-compliant. The current designation and zoning of the site does not allow for the use of a solar plant (i.e., designations of Open Space Recreation (OSR) & Resort/Recreation (REC), and zoning of Open Space, 40-acre minimum (OS-40)). Compliance could be met if the County approves a General Plan Amendment.</p>	Yes.
<p>Policy LU-4.8/Planned Development: The County shall encourage planned development and other flexible development techniques for any large or general industrial development.</p>	<p>Consistency: Non-compliant. Preliminary review has indicated that additional setbacks may be required for the project from the adjacent residential community of Charleston View. The current designation and zoning of the site does not allow for the use of a solar plant (i.e., designations of Open Space Recreation (OSR) & Resort/Recreation (REC), and zoning of Open Space, 40-acre minimum (OS-40)). The applicant has submitted an application to bring the project into compliance with the General Plan and zoning. Compliance could be met based on the addition of the County's Conditions of Certification.</p>	No.
<p>Policy LU-4.9/Landscaping: The County shall require landscaping to screen uses where necessary.</p>	<p>Consistency: Compliant. Preliminary assessment of project impacts is such that landscaping around power plant structures has been developed as a mitigation measure. However, even with mitigation measures, the height of the solar power towers is such that the project inherently changes the landscape in the vicinity of the project site and results in a significant and unavoidable aesthetic impact.</p>	Yes.
<p>Goal LU-5: Provide adequate public facilities and services for the existing and/or future needs of communities and their surrounding environs, and to conserve natural and managed resources.</p>	<p>Consistency: Non-compliant. The project is a renewable energy project that makes use of the County's abundant solar resources. However, the tie-in structure of the electrical and gas pipeline</p>	Yes.

Inyo County General Plan Goal or Policy	Analysis of Proposed Project's Consistency as Conditioned in PSA	Identified by PSA as LORS?
	<p>components of the project are such that no additional electricity or gas from the project would be available within the immediate area of the project site, but would be diverted to the east to substations where it will be dispersed to wider areas within Nevada and California.</p> <p>Preliminary assessment of the project indicated that provision of such additional electrical and gas resources could have growth-inducing impacts within the larger Pahrump Valley/Charleston View area or other development in more distant parts of Nevada and California. The project will result in increased demands for public services and facilities that have not been adequately addressed. Compliance could be met based on the addition of the County's Conditions of Certification.</p>	<p>Comment 76</p>
<p>Policy LU-5.1/Open Space & Recreation Designation (OSR): This designation provides for existing and planned public parks, ball fields, horse stables, greenbelts, and similar and compatible uses. The FAR shall not exceed 0.20. The minimum parcel size is generally 40 acres.</p>	<p>Consistency: Non-compliant. The current designation and zoning of the site does not allow for the use of a solar plant (i.e., designations of Open Space Recreation (OSR) & Resort/Recreation (REC), and zoning of Open Space, 40-acre minimum (OS-40)). Compliance could be met if the County approves a General Plan Amendment.</p>	<p>Yes.</p>
<p>Goal PSU-1/General Public Services & Utilities: To ensure the timely development of public facilities and the maintenance of adequate service levels for these facilities to meet the needs of existing and future County residents.</p>	<p>Consistency: Non-compliant. The project has not yet demonstrated how it will fund the increase in services that project's construction workers and subsequent solar plant workers will require. Compliance could be met based on the addition of the County's Conditions of Certification.</p>	<p>No.</p>
<p>Policy PSU-1.1/Facilities & Services for New Development: The County shall ensure through the development review process that public facilities and services will be developed, operational, and available to serve new development. The County shall not approve new development where existing facilities are inadequate unless the applicant can demonstrate that all necessary public facilities will be installed or adequately financed and maintained (through fees or other means).</p>	<p>Consistency: Non-compliant. The project has not yet demonstrated how it will fund the increase in facilities and services that the project's temporary construction workers and subsequent permanent solar plant workers will require. Compliance could be met based on the addition of the County's Conditions of Certification.</p>	<p>No.</p>

Inyo County General Plan Goal or Policy	Analysis of Proposed Project's Consistency as Conditioned in PSA	Identified by PSA as LORS?
<p>Policy PSU-1.2/On-Site Infrastructure: The County shall require all new development, including major modifications to existing development, to construct necessary on-site infrastructure to serve the project in accordance with County standards.</p>	<p>Consistency: Non-compliant. The project proposes adequate on-site infrastructure for the solar plant project, but it is not clear if adequate funding for services or infrastructure will be provided. Compliance could be met based on the addition of the County's Conditions of Certification.</p>	No.
<p>Policy PSU-1.5/Review for Land Use Changes: When reviewing applications for land use designation changes (i.e., zone change, General Plan Amendment, specific plan amendment), the County shall thoroughly analyze the impacts of the proposed changes on all aspects of the infrastructure system within the County, and require mitigation as appropriate. This shall include consultation with service providers who have infrastructure within the County.</p>	<p>Consistency: Non-compliant. The current designation and zoning of the site does not allow for the use of a solar plant (i.e., designations of Open Space Recreation (OSR) & Resort/Recreation (REC), and zoning of Open Space, 40-acre minimum (OS-40)). The project will not provide adequate infrastructures and services. Compliance could be met based on the addition of the County's Conditions of Certification.</p>	No.
<p>Policy PSU-1.6/Coordination: The County shall require that the provision of streets, sewer, water, drainage, and other needed infrastructure be coordinated in a logical manner between adjacent developments so as to reduce design, construction and maintenance costs.</p>	<p>Consistency: Non-compliant. The applicant has taken into consideration existing infrastructure such as roadways, and adjacent development such as the St. Therese Mission and the Charleston View community. However, impacts to streets may be significant. Compliance could be met based on the addition of the County's Conditions of Certification.</p>	<p>No.</p> <p>Comment 77</p>
<p>Policy PSU-1.7/Undergrounding Utilities: The County shall require undergrounding of utility lines in new development areas and as areas are redeveloped, except where infeasible for operational or financial reasons. The County will also work with utility providers to proactively place utilities underground as part of the utilities' ongoing maintenance program.</p>	<p>Consistency: Compliant. Transmission lines and gas pipelines exit the site at the east boundary, at the California-Nevada border, and will thus exist within Nevada.</p>	Yes.
<p>Goal PSU-2/Funding: To ensure that adequate facility and service standards are achieved and maintained through the use of equitable funding methods.</p>	<p>Consistency: Non-compliant. It has not yet been demonstrated how the project proposes to fund the increased need for, and impacts to, facilities and services which the large influx of temporary construction workers, and then permanent solar plant workers, will bring. Compliance could be met based on the addition of the County's Conditions of Certification.</p>	No.
<p>Policy PSU-2.2/Fair Share of Costs: The County shall require that new development</p>	<p>Consistency: Non-compliant. The project will not pay its fair share of the</p>	No.

Inyo County General Plan Goal or Policy	Analysis of Proposed Project's Consistency as Conditioned in PSA	Identified by PSA as LORS?
pays its fair share of the cost of developing new facilities and services and upgrading existing public facilities and services. Exceptions may be made when new development generates significant public benefits (e.g., low income housing) or when alternative sources of funding can be identified to offset foregone revenues.	cost of developing and upgrading new facilities and services resulting from it. Compliance could be met based on the addition of the County's Conditions of Certification.	
Policy PSU-2.3/Public Financing Plans: The County shall require a public financing plan be in place prior to the start of construction of new development to ensure that all required public improvements are adequately funded and provided in a timely manner.	Consistency: Non-compliant. The project does not include a public financing plan to ensure that required public improvements are adequately funded and provided in a timely manner, nor is there assurance that such improvements will be provided. Compliance could be met based on the addition of the County's Conditions of Certification.	No.
Policy PSU-2.4/Allocation of Costs: The County shall allocate the cost of public improvements to all benefiting properties and, to the extent that a landowner is required to pay for facility oversizing, the County shall utilize reimbursement mechanisms to maintain equity among all benefiting property owners.	Consistency: Unknown. It is unclear if the development will provide for its services or infrastructure.	No.
Goal PSU-3/Water: To ensure that there will be a safe and reliable water supply sufficient to meet the future needs of the County.	Consistency: Non-compliant. Preliminary assessments indicate the project will have significant impacts to area water resources. Compliance could be met based on the addition of the County's Conditions of Certification.	No.
Policy PSU-3.1/Efficient Water Use: The County shall promote efficient water use and reduced water demand.	Consistency: Non-compliant. Preliminary assessments indicate the project will have significant impacts to area water. Compliance could be met based on the addition of the County's Conditions of Certification.	Yes.
Goal PSU-4/Wastewater: To ensure adequate wastewater collection, treatment, and disposal.	Consistency: Compliant. The project proposes adequate wastewater management for the project site.	No.
Goal PSU-5/Stormwater Drainage: To collect and dispose of stormwater in a manner that minimizes inconvenience to the public, minimizes potential water-related damage, and enhances the environment.	Consistency: Compliant. The project proposes adequate stormwater drainage for the project site.	No.
Goal PSU-6/Solid Waste Facilities: To ensure the safe and efficient disposal or recycling of solid waste generated in Inyo	Consistency: Non-compliant. Although the applicant will participate in the County's Monitoring & Diversion of	No.

Comment 78

Comment 79

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County.	<div style="border: 1px solid red; padding: 2px;"> <p>Construction & Demolition Debris Program, waste will be disposed of in Nevada, as the County's Tecopa Landfill does not have the personnel or infrastructure to handle the quantity of waste that construction of the project will yield. The County has assessed the likely waste-related costs and impacts of the large influx of construction workers expected for the project. Compliance could be met based on the addition of the County's Conditions of Certification.</p> </div>	Comment 80
<p>Goal PSU-8/Fire Protection: To protect the residents of and visitors to Inyo County from injury and loss of life and to protect property from fires.</p> <p>AND</p> <p>Implementation Measure 10.0: The County shall work with the California Department of Forestry & Fire Protection, local fire protection districts, and federal agencies involved in fire protection activities to maximize the use of resources to develop functional and/or operational consolidations and standardization of services and to maximize the efficient use of fire protection resources.</p>	<p>Consistency: Unknown. Although adequate fire protection is proposed for the project site, preliminary assessments indicate that the project itself increases the risk of fire within the project area. As a result of this potential increased risk of off-site impacts, the Southern Inyo Fire District (SIFD) are working with the applicant on funding for such increased impacts to County fire protection services, and this issue is as yet unresolved.</p>	No.
<p>Policy PSU-8.1/Fire Protection for New Development: Prior to the approval of development projects, the County shall determine the need for fire protection services. New development in unincorporated areas of the County shall not be approved unless adequate fire protection facilities can be provided.</p>	<p>Consistency: Unknown. Although adequate fire protection is proposed for the project site, preliminary assessments indicate that the project itself increases the risk of fire within the project area. As a result of this potential increased risk of off-site impacts, the Southern Inyo Fire Protection District is working with the applicant on funding for such increased impacts to fire protection services, and this issue is as yet unresolved.</p>	No.
<p>Goal PSU-9/Law Enforcement: To provide adequate law enforcement services to deter crime and to meet the growing demand for services associated with increasing populations and commercial/industrial development in the County.</p>	<p>Consistency: Non-compliant. Preliminary assessments indicate that the project's expected influx of construction workers will have significant impacts on the County's law enforcement services. The County is currently still working with the applicant on funding for such impacts to County services, and the issue is as yet</p>	No.

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	unresolved. Compliance could be met based on the addition of the County's Conditions of Certification.	
<p>Goal PSU-10/Gas & Electrical Facilities: To provide efficient and cost-effective utilities that serves the existing and future needs of people in the unincorporated areas of the County.</p>	<p>Consistency: Compliant. The project is a renewable energy project that makes use of the County's abundant solar resources. However, the tie-in structure of the electrical and gas pipeline components of the project are such that no additional electricity or gas from the project would be available within the immediate area of the project site, but would be diverted to the east to sub-stations where it will be dispersed to wider areas within Nevada and California. Preliminary assessment of the project indicated that provision of such additional electrical and gas resources could have growth-inducing impacts within the larger Pahrump Valley/Charleston View area or other development in more distant parts of Nevada and California.</p>	<p>No.</p> <p>Comment 81</p>
<p>Policy PSU-10.1/Expansion of Services: The County shall work with local electric utility companies to design and locate appropriate expansion of electric systems, while minimizing impacts to agriculture and minimizing noise, electromagnetic, visual, and other impacts on existing and future residents.</p>	<p>Consistency: Compliant. The project is a renewable energy project that makes use of the County's abundant solar resources. However, the tie-in structure of the electrical and gas pipeline components of the project are such that no additional electricity or gas from the project would be available within the immediate area of the project site, but would be diverted to the east to sub-stations where it will be dispersed to wider areas within Nevada and California. Preliminary assessment of the project indicated that provision of such additional electrical and gas resources could have growth-inducing impacts within the larger Pahrump Valley/Charleston View area or other development in more distant parts of Nevada and California.</p>	<p>Yes.</p>
<p>Goal PSU-11/Schools: To ensure that adequate school facilities are available and appropriately located to meet the needs of Inyo County residents.</p>	<p>Consistency: Unknown. Preliminary assessments indicate that the project's expected influx of construction workers will have significant impacts on school facilities and services in the County. It is unclear if the CEC and the applicant have consulted with local school officials, and</p>	<p>No.</p>

Inyo County General Plan Goal or Policy	Analysis of Proposed Project's Consistency as Conditioned in PSA	Identified by PSA as LORS?
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	the issue is as yet unresolved.	
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ECONOMIC DEVELOPMENT ELEMENT

<p>Goal ED-1: Promote increased capacity to serve tourists within the County's established urbanized areas, and in those areas with established tourist attractions.</p> <p>AND</p> <p>Implementation Measure 16.0: Encourage the telecommunications industry to install and maintain state of the art high speed high capacity service throughout the County so that established businesses, public agencies, and home businesses may overcome any distance to market competitive disadvantage they currently have.</p>	<p>Consistency: Non-compliant. The project is a renewable energy project that makes use of the County's abundant solar resources. However, the tie-in structure of the electrical and gas pipeline components of the project are such that no additional electricity or gas from the project would be available within the immediate area of the project site, but would be diverted to the east to sub-stations where it will be dispersed to wider areas within Nevada and California. Preliminary assessment of the project indicated that provision of such additional electrical and gas resources could have growth-inducing impacts within the larger Pahrump Valley/Charleston View area or other development in more distant parts of Nevada and California. The project could hinder economic development in the area, impact public services and facilities, and result in lost opportunity costs. Compliance could be met based on the addition of the County's Conditions of Certification.</p>	No.
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<p>Goal ED-4/Resource Based & Industrial Land Uses: Actively encourage the expansion of existing industry of all types (including resource industries, manufacturing and service industries), and actively recruit new businesses that will bring new jobs to the County.</p>	<p>Consistency: Compliant. The project is a renewable energy project that makes use of the County's abundant solar resources and assists the State of California in meeting its targeted goals for its renewable energy portfolio.</p>	No.
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HOUSING ELEMENT

<p>Goal HE-2: To provide adequate sites for residential development.</p>	<p>Consistency: Unknown. The project displaces lands available for housing. The Preliminary Staff Assessment (PSA) prepared by the California Energy Commission (CEC) does not address this impact.</p>	No.
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<p>Goal HE-3: Encourage the adequate provision of housing by location, type of unit, and price, to meet the existing and future needs of Inyo County residents.</p>	<p>Consistency: Unknown. The project displaces lands available for housing. The Preliminary Staff Assessment (PSA) prepared by the California Energy Commission (CEC) does not address this impact.</p>	No.
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<p>Policy HE-3.1/Variety of Housing: In</p>	<p>Consistency: Unknown. The project</p>	No.
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<p>consultation with federal, state, and local agencies, the County shall continue to identify and evaluate the best approaches to providing a variety of residential development opportunities in the County, including single-family homes, mobile homes, second units, and apartments to fulfill regional housing needs.</p> <p>AND</p> <p>Implementation Measure 3.1.1: The County will explore an Employer Assisted Housing Program by forming a working group with major employers in the area to discuss how the County can assist in the development of employer-assisted housing in Inyo County, including housing for lower- and moderate-income households, such as those with teachers, police officers and sheriff's deputies, nurses, etc.</p>	<p>displaces lands available for housing. The Preliminary Staff Assessment (PSA) prepared by the California Energy Commission (CEC) does not address this impact.</p>	
<p>Policy HE-3.3/Second Units: Encourage the development of second units as another way to promote housing opportunities for lower-income households.</p>	<p>Consistency: Unknown. The project displaces lands available for housing. The Preliminary Staff Assessment (PSA) prepared by the California Energy Commission (CEC) does not address this impact.</p>	No.
<p>Policy HE-3.4/Manufactured and Mobile Homes: The County will continue to promote the utilization of manufactured housing and mobile home purchase and placement as an affordable homeownership opportunity.</p>	<p>Consistency: Unknown. The project displaces lands available for housing. The Preliminary Staff Assessment (PSA) prepared by the California Energy Commission (CEC) does not address this impact.</p>	No.
<p>Policy HE-5.3/Infrastructure: The County will work to provide adequate infrastructure to accommodate residential development in all areas of the unincorporated county.</p> <p>AND</p> <p>Implementation Measure 5.3.1: The County will work to provide adequate infrastructure to accommodate residential development in all areas of the unincorporated county.</p>	<p>Consistency: Non-compliant. The project will result in public service and infrastructure deficiencies that could hinder residential development. Compliance could be met based on the addition of the County's Conditions of Certification.</p>	No.
CIRCULATION ELEMENT		
<p>Goal RH-1: A transportation system that is safe, efficient, and comfortable, which meets the needs of people and goods and enhances</p>	<p>Consistency: Non-compliant. Preliminary assessment of the project's likely transportation impacts has resulted</p>	No.

Inyo County General Plan Goal or Policy	Analysis of Proposed Project's Consistency as Conditioned in PSA	Identified by PSA as LORS?
the lifestyle of the County's residents.	<p>in the development of a number of mitigation measures designed to decrease project impacts to less than significant levels. In particular, Old Spanish Trail Highway/Tecopa Road has an existing paved width of just 22 feet. Preliminary assessments indicate that impacts to the roadway during the construction of the project would require mitigation in the form of a traffic control plan, which would be necessary for the roadway to continue to operate at a Level of Service (LOS) of C or better. However, damage to the roadway could result from heavy truck traffic during the construction phase of the project, and mitigation in the form of restoration of the roadway may be necessary. Compliance could be met based on the addition of the County's Conditions of Certification.</p>	<p>Comment 82</p>
<p>Policy RH-1.4/Level of Service: Maintain a minimum level of service (LOS) "C" on all roadways in the County. For highways within the County, LOS "C" should be maintained except where roadways expansions or reconfigurations will adversely impact the small community character and economic viability of designated Central Business Districts.</p>	<p>Consistency: Unknown. Preliminary assessment of the project's likely transportation impacts has resulted in the development of a number of mitigation measures designed to decrease project impacts to less than significant levels. Under such mitigation measures, a Traffic Control Plan is prepared and LOS shall be monitored, but mitigation measure language does not state specifically that a minimum LOS of "C" or better shall be maintained.</p>	<p>Yes.</p>
<p>Policy RH-1.5/Proper Access: Provide proper access to residential, commercial, and industrial areas.</p>	<p>Consistency: Compliant. Preliminary assessment of the project's likely transportation impacts has resulted in the development of a number of mitigation measures designed to decrease project impacts to less than significant levels.</p>	<p>Yes.</p>
<p>Policy RH-1.6/Minimize Environmental Impacts: Insure that all transportation projects minimize adverse effects on the environment of the County.</p>	<p>Consistency: Unknown. Preliminary assessment indicates that, even with mitigation measures, the height of the solar power towers is such that the project inherently changes the landscape in the vicinity of the project site and results in a significant and unavoidable aesthetic impact. In particular, assessments identify the Old Spanish Trail as a scenic resource that will be substantially</p>	<p>Yes.</p>

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<p>Policy SH-1.1/Protect the Natural Qualities of Designated Scenic Routes: The natural qualities of designated scenic routes should be protected.</p>	<p>disrupted by the project.</p> <p>Consistency: Unknown. Preliminary assessment indicates that, even with mitigation measures, the height of the solar power towers is such that the project inherently changes the landscape in the vicinity of the project site and results in a significant and unavoidable aesthetic impact.</p>	<p>Yes.</p>
<p>Goal CPT-1: To ensure that regional conveyance systems are designed and located to serve Inyo County residents while not significantly impacting communities or regional viewsheds.</p>	<p>Consistency: Unknown. The tie-in structure of the electrical and gas pipeline components of the project are such that no additional electricity or gas from the project would be available within the immediate area of the project site, but would be diverted to the east to substations where it will be dispersed to wider areas within Nevada and California. Preliminary assessment of the project indicated that provision of such additional electrical and gas resources could have growth-inducing impacts within the larger Pahrump Valley/Charleston View area or other development in more distant parts of Nevada and California.</p> <p>In addition, Preliminary assessment indicates that, even with mitigation measures, the height of the solar power towers is such that the project inherently changes the landscape in the vicinity of the project site and results in significant and unavoidable aesthetic impacts.</p>	<p>No.</p>
<p>Policy CPT-1.1/Placement of Corridors: The County shall consider the visual and environmental impacts associated with placement of regional conveyance corridors.</p>	<p>Consistency: Unknown. Preliminary assessment indicates that, even with mitigation measures incorporated, the large size of the project and the height of the solar power towers is such that the project inherently changes the landscape and scenic vistas within the greater Pahrump Valley and results in a significant and unavoidable aesthetic impacts.</p> <p>Environmental impacts, such as to water resources and biological resources, are also assessed to be significant, although mitigation developed for the project will</p>	<p>Yes.</p>

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	decrease such impacts to less than significant levels.	
CONSERVATION/OPEN SPACE		
<p>Goal WR-1: Provide an adequate and high quality water supply to all users within the County.</p>	<p>Consistency: Non-compliant. Preliminary assessment of the project indicates that the project could exacerbate overdraft conditions, contribute to water level decline for groundwater dependent vegetation, and substantially lower water levels in neighboring domestic wells. Compliance could be met based on the addition of the County's Conditions of Certification.</p>	No.
<p>Policy WR-1.1/Water Provisions: The County shall review development proposals to ensure adequate water is available to accommodate projected growth.</p>	<p>Consistency: Non-compliant. Pump tests performed for the project were subject to irregularities in execution, and were discontinued prematurely, and the results were inconclusive. Despite these issues, preliminary assessment of the project indicates that the project could exacerbate overdraft conditions, contribute to water level decline for groundwater dependent vegetation, and substantially lower water levels in neighboring domestic wells. Compliance could be met based on the addition of the County's Conditions of Certification.</p>	No.
<p>Policy WR-1.3/Domestic Groundwater: Support sustainable groundwater extraction for domestic use in rural areas.</p> <p>AND</p> <p>Implementation Measure 2.0: The County shall review any new development proposals that involve a withdrawal of groundwater that is not regulated by the County's Groundwater Ordinance (Ordinance 1004) or the Inyo County/Los Angeles Water Agreement to ensure that with the proposed use, there will be an adequate, safe, and economically viable supply of groundwater to supply all existing users of the groundwater as well as the future users under the proposed development.</p> <p>AND</p> <p>Implementation Measure 3.0: The County</p>	<p>Consistency: Non-compliant. Preliminary assessment of the project indicates that the project could exacerbate overdraft conditions, contribute to water level decline for groundwater dependent vegetation, and substantially lower water levels in neighboring domestic wells. Compliance could be met based on the addition of the County's Conditions of Certification.</p>	<p>No.</p> <p style="text-align: right; border: 1px solid black; padding: 2px;">Comment 83</p>

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shall work with private industries to support the development of reclaimed water systems for non- potable uses. These efforts may include obtaining funding for subsidizing reclaimed water systems.		
Policy WR-2.2/Watercourse Alterations: Encourage the preservation of existing conditions of watercourses when considering flood control projects.	Consistency: Compliant. Preliminary assessments indicate that the majority of the project site would maintain the original grades and natural drainage features and require no added storm drainage control.	No.
Goal WR-3: Protect and restore environmental resources from the effects of export and withdrawal of water resources.	Consistency: Non-compliant. Pump tests performed for the project were subject to irregularities in execution, and were discontinued prematurely, and the results were inconclusive. Despite these issues, preliminary assessment of the project indicates that the project could exacerbate overdraft conditions, contribute to water level decline for groundwater dependent vegetation, and substantially lower water levels in neighboring domestic wells. Other natural and human resources in the County could be impacted. Compliance could be met based on the addition of the County's Conditions of Certification.	No.
Policy WR-3.2/Sustainable Groundwater Withdrawal: The County shall manage the groundwater resources within the County through ordinances, project approvals and agreements, ensure an adequate, safe and economically viable groundwater supply for existing and future development within the County, protect existing groundwater users, maintain and enhance the natural environment, protect the overall economy of the County, and protect groundwater and surface water quality and quantity.	Consistency: Non-compliant. Pump tests performed for the project were subject to irregularities in execution, and were discontinued prematurely, and the results were inconclusive. Despite these issues, preliminary assessment of the project indicates that the project could exacerbate overdraft conditions, contribute to water level decline for groundwater dependent vegetation, and substantially lower water levels in neighboring domestic wells. Compliance could be met based on the addition of the County's Conditions of Certification.	No. Comment 84
Policy BIO-1.1/Regulatory Compliance: The County shall review development proposals to determine impacts to sensitive natural communities, of both local and regional concern, and special-status species. Appropriate mitigation measures will be	Consistency: Compliant. Extensive biological surveys have been prepared for the project, together with mitigation for identified impacts.	No.

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<p>incorporated into each project, as necessary.</p> <p>Policy BIO-1.2/Preservation of Riparian Habitat & Wetlands: Important riparian areas & wetlands, as identified by the County, shall be preserved and protected for biological resource value.</p>	<p>Consistency: Non-compliant. Preliminary assessment indicates the project will have significant impacts on groundwater dependent areas such as riparian habitats and Areas of Critical Environmental Concern such as Stump Springs. Preliminary assessment of the project indicates that the project could exacerbate overdraft conditions and contribute to water level decline for groundwater dependent vegetation. Compliance could be met based on the addition of the County's Conditions of Certification.</p>	No.
<p>Policy BIO-1.5/Develop Outside of Habitat Areas: Work with regulatory agencies and private developers to direct development into less significant habitat areas. Discourage urban development in areas containing sensitive natural communities or known to contain special-status species.</p>	<p>Consistency: Compliant. Preliminary assessment indicates the project will have significant impacts on a number of species. However, mitigation has been developed for the project that will decrease impacts to less than significant levels and satisfy regulating agencies such as Bureau of Land Management (BLM) and Department of Fish & Game (DFG). However, such mitigation measures include off-site mitigation, which at this time is still being investigated. Should such mitigation prove unworkable, then impacts may be significant and immitigable.</p>	No.
<p>Goal CUL-1: Preserve and promote the historic and prehistoric cultural heritage of the County.</p>	<p>Consistency: Unknown. Preliminary assessment indicates the project will result in significant impacts to various cultural resources (notably three ethnographic landscapes and the Old Spanish Trail-Mormon Road Northern Corridor), and that there is no way that the project, as currently proposed, could be mitigated to minimize such significant impacts.</p>	No.
<p>Policy CUL-1.3/Protection of Cultural Resources: Preserve and protect key resources that have contributed to the social, political, and economic history and prehistory of the area, unless overriding circumstances are warranted.</p>	<p>Consistency: Unknown. Preliminary assessment indicates the project will result in significant impacts to various cultural resources (notably three ethnographic landscapes and the Old Spanish Trail-Mormon Road Northern Corridor), and that there is no way that the project, as currently proposed, could</p>	Yes.

Comment 85

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	be mitigated to minimize such significant impacts.	
<p>Policy CUL-1.4/Regulatory Compliance: Development and/or demolition proposals shall be reviewed in accordance with the requirements of CEQA and the National Historic Preservation Act.</p>	<p>Consistency: Unknown. The project has been so reviewed. However, preliminary assessment indicates the project will result in significant impacts to various cultural resources (notably three ethnographic landscapes and the Old Spanish Trail-Mormon Road Northern Corridor), and that there is no way that the project, as currently proposed, could be mitigated to minimize such significant impacts.</p>	No.
<p>Policy CUL-1.5/Native American Consultation: The County and private organizations shall work with appropriate Native American groups when potential Native American resources could be affected by development proposals.</p>	<p>Consistency: Compliant. Tribal representatives have met extensively with project representatives and have contributed directly and significantly to the preliminary assessment of the significant and immitigable impacts the project would have on various cultural resources.</p>	No. Comment 86
<p>Chapter 8.8/Visual Resources: Critical identified visual resource issues include:</p> <ul style="list-style-type: none"> • Maintaining the small town character of towns in Inyo County • Preserving panoramic views • Maintaining the open, natural character of the County • Maintaining visual resources of scenic corridors, highways, and roadways 	<p>Consistency: Unknown. Preliminary assessment indicates that, even with mitigation measures, the height of the solar power towers is such that the project inherently changes the landscape in the vicinity of the project site and results in a significant and unavoidable aesthetic impact.</p>	Yes.
<p>Goal VIS-1: Preserve and protect resources throughout the County that contribute to a unique visual experience for visitors and quality of life for County residents.</p>	<p>Consistency: Unknown. Preliminary assessment indicates that, even with mitigation measures, the height of the solar power towers is such that the project inherently changes the landscape in the vicinity of the project site and results in a significant and unavoidable aesthetic impact.</p>	Yes.
<p>Goal VIS-1.1/Historical Character: The County shall preserve and maintain the historic character of communities within the County.</p>	<p>Consistency: Unknown. Preliminary assessment indicates that, even with mitigation measures, the height of the solar power towers is such that the project inherently changes the landscape in the vicinity of the project site and results in a significant and unavoidable aesthetic impact. In particular, assessments identify the Old Spanish Trail as a scenic resource that will be substantially</p>	No. Comment 86a

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<p>Policy VIS-1.4/Equipment Screening: Within communities, building equipment shall be screened from public view.</p>	<p>disrupted by the project. Consistency: Unknown. Preliminary assessment of project impacts is such that landscaping around power plant structures has been developed as a mitigation measure. However, even with mitigation measures, the height of the solar power towers is such that the project inherently changes the landscape in the vicinity of the project site and results in a significant and unavoidable aesthetic impact.</p>	<p>Yes.</p>
<p>Policy VIS-1.6/Control of Light & Glare: The County shall require that all outdoor light fixtures including street lighting, externally illuminated signs, advertising displays, and billboards use low-energy, shielded light fixtures which direct light downward (i.e., lighting shall not emit higher than a horizontal level) and which are fully shielded. Where public safety would not be compromised, the County shall encourage the use of low-pressure sodium lighting for all outdoor light fixtures.</p>	<p>Consistency: Unknown. Preliminary assessment of project impacts is such that mitigation for control of light and glare has been developed. However, even with mitigation measures, the height of the solar power towers is such that the project inherently changes the landscape in the vicinity of the project site and results in a significant and unavoidable aesthetic impact.</p>	<p>Yes.</p>
<p>Policy VIS-1.7/Street Lighting: Street lighting shall only be utilized where needed to protect public safety related to traffic movement.</p>	<p>Consistency: Unknown. Preliminary assessment of project impacts is such that mitigation for control of light and glare has been developed. However, even with mitigation measures, the height of the solar power towers is such that the project inherently changes the landscape in the vicinity of the project site and results in a significant and unavoidable aesthetic impacts.</p>	<p>Yes.</p>
<p>Policy REC-1.2/Recreational Opportunities on Federal, State, and LADWP Lands: Encourage the continued management of existing recreational areas and open space, and appropriate expansion of new recreational opportunities on federal, state, and LADWP lands.</p>	<p>Consistency: Unknown. It is not yet clear the impacts that use by the increased numbers of construction workers will have on such Federal, State, and LADWP lands, or whether/how the agencies responsible for such lands will expand opportunities for use to the increased population brought by the project.</p>	<p>No.</p>
PUBLIC SAFETY ELEMENT		
<p>Goal AQ-1: Provide good air quality for Inyo County to reduce impacts to human health and the economy.</p>	<p>Consistency: Compliant. Mitigation has been developed for impacts to air quality that will decrease them to less than significant levels.</p>	<p>No.</p>
<p>Policy AQ-1.2/Attainment Programs: Participate in the GBUAPCD's attainment</p>	<p>Consistency: Compliant. Mitigation has been developed for impacts to air quality</p>	<p>No.</p>

Comment 87

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programs.	that will decrease them to less than significant levels.	
Policy AQ-1.3/Dust Suppression During Construction: Require dust-suppression measures for grading activities.	Consistency: Compliant. Mitigation has been developed for impacts to air quality that will decrease them to less than significant levels.	No. Comment 88
Policy AQ-1.5/Monitor Regional Development: Publicly object to development proposals within the region that do not adequately address and mitigate air quality impacts, especially fugitive dust.	Consistency: Compliant. Mitigation has been developed for impacts to air quality that will decrease them to less than significant levels.	No. Comment 89
Goal WF-1: Prevent wildfires and provide public safety from wildfire hazards.	Consistency: Unknown. Although adequate fire protection is proposed for the project site, preliminary assessments indicate that the project itself increases the risk of fire within the project area. As a result of this potential increased risk of off-site impacts, the County and the Southern Inyo Fire District (SIFD) are working with the applicant on funding for such increased impacts to County fire protection services, and this issue is as yet unresolved.	No.
Policy WF-1.1/Fire Protection Agencies: Support expansion of fire protection agencies and volunteer fire departments, and continue to cooperate with federal, state, local agencies and private landowners to provide greater fire protection for the County.	Consistency: Unknown. Although adequate fire protection is proposed for the project site, preliminary assessments indicate that the project itself increases the risk of fire within the project area. As a result of this potential increased risk of off-site impacts, the County and the Southern Inyo Fire District (SIFD) are working with the applicant on funding for such increased impacts to County fire protection services, and this issue is as yet unresolved.	No.
Policy WF-1.2/Limitations in Fire Hazard Zones: Discourage development within high fire hazard severity zones.	Consistency: Compliant. The project is located within a "Moderate," not a "High," fire hazard severity zone, as is most of Inyo County.	No.
Policy WF-1.3/Fuel Modification: Require fuel modification for structures within fire hazard zones.	Consistency: Compliant. The project will manage fuel/vegetation within the project boundaries and has developed fire protection mitigation measures for the project site.	No.
Policy WF-1.5/Emergency Access: All County public roads shall be developed and maintained at adequate standards to provide safe circulation for emergency equipment.	Consistency: Unknown. Although adequate fire protection is proposed for the project site, preliminary assessment indicate that the project itself increases	No. Comment 90

Inyo County General Plan Goal or Policy	Analysis of Proposed Project's Consistency as Conditioned in PSA	Identified by PSA as LORS?
<p>AND</p> <p>Implementation Measure 2.0: The County shall work with local fire districts and volunteer fire departments to develop community fire plans to identify the desired level of service and methods to obtain such services.</p>	<p>the risk of fire within the project area. As a result of this potential increased risk of off-site impacts, the County and the Southern Inyo Fire District (SIFD) are working with the applicant on funding for such increased impacts to County fire protection services, and this issue is as yet unresolved.</p>	
<p>Goal GEO-1: Minimize exposure to hazards and structural damage from geologic and seismic conditions.</p>	<p>Consistency: Compliant. Although preliminary assessment of the site indicates it could be subject to strong levels of earthquake-related ground shaking due to area earthquake faults, as well as subject to soil failure due to hydrocollapse, soil fissure formations, and dynamic compaction, mitigation measures have been developed for the project that would keep impacts to less than significant levels.</p>	Yes.
<p>Goal NOI-1: Prevent incompatible land uses, by reason of excessive noise levels, from occurring in the future. This includes protecting sensitive land uses from exposure to excessive noise and to protect the economic base of County by preventing the encroachment of incompatible land uses with areas affected by existing or planned noise-producing uses.</p>	<p>Consistency: Compliant. The solar plant itself should not create excessive noise levels for the adjacent residential community of Charleston View.</p>	<p>Yes.</p> <p style="text-align: right;">Comment 91</p>



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**COUNTY OF INYO
WATER DEPARTMENT**

July 19, 2012

TO: Mike Monasmith, Project Manager
Siting, Transmission, and Environmental Protection Division
California Energy Commission
1516 Ninth Street, MS-2000
Sacramento, California 95814

FROM: Robert Harrington, Ph.D, R.G.
Director, Inyo County Water Department

SUBJECT: Comments on Preliminary Staff Assessment for the Hidden Hills Solar Energy
Generating System

Thank you for the opportunity to comment on the Hidden Hills Solar Energy Generating System (HHSEGS) Preliminary Staff Assessment (PSA). The CEC is to be commended for the thorough, transparent, and accessible public process conducted for this project. The following comments pertain to Section 4.15 (Water Supply) and parts of Section 4.2 (Biological Resources) that pertain to groundwater-dependent vegetation. The County of Inyo Board of Supervisors has adopted a resolution titled "*A Resolution of the Board of Supervisors of the County of Inyo, State of California, Adopting the findings and Conditions of Certification for the Proposed Hidden Hills Solar Electric Generating Station in Charleston View in Inyo County (California Energy Commission Application for Certification No. 11-AFC-2).*" In that resolution, the Board of Supervisors makes a number of findings and establishes conditions of certification related to many sections of the PSA, including Biological Resources and Water Supply. The comments given below provide the rationale for a number of the findings and conditions in the Board Resolution related to Biological Resources and Water Supply.

Comment #1: Hydrologic analysis. The emphasis of the conditions of certification associated with groundwater extraction should be on monitoring to detect off-site changes in groundwater elevation. In response to data request #141, the applicant reported on an aquifer performance test (APT) to observe the groundwater system's response to pumping. The PSA, as well as discussions at status conferences and public workshops, have placed considerable emphasis on the results of APT. The applicant has used the APT results to argue that the project will have no off-site impacts to the groundwater system; CEC staff argues in the PSA that the applicant has misinterpreted the ATP results; and other parties have criticized the conduct of the APT. The applicant and CEC staff presented a number of interpretations of the APT results, all of which necessarily simplify the hydrogeologic system; however, there is insufficient

data to settle on one single interpretation as the correct rendition of the hydrologic system. In general, the simple analytical models such as used by the applicant and CEC staff to interpret the APT results do not provide a single, uniquely correct interpretation of the aquifer system; multiple interpretations may fit the test results equally well. We agree with CEC staff's analysis that stabilization of the Orchard Well's cone of depression was probably due to leakage from an unidentified source. There is insufficient information to determine whether the leakage is from an underlying, overlying, or adjacent aquifer. The applicant further argues that the regional gradient stabilized the cone of depression. In general, a developing cone of depression is additively superimposed on a regional gradient according to the principle of superposition that is applicable to all linear systems (Bear, 1979), and therefore; the transient effects resulting from a pumping well are over-printed on, separable from, and unaffected by the presence of a regional gradient. There is insufficient evidence in the record to show that this general feature of groundwater systems is, for some reason, not applicable to the project site, so we disagree with the applicant's contention. We do agree that there is a regional gradient implying flow from the Spring Mountains toward the project site, and the presence of a regional gradient does imply that groundwater flowing through the site is in transit to a down-gradient point of discharge, possibly the Amargosa River. We think it is important to establish the nature of groundwater flow from the Pahrump Valley to California Valley, Stewart Valley, Middle Amargosa Valley, and Chicago Valley. Further, we agree with CEC staff's contention that partial penetration of the APT monitoring wells may have affected the test results, and was not accounted for in any APT analysis.

The APT provided useful information related to conditions near the pumped wells, but extrapolating results from a test that spanned a few days into an assessment of impacts over the life of the project is inherently uncertain. Additional testing for a week or a month will not eliminate this uncertainty, so the CEC is faced with developing its final staff assessment based on inconclusive data. A high level of hydrogeologic uncertainty is not unique to this project; rather, it is typical when making hydrogeologic predictions involving new stresses on an aquifer system. For example, not far to the north of the project area, billions of dollars have been spent evaluating the Yucca Mountain Nuclear Waste Repository, yet great uncertainty still remains as to the likelihood of radionuclides escaping the repository via the groundwater system. For HHSEGS, because the assessment of impacts is inconclusive, the most viable way for the project to proceed is to require monitoring that will allow tracking of impacts to the groundwater system as they develop during the life of the project, so that mitigation can be implemented if it becomes apparent that groundwater dependent resources will be impacted. This approach is reasonable and feasible for HHSEGS. The applicant predicts that the modest amount of pumping proposed for this project will have negligible off-site effects; therefore, from a hydrogeologic perspective, all that is required is monitoring sufficient to verify the applicant's contention, and mitigation measures that become active if monitoring shows that the applicant's contention was wrong.

We support the provisions of WATER SUPPLY – 6A and 8A and for a monitoring well network, and recommend that conditions of certification WATER SUPPLY – 6A and 8A be modified to include the following:

In cooperation with USBLM, the applicant shall fund and construct a monitoring well approximately ½ mile west of the Stump Springs ACEC for inclusions in the monitoring well network.

Comment #2: Triggers for mitigation actions. We do not see in the PSA a mechanism to avoid impacts by tracking groundwater level changes and taking action to reduce or stop pumping before negative impacts occur. Mitigation measures Bio – 23 and Water Supply – 8C do not require that action be taken until vegetation vigor has declined by 20%, which may be well past the point where moderating

pumping would avoid impacts. Groundwater level declines necessarily precede pumping-induced declines in soil moisture and vegetation condition; therefore, observations of water level change can be used to anticipate negative impacts and manage pumping to avoid them.

Vegetation conditions are affected by numerous factors. Our experience in Owens Valley has been that using vegetation condition as a trigger to control pumping is less reliable than using groundwater levels, because (1) groundwater levels necessarily respond sooner to pumping than vegetation conditions, and (2) vegetation conditions are affected by a greater variety and number of factors than groundwater levels. We recommend that mitigation actions be triggered by changes in groundwater levels, and vegetation monitoring be used as a check to evaluate the effectiveness of the triggering mechanism, so that the water-level based triggering mechanism can be modified if the vegetation monitoring shows that vegetation conditions are declining due to water table withdrawal.

Concerning the statement made on page 4.2-144 that "*Long-term study in the Owens Valley suggests that a change in water table elevation of as little as 0.3 feet could affect a major change in plant life form and species composition, if, in fact, the plants survive,*" the threshold of 0.3 feet of drawdown seems arbitrary. We have seen no evidence in Owens Valley that such small changes in groundwater level measurably affect phreatophytic grass-dominated communities that have rooting zones around 2 meters. The literature supports this observation, and also indicates that deep-rooted species are generally more tolerant of changes in water table depth than shallow-rooted species (Elmore et al., 2002; Patten et al., 2008; Cooper et al., 2006; Horton et al., 2001; Horton and Clark, 2001; Segelquist et al., 1993; Amlin and Rood, 2002; Horton et al., 2003; Lite and Stromberg, 2005; Stromberg et al., 1996; Amlin and Rood, 2003; Shafroth et al., 2000; Scott et al., 2000). None of these studies suggest that a 0.3 foot water table decline equates to a 20% or greater decline in measures of vegetation health in deep-rooted phreatophytes. We recommend that CEC staff conduct a more thorough review of peer-reviewed literature and existing data related to tolerance of the extant vegetation communities to water table drawdown, and, based on that review, set a threshold of water table drawdown that defines a significant impact. That threshold can then be applied to a drawdown-based mechanism for controlling project pumping as described below.

The well network should be used as an early warning system, and that action be taken based on observed declines in groundwater levels to avoid significant impacts. Action levels can be determined using predictive hydrologic modeling tools to associate observed water level changes in monitoring wells with quantitative measures of significant impact at groundwater dependent resources. In groundwater systems where pumping continues for long periods of time and large areas are affected, groundwater levels at sensitive resources may continue to decline even after pumping has stopped; therefore, special care should be given to account for delayed water table recovery at sensitive resources. To this end, BIO-23.3 should be replaced with the following:

Based on the results of inventory of groundwater-dependent and groundwater-influenced habitat and resources produced under BIO-23, subparagraph 13, an amount of water table drawdown that would cause a significant impact to GDEs shall be identified. Using drawdown curves calculated using representative aquifer parameters applied to the Theis method, determine the maximum pumping rate that will not exceed the threshold of significant drawdown at GDEs over the life of the project. Using this pumping rate and these aquifer parameters, determine the maximum drawdown that could occur within each monitoring well located between the project and the GDEs without exceeding the threshold of significant drawdown for any GDE. If drawdown in any monitoring well exceeds the drawdown that corresponds to a threshold of significant drawdown for any GDE, the project owner shall have

90 days to provide evidence to the CPM that the drawdown is not a result of groundwater pumping by the project. If after reviewing the evidence provided by the project owner and other relevant evidence, the CPM, in consultation with BLM Nevada and California state leads for Soil, Water, Air and Riparian Programs, the BLM Southern Nevada District Hydrologist and Botanist and the Inyo County Water Department concludes that the drawdown is due to groundwater pumping by the project, the CPM shall notify the project owner that its groundwater pumping is to cease.

Subsequently, the project owner may resume pumping if the CPM, in consultation with BLM Nevada and California state leads for Soil, Water, Air and Riparian Programs, the BLM Southern Nevada District Hydrologist and Botanist and the Inyo County Water Department concludes that the exceedence of the drawdown trigger(s) was due to factors other than the project's pumping, and that the project's groundwater pumping did not contribute to the trigger exceedence, or the water table recovers to baseline levels.

Condition of certification BIO-23 is unclear as to what measure of vegetation condition will be used to determine if action is necessary. On page 4.2-234, a significant impact is described as "decline in health of any groundwater-dependent species of 20 percent or more." Elsewhere, a less than significant impact is defined as "less than 20 percent change from the baseline condition" (p. 4.2-233), "20 percent above baseline" (p. 4.2-235), and on pages 4.15-43 – 44, one of the criteria given for reducing pumping is given as "the significance threshold for decline in plant vigor is reached." Nowhere are specific variables or methods identified to define the threshold of significant impact to vegetation. This mitigation measure and related water supply mitigation measures should clearly define what methods and variables will be used to assess vegetation health or vegetation vigor, and use consistent terminology throughout.

Comment 91a

BIO-23 discusses whether changes are correlated solely to regional drought conditions. It is unclear whether the correlation with drought conditions is applied to vegetation conditions, hydrologic conditions, or both. This concept should be broadened to allow the applicant to resume pumping if the applicant can show that the trigger exceedence was caused by some other factor than the applicant's pumping.

Comment 91b

BIO-23.9 requires that offsite reference plots have similar species assemblages, depth to groundwater, and lithology to sites of concern. Other considerations in identifying valid reference sites are similarity in climate, geomorphic position, soils, elevation, potential evapotranspiration, runoff/runon status, depth to water variability, site disturbance, and water quality. If reference plots are used, numerous control sites should be monitored in order to reduce the effect of monitoring site idiosyncrasies on management decisions. In Owens Valley, we have found that locating truly valid control plots is challenging because of the many factors that may invalidate a plot, and that the validity of plots needs to be reassessed as time goes on and plots are subject to later disturbances.

Comment 91c

Comment #3: Water-related compliance with Inyo County Code Title 21. The CEC should use Inyo County Code Title 21 as a framework for analyzing groundwater-related impacts. PSA page 4.15-3 lists local laws, ordinances, regulations, and standards related to groundwater use by the project. Inyo County Code Title 21, Renewable Energy Development, was omitted from this list. Were it not for the CEC's sole permitting authority over the HHSEGS, this project would be subject to Title 21. Title 21 provides that:

As a condition to the issuance of a renewable energy impact determination or a renewable energy permit, the county planning commission may, in the case of a renewable energy impact determination, incorporate, and in the case of a renewable energy permit, impose such reasonable and feasible mitigation measures as it finds to be necessary to protect the health, safety and welfare of the county's citizens, the county's environment, including its public trust resources, and to ensure that the county and its citizens do not bear an undue financial burden from the project. (Ord. 1158 § 3, 2010.)

To implement Title 21, County staff would develop and recommend mitigation measures for consideration by the Planning Commission. To protect the County's citizens and environment from impacts related to groundwater pumping, staff would develop and recommend a mitigation plan according to this outline:

- 1) The Project Owner shall cooperate with the County to complete an inventory of non-project wells potentially affected by the Project that identifies the owner of each well and includes the location, depth, screened interval, pump depth, static water level, pumping water level, and capacity of each well. For each such well, the Project Owner shall assess any projected impact of the Project on the well and shall develop and submit a plan for monitoring and mitigating any adverse effects on the well, including thresholds where mitigation activities would be undertaken. The plan should include, as feasible, agreements from the owner of each well approving monitoring activities. Monitoring should include both groundwater elevation and water quality. Mitigations should include deepening or replacing wells that become inoperable due to Project pumping, monetary compensation for additional pump lift incurred by Project pumping, and mitigation for impacts to water quality.

Comment 91d

- 2) The Project Owner shall complete and provide to the County an inventory of groundwater-dependent or groundwater-influenced habitat and resources that may be potentially affected by the Project. The inventory should identify and describe habitat and resources dependent on or influenced by groundwater, including spring flow, baseflow to streams and rivers, phreatophytic meadows, phreatophytic scrub, and riparian areas. For each habitat or resource identified, quantitative measures of what constitutes a significant impact to such habitats and resources should be identified and associated with corresponding amounts of water table drawdown, a monitoring program should be developed that is sufficient to assess potential impacts to the habitats and resources, and mitigation measures should be identified that will be implemented if significant impacts to such habitats and resources should occur. The preferred form of mitigation is avoidance of adverse effects on habitat and resources by modifying, reducing, or ceasing groundwater pumping by the Project if adverse impacts are projected as a result of prior evaluations and monitoring results.

- 3) The Project Owner shall develop a model for predicting changes in the groundwater flow system resulting from the Project which has the capability to assess changes in hydraulic head, flow rate, flow direction, and water budget. The Project Owner shall also provide to the County model runs which predict effects of the planned groundwater pumping by the Project on the habitats and resources described above and predictions of the level of groundwater pumping that will cause significant impacts on such habitats and resources. The Project Owner shall also use the model to provide an evaluation of the sustainability of the water supply for the life of the project, including the cumulative sustainability when considered with other pumping occurring or projected to occur in the groundwater basin.

- 4) The Project Owner shall develop and provide to the County the following:
- a. A plan for a network of monitoring wells (either existing or to be constructed) to be regularly monitored together with a schedule for reporting water levels in the wells to the County by the Project Owner. Construction of production and monitoring wells (water level monitoring should be initiated as soon as wells are available and results will be publicly available);
 - b. A plan for logging and aquifer testing of all new production wells;
 - c. A plan for monitoring and reporting on the impacts of the Project on private wells and on habitats and resources described above.
 - d. A plan for verifying the predictive tools described above and for revising or recalibrating the tools during project operation.
 - e. A plan for revising thresholds as dictated by new data concerning system response to Project operation.
 - f. An enforceable commitment based on monitoring data and significance thresholds, to implement mitigation measures as necessary.

Comment # 4: Water Use Offset Plan (page 4.15-32). Condition of Certification Water Supply – 1 requires that the Project Owner shall submit a plan “showing that it will replace 4,900 acre-feet or 163 AFY and the [Project Owner] shall undertake one or more of the activities identified below to mitigate project overdraft impacts...” In this section, it is unclear what types of activities are contemplated. Activities such as retirement of water rights, development of artificial recharge, or salvage of phreatophyte transpiration could each be thought of as activities that replace water in an overdrafted aquifer, but these activities each have differing environmental and economic considerations. This condition of certification should be more specific regarding what activities it encompasses.

If acquisition and retirement of water rights in Pahrump Valley is approved under this condition of certification, the CEC should require that the retired rights are currently being exercised. Since the amount of permitted groundwater rights in Pahrump Valley is far greater than actual pumpage, it is clear that there are permitted rights to pump groundwater that are currently unexercised. If rights are acquired and retired that are currently not being used, there would not be an actual reduction in groundwater extraction. Retirement of water rights is effective as mitigation only if the retirement results in an actual reduction in pumping, and even then, it is only mitigation for basin-wide overdraft. Water rights retirement does not in any way mitigate for any impacts that might occur to groundwater dependent resources affected by project pumping unless the retirement results in the water table rising in the affected area. This is unlikely to happen unless the retired water rights are located approximately equidistant to the affected area as the project is to the affected area.

This condition should require that the applicant provide records showing that any water rights retired for the purpose of satisfying this condition of certification were actually being exercised. When determining how much water use offset should be credited to a water right, the offset should be based on consumptive use of groundwater, not the total water right or the total amount of water pumped. For example, if a water right that was being used for irrigation is acquired for water offset, the offset should be for the amount of water lost to evapotranspiration, not the amount permitted or the amount pumped.

Comment #5: Compliance with California mandates for groundwater elevation monitoring. This project hampers Inyo County's ability to comply with state-mandated groundwater monitoring requirements. The State of California enacted legislation in 2009 (SBX7-6, Statutes of 2009, Seventh Extraordinary Session, chaptered as Water Code 10920 et seq.) that requires all groundwater basins and subbasins delineated in *California's Groundwater*, the Department of Water Resources' (DWR) Bulletin 118-2003 (DWR, 2003), to be monitored for seasonal and long-term trends in groundwater elevation. The data collected is required to be reported to DWR who will in turn compile the data in an online system that is accessible to the public. The law identifies numerous entities such as counties, cities, water districts, and groundwater monitoring cooperatives that may assume responsibility for the monitoring. Notably, state, tribal, and federal agencies are not among the eligible monitoring entities.

To fulfill the requirements of the legislation, DWR initiated the California Statewide Groundwater Elevation Monitoring Program (CASGEM). Participation in CASGEM by local entities is voluntary; however, if no eligible local party volunteers to become the designated monitoring entity, DWR may undertake the groundwater elevation monitoring. If DWR assumes responsibility for the groundwater monitoring, nonparticipating eligible monitoring entities may lose eligibility for water grants and loans awarded or administered by the state. Naturally, Inyo County is concerned about the potential for losing eligibility for these grant funds, and wishes to comply with the requirements of CASGEM. No funding was provided in the legislation for local entities to implement this new state program.

SBX7-6 does not allow for exceptions to its requirement that groundwater elevations be monitored in all groundwater basins. In many remote desert basins in Inyo County, designation as federal wilderness or military uses render it impossible to construct monitoring wells, and additionally, many other basins have no significant groundwater pumping. To address these flaws in the SBX7-6 legislation, in August 2011, legislation passed (AB 1152) amending Water Code Sections 10927, 10932, and 10933, and authorizing that a monitoring entity may report groundwater elevations using specified alternate monitoring techniques for certain groundwater basins and subbasins meeting prescribed conditions. AB 1152 allows that, at DWR's discretion, a monitoring entity may use alternative monitoring techniques to assess whether groundwater conditions in a basin are changing. Alternative monitoring techniques may be approved by DWR if groundwater elevations are unaffected by land use activities or planned land use activities.

Approval of HHSEGS will invalidate any argument by Inyo County that the California portion of Pahrump Valley, California Valley, and Middle Amargosa Valley are unaffected by land use activities; therefore, the County will be required to either develop a program for reporting groundwater elevations to DWR, or be ineligible for state water grants and loans. In order to comply with CASGEM requirements, the County could use the groundwater elevation monitoring data proposed in condition of certification Water Supply – 6.C.4 and Water Supply – 8.C.5 if those data are made available to the County. To that end, we request that the conditions of certification be modified to require that:

Groundwater elevations shall be measured throughout the life of the project at least twice per year, and reported to the CPM and to the Inyo County Water Department. The County will report these data to the California Department of Water Resources as part of the California Groundwater Elevation Monitoring Program.

Comment # 6: Water Level Monitoring for Neighboring Wells, Mitigation, and Reporting (Pages 4.15-36 – 4.15-40). Concerning section A.2, we understand from discussion with CEC staff that the well network will include at a minimum one well at the southern end of the site. Development of water level maps within the Pahrump Valley, as required by A.4, will require a network of more than the one well

indicated in A.2. Section C.3 requires that an owner provide documentation of the well location, construction, and pump intake depth. Some well owners may not have all of this information available, particularly pump intake depth. The Project Owner should be required to assist well owners with developing this information if the information is not readily available to the well owner. Concerning section C.5, monetary compensation should be on an annual basis only so that this payment transfers to any new owner of the land.

Comment # 7: Corrections. On page 4.15-11, Table 2, there appears to be an error in determining the median value. The Stateline well has a trend of -0.237, but the overall median is given as -0.273 at the bottom of the table and in the text at the bottom of page 4.15-10.

The language in WATER SUPPLY 8.C.6 appears to be more applicable to domestic wells. Likewise for the language at the top of page 4.15-45.

On page 4.15-13, in the definition of the variables for Equation 2, time should be lowercase t.

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**REPONSES TO THE MAY, 2012 "SOCIOECONOMIC AND
FISCAL IMPACTS OF THE HIDDEN HILLS SOLAR ELECTRIC
GENERATING SYSTEM ON INYO COUNTY"**

Presented to

THE COUNTY OF INYO, CALIFORNIA

by

GRUEN GRUEN + ASSOCIATES

July 20, 2012

C1299.1

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CHAPTER 1

SYNTHESIS AND RECOMMENDATIONS

We have reproduced below Table ES-1 from the May, 2012 "Socioeconomic and Fiscal Impacts of the Hidden Hills Solar Electric Generating System [HHSEGS] on Inyo County" prepared for the California Energy Commission (CEC). All of the revenue forecasts shown on that table for the construction period and the annual operating period are those of the report's authors. The expenditures shown in that table were prepared by the departments and consultants of the County of Inyo, a political subdivision of the State of California. The CEC analysis utilizes the present value calculation as a way of summing up or blending the estimates prepared by the authors of the CEC analysis.

**Table ES-1. Net Fiscal Impacts on Inyo County:
28 Years, Scenario 1**

	Construction (3 Year Total)	Operation (Annual)	Net Present Value
Revenues	\$86,500,000	\$1,100,000	\$92,200,000
Expenditures	\$11,100,000	\$1,700,000	\$31,000,000
Net Impact	\$75,400,000	(\$650,000)	\$61,100,000

In this response to that analysis, Chapter 2 considers the revenue forecasts contained in the May CEC report and finds them to be uncertain and significantly overstated. The estimate of \$86,500,000 revenues to the County for the 3-year construction period is so large that if it were accurate, the County could invest that money in safe government bonds at 3 percent per year and earn more than \$2.5 million per year. Even though, as discussed in Chapter 3 of this response, the CEC report's prediction of the County expenditures is understated, the earnings from the more than \$80 million would probably cover the annual operating deficits identified by the County.

Unfortunately, as we discuss in Chapter 2, the best guess, and we admit it is a guess, of what the revenues to the County will be during the 3-year construction period, is likely to be somewhat in excess of \$10 million. But even if the revenue coming to the County during the project's construction were to reach \$12 million, investing that amount in 3% bonds earning \$360,000 and assuming that the CEC report's forecast that the County would obtain \$1,100,000 per year during the project's operation was correct, there would still be a 15% gap between what the project costs the County and what it pays the County in taxes and fees.

The combined effect of overstated and highly uncertain revenue forecasts in the CEC



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analysis threatens the fiscal health of Inyo County, and this effect is further compounded by the discounting of the legitimate costs the County is likely to incur.

Comment 92

As this response discusses in Chapter 3, many of the deductions from the County departments' original estimates of the costs they will have to pay in order provide services to the proposed project are unwarranted. There are, however, opportunities, to reduce County costs. For example, if the applicant takes steps to improve and utilize alternative routes and cooperate with a system to keep project traffic off the road that requires an overlay to handle anticipated traffic, some moneys could also be cut from the estimated roadway improvement and maintenance costs.

However, even reducing the County's likely expenditures is not going to avoid imposing severe fiscal stress on the County, unless the uncertainties that currently apply to the CEC's analysis of potential revenues to the County's treasury can be made more certain by the following conditions of project approval:

Comment 93

1. The project sponsor shall require that all qualifying contractors and subcontractors exercise their option(s) to obtain a Board of Equalization sub-permit for the Hidden Hills SEGS jobsite and allocate all eligible sales and use tax payments to the County of Inyo.

1. That the project sponsor be required to reimburse the County for all costs associated with a consultant with expertise in sales and use tax allocation, hired by the County, to assist the project sponsor and its contractors to complete and submit all documents necessary to register the jobsite as the source of all sales and use taxes, and then work proactively with contractors and subcontractors of the project to identify and properly document all purchases in conformity with the laws and regulations of the Board of Equalization so as to maximize the amount of sales and use tax captured and allocated to the County.

Comment 94

In addition, in order to encourage economic development in the County, the CEC is asked to request that the applicant design and operate the interpretive center so as to promote and take full advantage of the potential for expanded tourism that the project has the potential of inducing. We would also point out that such an interpretive center could be developed and programmed as a multi-purpose building providing police and fire facilities, as well as a community center and emergency shelter identified as necessary to mitigate other socioeconomic and public safety impacts. Doing so will provide the developer with certain economies of scale in addressing this suite of impacts.



CHAPTER 2
EXPECTED FISCAL AND ECONOMIC BENEFITS

The revenues or fiscal benefits, as well as the jobs, income and output or economic benefits to Inyo County of HHSEGS are discussed in several sections of the May, 2012 Socioeconomic and Fiscal Impacts report issued by the CEC. Below, we first discuss the County's response to the assumptions and resulting forecasts of fiscal benefits presented in several sections of the May CEC document. Next, we consider the economic impacts forecast in the May CEC document. The third section of this response discusses the benefits foreclosed, or opportunity costs of the project, as well a likely positive economic and fiscal benefit ignored in the CEC document. The final section will make a recommendation to mitigate the uncertainties discussed in the aforementioned three sections. As discussed in Chapter 1 to this response, which reaches conclusions based on an evaluation of both the benefits discussed in this chapter and the forecasts of County expenditures discussed in the next, failure to deal with the uncertainties discussed in this chapter will cause the proposed HHSEGS to pose a serious threat to the future fiscal health of the County.

Expected Sales and Property Tax Receipts

Sales and Use Tax

Because of the long-term relationships between County expenditures to provide the services likely to be induced by the project and likely on-going revenues to the County from the operations and maintenance of the project, determining the amount of sales and use taxes likely to be garnered by the County during the 29-month construction phase is critical. To remain fiscally solvent in providing services to the project during its operations phase, those sales taxes will have to provide the County with an investment corpus large enough to fund likely annual deficits induced by the project during its years of operations and maintenance.

Page 24 of the Socioeconomic and Fiscal Impact report cited the following quotation from the BrightSource (BSE) sponsored Application for Certification (07-AFC-05C): "BrightSource worked with the County of San Bernardino to maximize sales and use tax allocated to the unincorporated San Bernardino County stemming from construction of the Ivanpah SEGS project." The CEC report continues:

"This indicates that it will likely follow through with its intentions and do the same for Inyo County. Furthermore, BrightSource noted that even if it designated the 'point of sale' as nearby Pahrump, Nevada, it would still be subject to use tax in Inyo County.

Based on these assumptions presented by the proponents, the County government could receive \$84.5 million in its local shares of sales and use tax over the 29-month



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construction period based on the assumptions presented in this report. During operation, however, sales tax revenues from the project will be negligible, because non-payroll O&M expenditures spent in the County amount to only \$540,000 annually. Of this amount collected, only \$2,900 would go to the County." (page 24; Socioeconomic and Fiscal Impacts of the HHSEGS on Inyo County)

Comment 95

The Executive Summary of the CEC impact report states, "The proposed project is expected to cost in the range of \$2.9 billion in total to construct, with direct material costs of roughly \$2.5 billion, based on publicly available estimates for each of the technologies." (page 1; Socioeconomic and Fiscal Impacts of the HHSEGS on Inyo County) This estimate is not otherwise substantiated, and seems to be contradicted by the following statement in Section 5.3.1 of the same report. "In addition, the assessed value of the plant facilities would be \$2.18 billion for the project." (page 22) The questionable credibility of these basic assumptions concerning project costs also calls into question the entire revenue analysis, which, as we read the report, is based largely on the aforementioned cost numbers.

The CEC report goes on to assert that the project will generate sales tax revenues for the County because newly employed local workers will be spending some of their additional disposable income locally on various goods, such as food, appliances and clothing. During the 29 months, direct and indirect income suggested by the JEDI model is expected to generate \$2 million from the purchases of employees, whereas during the assumed 25-year operating period, the 19 forecast direct and indirect jobs assumed to be locally employed are projected to generate nearly \$43,000 annually during the 25-year operation period.

We will comment in the next section of this chapter on the credibility of the assumptions forecast from the JEDI model output for employee generated sales tax revenue. However, here we express our concern that the County place any possible reliance on the statement expressed in the CEC impact report that the County government could receive \$84.5 million in "its local share of sales and use tax over the 29-month construction period." All but the very small amount of the retail sales likely to result from the direct and induced expenditures in Inyo County by construction related workers will come from the purchase of tangible personal property by the project's construction contractors and subcontractors, upon which sales tax has not been collected by a retailer. However, this potential will be maximized if, and only if, the developer of the project has exercised the option of requiring its contractors and sub-contractors to register the construction jobsite as the point of sale for all such purchases, **and institutes a very proactive program of implementing the procedures needed to properly document these purchases.**

We found that a Fair Share Contribution Agreement between San Bernardino County and the Ivanpah developer was signed on December 9, 2010. Presumably, this is the mechanism that BSE referred to when it wrote in its Application for Certification (07-AFC-05C): "BrightSource worked with the County of San Bernardino to maximize sales and use tax



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allocated to the unincorporated San Bernardino County stemming from construction of the Ivanpah SEGS project." This agreement stated that \$377,000 would be paid to the County annually for fire protection and emergency responsive services for the Ivanpah Solar Electric Generating Complex. However, the system put in place in San Bernardino County in order to bring sales and use tax receipts from the project during and after construction does not suggest that anything close to the \$84.5 million in sales and use tax receipts that the authors of the CEC analysis claim will flow into the County of Inyo coffers, or that that the County will ever see close to the more than 3 percent of the sales and use tax that appears to be suggested by the narrative describing Table 5.5, "Sales and Use Tax Fund Distribution." (page 23 Socioeconomic and Fiscal Impacts of the HHSEGS on Inyo County)

Comment 96

Based on conversations with apposite San Bernardino officials and consultants, we believe that San Bernardino County will receive approximately \$7.2 million in sales and use tax receipts from the construction of the Ivanpah project, and very little, if any, sales-tax-related receipts from the operation of the solar generating facility. The \$7.2 million represents construction expenditures of tangible personal property of a little over \$82 million, from which all local and county governmental agencies and districts in the county are likely to receive about \$7.2 million after the deduction of a \$205,000 credit to BSE. Most importantly, this amount of sales and use tax dollars will accrue to San Bernardino County only because BSE has been cooperating with an attorney specializing in sales and use tax allocations, in order to track all significant purchases to their source and assure that the complex documentation required under State law and Board of Equalization rules is provided by the vendors all over the world who sell and lease tangible personal property to project construction contractors and subcontractors.

In no way do we mean to imply by our criticism of the sales and use tax forecasts in the CEC impact report that the task of predicting such taxes is easy. Even after construction has started, adjustments are going to have to be made in the cost of purchases and in the list of items purchased and leased. Furthermore, some personal property purchased during the construction period will not cost enough to qualify for a sub-contractor to obtain a sub-permit for the jobsite since there is a \$5 million minimum, or justify having the contractor doing the work necessary to capture the tax. While certainly this will not eliminate all uncertainties, we believe the best way to forecast the amount of sales and use tax likely to be collected **under the assumption that point of sale options are exercised and the current and future owners of the project cooperate fully in the complex task associated with capturing the taxes for the County**, would be to utilize the experience of San Bernardino County on this matter as a comparable. As we understand it, Ivanpah is being built to generate 370 megawatts (mw) of power, while the HHSEGS project will be built to generate 35 percent more electric power, or 500 mw. Thus, under the heroic assumption that output will be correlated with construction costs and produces an estimate of \$10 million in sales and use tax receipts to the County, the County captures 1 percent of the sales and use taxes paid by the project during construction. As we will repeat in the



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recommendations section at the conclusion of this chapter, unless BSE cooperates in requiring its construction contractor and sub-contractors to maximize sales tax accruing to the County of Inyo, and Inyo County engages the services of an expert in the allocation of sales and use tax to work consistently with all BSE contractors and subcontractors to make sure that the not insignificant amount of paperwork required to capture these taxes is properly filled out, can anything close to the estimated \$10 million flow into the coffers of Inyo County.

The property tax revenue (discussed below) and much of the sales and use tax revenue projected to accrue to the County of Inyo in the CEC analysis is discretionary General Fund revenue available to the Inyo County Board of Supervisors to budget as it deems appropriate but which, for the purposes of the Socioeconomic and Fiscal Impacts analysis, the CEC assumes will be used to mitigate project induced impacts that could otherwise be funded through project specific conditions of approval, which would most likely be required by the County of Inyo if not for the CEC's sole permitting authority. However, even if the CEC's premise that these funds would be available to fund the cost to County programs and services impacted by the construction and operation of the HHSEGS is accepted, it should be noted that the intended, allowable, and sometimes required uses of portions of the sales and use tax monies relied upon in the CEC analysis is restricted by State and local regulations. For example, the 1.06% in the Local Revenue Fund 2011 does not go into the County's General Fund. Under Section 6051.15, this revenue is distributed by the State Controller for expenses incurred by counties for the realignment of law enforcement costs previously paid by the state. The amount in the Local Revenue Fund is distributed to counties based on formulas specified in 2011's AB 118 regardless of the jurisdiction in which the tax is collected. Similarly the .5% for the Local Public Safety Fund and the .5% for the Local Human and Health Services Fund are specifically designated and do not go into the County's General Fund. Additionally, there is no analysis or assurance in the CEC report that restricted portions of the sales taxes, such as the examples provided above, will match-up with the service and program needs identified by the County. For example, the County is not arguing that the HHSEGS project will generate significantly increased costs that it is responsible for under criminal justice realignment, yet a large portion of the sales tax is reserved for costs specific to criminal justice realignment.

Property Tax

In Section 5.3.1 of the May CEC Impact study, the proposed solar project is estimated to generate approximately \$3.5 million in property taxes annually. Given the 1 percent property tax rate, this forecast assumes a base year \$350 million property tax assessment for the project. This forecast is arrived at by assuming the cost of the entire facility will be \$2.18 billion, of which approximately 45 percent will be taxable non-solar property, of which 38 percent will be classified as dual-use, and thus taxable at 25 percent of full value, and 7 percent will be fully taxable. We believe it is significant to note that the effective base of this



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forecast is that the project will be valued at its cost of construction. Unless an agreement is made that the present and future owners of the solar plant will accept this base year forecast and not request a reassessment throughout the life of the project, this foundational assumption is highly questionable.

Comment 97

Whatever the final assessed value is, the County will only receive a little less than 30 percent of the annual tax based on this assessment. School districts in Inyo County will receive approximately 62.5 percent; and the special districts a little under 7 percent.

Mr. Eric Endler, an appraiser in the San Bernardino County Assessor's Office, told Dr. Gruen in a telephone conversation, the final construction cost of the Ivanpah project was approximately \$500 million. However, after the provisions of Revenue & Taxation Code Section 73 were considered, the actual base year for Ivanpah was approximately \$250 million, suggesting annual potential revenue from property taxes of \$2,750,000, given the San Bernardino County property tax rate of .011 percent. However, after allocations were made to all property tax recipients in San Bernardino County, it is estimated that, assuming the base year remains uncontested, the County of San Bernardino will receive \$300,000. While the scale of the two projects, when measured in terms of their electric output (370 MW for Ivanpah, and 500 MW for HHSEGS) is that the completed Ivanpah project is 26 percent smaller than the HHSEGS project, the actual property tax expected from Ivanpah is 70 percent less than what has been forecast in the CEC report to apply to the HHSEGS project, assuming that reassessments are not requested in either County.

Neither the appraiser we spoke with in San Bernardino County, nor the past experience of the Inyo County Assessor with regard to other alternative energy projects, would lead one to assume that the initial and future owners of the proposed project in Inyo County will not seek downward reassessments of the base. As is discussed in the following chapter in the subsection that deals with the forecast of Assessor's expense, that Office should assume that a project whose costs have been heavily subsidized by exemptions and assurances, at both the state and federal levels, will most likely seek to have their base year property tax lowered below construction costs, for many of the same reasons they pointed to as necessitating the receipt of federal and state subsidies.

Economic Benefits and Opportunity Costs

The regional economic model, JEDI, was used to estimate the economic benefits of both the construction and ongoing impacts of the project during operation. Important inputs to the model included estimates that during the construction phase, thirty-two (32) jobs would be created in the County directly from construction activity, and then the model was used to forecast that another seventy-seven (77) jobs would be induced through increased activity in the County. This means that during construction, total earnings by County residents would increase by \$12.1 million, while the output of the Inyo County economy would increase by



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\$73.8 million in the full 29-month period, or about \$30.5 million per year.

The model was also used to look at the effect of assuming that six (6) jobs out of a total of 120 jobs during the operation period would be filled by local residents. These jobs were forecast to "multiply" to create an additional fourteen (14) jobs, with total annual earnings of \$1.1 million, with \$2.3 million in output. While these contributions to the County economy are relatively small compared to the previously discussed effect of taxable construction spending and increases in the property tax base forecast, they are nevertheless quite questionable because of the JEDI model's failure to take cognizance of the geographic distribution of economic activity within Inyo County.

"Small area analysis is notorious for over-estimating local impacts." This comment was made by Prof. Geoffrey J.D. Hewings, the Director of the Regional Economic Applications Laboratory at the University of Illinois, an internationally-respected expert in regional economic analysis. Hewings' comment reflects the reality that economic activity is never spread evenly through space, but concentrated within differentiated agglomerations. Simply put, in those cases where a proposed new economic activity or construction project is located near other activity centers, input-output models such as JEDI can be reasonably depended upon, even when they deal with areas as small as a single county. However, given the sparseness of economic activity near the proposed site but within Inyo County, models such as JEDI can be quite misleading.

The area around the proposed project has very little to offer in terms of economic activity, but is close to much larger and more attractive activity in Nevada. Sixty-five percent of Inyo County's taxable sales are made in the incorporated City of Bishop. Bishop is 241 miles and, according to Mapquest, a 4-hour and 13-minute drive from Tecopa. Tecopa, again according to Mapquest, is 26 miles and 39 minutes driving time to Pahrump, while Las Vegas, NV is 82 miles and 1 hour and 38 minutes driving time.

The implicit assumptions of the generalizations of the JEDI model, which are built on an economic model which was first proposed by Nobel Laureate Wassily Leontief in the late 1930s, was preceded by Reilly's Law of Retail Gravitation to predict the area from which customers will come to various retail outlets. Reilly's Law noted that the attraction of retail outlets increased with their size and decreased with their distance from potential customers. The use of the JEDI model to estimate the indirect jobs and output that will be induced by local residents of the County working at the site violates Reilly's law, which neither Leontief nor any other economist has ever rejected. While it's impossible to make a sure-footed forecast of how many local residents will work at the project during its construction or operation, the JEDI's estimate of their multiplier effect within the County is very likely to be over optimistic.



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Opportunity Costs and Potential Visitor Benefits Ignored

Comment 98

The May CEC Socioeconomic and Fiscal Impact study shrugs off the opportunity costs of taking close to 10,000 acres of Inyo County's very limited land for private development for the foreseeable future with the following sentence on page 11: "No economic losses from reduced agricultural activity are projected as the reasonably foreseeable impact is negligible. As discussed in AFC Section 5.6 Land Use, there are currently no agricultural uses within the HHSEGS site." As the County has pointed out in numerous meetings and communications, and as the County's economic consultants, Gruen Gruen + Associates, pointed out to the representatives of CH2MHill who wrote the AFC, much of the land being taken by the project is already plotted for residential use, and as County Planning Director Joshua Hart has pointed out, the long-range planning vision for the area affected by the project includes a variety of non-agricultural uses, including not only residential but eco-resort, visitor-serving uses and possibly commercial activities, as well.

The affected area, including the approximately 6,000 acres around the project that are set aside as a potential mitigation area, is approximately 9,000 acres. For a county with so little private land available for development, the loss of future opportunities for development on this amount of acreage is significant.

Comment 99

Surprisingly, the project planners and the socioeconomic report seem to have ignored the potential the project would offer for the attraction of tourists to the area. Not only does this oversight represent a gap in the CEC Socioeconomic report, it also raises the concern that the interpretive center the project plans to build will not be built and operated in a way that captures the tourism attracting potential of the project.

The June 17, 2012 issue of the New York Times Magazine featured an article entitled, "The Beauty of the Largest Solar Farm in the World." The black and white photographic visuals were stunning. This type of PR is likely to encourage visitation to the proposed Charleston View site. Those visitors who strongly support solutions to global warming are the most likely to visit the BSE solar farms.

A comprehensive study of visitors to Death Valley National Park (DVNP),¹ the nation's largest park, included the results of a visitor survey conducted in DVNP in the summer of 2010. The survey revealed that 55% of the visitors to DVNP in the summer were tourists from foreign countries, most of whom came to the park after visiting Las Vegas. Forty-five percent of these foreign visitors originated from Western Europe. There is a strong crossover between these Western European visitor respondents and their response to the question, "Should the government allocate more resources to global warming?" Over 52% of those surveyed in this DVNP summer survey felt the government should allocate more

¹ Gruen Gruen + Associates, "A County at Risk: The Socio-Economic Impacts of the Proposed Yucca Mountain High-Level Nuclear Waste Repository on Inyo County, California" Appendix C, September 29, 2010



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resources. Another 19% said maybe, 14% did not offer a response, while only 15% stated no.

Comment 100

What these survey results suggest is that many of these summer visitors, along with visitors from the northwest, who also hold strong environmental values, may consider including HHSEGS in their visit to DVNP if made aware of the solar project and, as shown on Figure 1, that HHSEGS could easily be included on trips from Las Vegas to DVNP. How many visitors to DVNP traveling from Las Vegas would include both sites is a question to which we do not have an answer. To the extent they do, additional nearby lodging might be induced. In time, additional eating establishments that cater to these visitors would be induced.

It is important to point out that our 2010 DVNP sample underrepresented tour groups. Only 2.4% of our sample was part of a tour group. Most of the visitors on the tours had relatively limited to no English speaking skills, which may have been the primary reason they elected to take a tour in the first place. Most of the foreign visitors who were not on tour had at least adequate English skills. Should tour groups elect to add HHSEGS to their route, it is likely to add considerably to the wear and tear on the existing roads, but also likely to increase the demand for nearby food services.

Recommendations

In order to reduce the uncertainties that both these responses and the CEC Impact study agree exist with regard to the forecasts of revenues induced by the project that flow to the County, and maximize the potential that much of these revenues, particularly those potentially induced by the construction period, we would strongly recommend that the CEC meet the following conditions of approval:

Comment 101

1. The project sponsor shall require that all qualifying contractors and subcontractors exercise their option(s) to obtain a Board of Equalization sub-permit for the Hidden Hills SEGS jobsite and allocate all eligible sales and use tax payments to the County of Inyo.

2. That the project sponsor be required to reimburse the County for all costs associated with a consultant with expertise in sales and use tax allocation, hired by the County, to assist the project sponsor and its contractors to complete and submit all documents necessary to register the jobsite as the source of all sales and use taxes, and then work proactively with contractors and subcontractors of the project to identify and properly document all purchases in conformity with the laws and regulations of the Board of Equalization so as to maximize the amount of sales and use tax captured and allocated to the County.

Comment 102



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3. That the interpretive center be designed and operated so as to promote and take full advantage of the potential for expanded tourism visitation to the project and other visitor attractions in Inyo County. As previously pointed out in Chapter I, the interpretive center could be developed and programmed as a multi-purpose building providing police and fire facilities, as well as a community center and the emergency shelter identified as necessary to mitigate other socioeconomic and public safety impacts.

Comment 103



CHAPTER 3

FORECAST OF PROJECT-INDUCED COUNTY EXPENDITURES

Introduction

In February of 2012, the departments in Inyo County considered the scale, location and activity of the proposed project, and estimated the costs from serving the demands for service likely to be induced by the initial construction and ongoing annual operation and maintenance of the project. Table III.1 reproduces those cost estimates, along with comments. The May Socioeconomic and Fiscal Impact Analysis authored by Richard McCann, presenting CEC staff recommendations, disputed these costs, seeking to eliminate the annual Health and Human Services costs with the comment that, "These costs would not create a significant environmental impact and are beyond the regulatory purview of the Commission." However, these costs are not beyond the regulatory purview of Title 21 of the Inyo County Code, and would be fully evaluated and mitigated by Inyo County if not for the sole permitting authority of the CEC. The failure of the Socioeconomic and Fiscal Impacts of the Hidden Hills Solar Electric Generating System [HHSEGS] on Inyo County report to undertake as thorough and rigorous analysis of the socioeconomic impacts of the HHSEGS project as would be carried out by the County – relying on staff experts in the delivery of County services rather than the self-serving interests of a project applicant and consultants with no municipal experience – under Title 21 calls into question the validity and accuracy of the entire CEC Socioeconomic and Fiscal Impacts analysis.

Table III.1 Forecasts of Departmental Costs Induced by Construction and Operation of HHSEGS			
Departments	Initial/ Construction	Ongoing Annual*	Comments
Health & Human Services		\$188,115	
Assessor	\$120,000	\$120,000	Specialized appraisal requiring the retention of expert appraiser and tax counsel.
Sheriff	\$2,130,666	\$1,269,120	Closest substation is 34 miles away, and current staff serves 3,200 square miles west of the substation.
Public Works	\$8,157,000	\$78,500	Reconstruction of Spanish Trail and annual maintenance
Information Services	\$237,600		Assumes 30 months of high speed data communications system
Agricultural	\$150,000	\$50,000	Monitoring and control project targeted against introduction of invasive weeds
Waste Management	\$156,000		Waste collection for 3 years from Tecopa RV Park and Charleston View area



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Table III.1 Forecasts of Departmental Costs Induced by Construction and Operation of HHSEGS			
Departments	Initial/ Construction	Ongoing Annual*	Comments
Motor Pool	\$33,200		Lower of two estimates of trips during construction. May be as high as \$66,000
Water Department	\$145,000	\$8,000	Estimate for creation of monitoring program and ongoing monitoring costs.
Total	\$11,129,466	\$1,713,735	
*Annual costs shown are for the first year. They are estimated to increase at 5% per year.			
Source: Information on the project's characteristics provided by the BSE AFC and additional information provided by CH2MHill in response to questions by Gruen Gruen + Associates			

In the following section of this chapter, we present a response from the Health and Human Services Department, indicating the nature, extent and rationale behind the costs that they feel will be induced upon them by the impacts of the project on health and human services. The May CEC Socioeconomic report also argued that the Assessor's estimate should be reduced from \$120,000 to \$50,000. A significant part of the contention between the two cost estimates results from the Assessor's belief that appeals for reassessment are likely. As discussed in more detail below, the estimated expenses outlined by the Assessor are reasonably foreseeable and properly included when determining the overall economic impact to the County resulting from the proposed project.

The May report also called for very significant reductions in the cost estimates of both the Sheriff's office and Public Works. In the following pages of this section, additional evidence in support of the original estimates is presented. The May impact report from CEC rejects all of the Agricultural Commissioner's cost estimates, contending that the required work will be accomplished by HHSEGS. Our responses to that comment, as well as projections in the cost of Waste Management, Motor Pool, and Water Department estimates, are presented in the following sections of this report.

Generalizations – Difference

The CEC report describes a general methodology for estimating costs, which we believe is flawed because it ignores the unique geographic, demographic and economic condition of the Charleston View area. Thus, the fundamental methodology or point of view that the CEC report utilizes to estimate the size of induced expenditures is inappropriate.

The general perspective that the CEC report takes to the forecasting of the County expenditures likely to be induced is expressed by the following quotation:

"From an economic perspective, it is the "marginal costs" that are created by



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economic or population growth that must be examined to determine whether or not a new project produces additional public sector costs. That is, a large portion of public service expenditures are fixed — they cannot be changed quickly. In many cases capital-related costs are sized with extra, or flexible, capacity. Other costs, such as staffing, may vary with demand and funding, but also can be "lumpy," that is, an employee is hired after a threshold level of demand or funding is added.

Fixed costs such as school classrooms, fire stations, and roads will generally not be affected by a small increase in demand. For example, a dozen or more students can typically be added to a school with 500 students without creating a need to enlarge the facility. Similarly, two to three additional calls a year to the fire and police departments will not create the need for a new fire station, or even another officer. However, an additional student, or extra police visit, will result in additional costs associated with supplies, transportation, and other operating expenses. A series of such small incremental increases or a single large project can reach a cumulative threshold where a new school or fire station would be required." (page 12)

As suggested by the example used in the first line of the second paragraph above, the fact that "fixed costs such as school classrooms, fire stations and roads will generally not be affected by a small increase in demand" is, in fact, generally true. But, unfortunately, the situation in Charleston View and Inyo County is such that all too often, the needed first fire station and the capacity of the existing roads do not currently exist. Thus, we are not in the classic situation taught in the classroom where average costs decline as production is ramped up through increases in variable costs without any additions to capacity. This is a great model for a classroom, general understanding of economic realities. But applying that same model to the situation in Charleston View would be similar to having told Henry Ford that in order to build automobiles, all he had to do was move some additional workers to the River Rouge and not worry about either building a new plant or having enough workers to efficiently man the first production line. The CEC report's methodology of consistently assuming the appropriateness of employing a marginal cost approach to projecting the costs of induced County revenues versus the County's approach of actually considering the fixed capital costs and increase in staff capacities required may well account for a significant portion of the large differences between the expenditure estimates projected by the two entities. The total cost estimated by the County is over \$11 million during the construction period, and \$1.7 a year million thereafter, while the CEC analysis comes up with just under \$2.8 million during the construction period and just under \$390,000 on an annual basis.

Health and Human Services

The second paragraph on page 7 discusses the rationale behind the staff conclusion that the construction and operation of the project will not cause any additional workers to move into the local area. On page 15, the opinion of BSE and Bechtel with regard to the Ivanpah



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SEGS project is expressed as follows:

"All workers would reside within commuting distance of the proposed ISEGS site, and therefore would not need to move into the area. Therefore, no construction or operation-related impacts are expected on the local housing supply availability or demand."

Comment 104

The report goes on to point out that the HHSEGS site is located within an hour of the suburbs of Las Vegas, NV, and that Pahrump, NV is less than 15 minutes away. The last paragraph on page 15 refers to a December 12, 2011 letter from Inyo that refers to the possibility of workers living in Southeast Inyo near the project on lots or in trucks with camper shells, in order to obtain inexpensive housing. However, this letter was amended with one dated January 5, 2012, that was emailed to Mr. Monasmith on February 29, 2012. The January 5 letter suggested that, "We expect that even if a minimal number of BrightSource employees reside in Inyo County, at least some of them can be expected to require some level of HHS services, simply based on residency." The letter goes on to explain the kinds of services that would require travel to the Tecopa office by members of the County of Inyo Health and Human Services staff.

Given the differences between conditions around the HHSEGS site and the Ivanpah Solar Energy Generating Station, it does appear reasonable that some of the workers will seek to locate in Southeast Inyo County during the construction period, and possibly even during the operations period.

Health and Human Services can likely absorb any additional caseloads that result from a very small number of workers relocating to southeastern Inyo County. As stated at the bottom of page 15:

"It is likely that the operational workforce of 120 would be largely drawn from the local population and if not, this increase would not represent a substantial increase in demand on services. In addition, *this population is likely to be employed and of working age* so demands on social services should be less than the average experienced in the region."

We agree with this assessment. However, if the assumptions are incorrect and the demand for services increases, we present in Table III.2 the thresholds for different programs that would trigger the need to hire additional staff -- either paraprofessional staff to facilitate connections to services in Tecopa, or professional staff based in Bishop or Tecopa to provide direct service.

As explained in the Health and Human Services memo dated January 5, 2012, staffing ratios to persons served can vary from 1:6 to 1:150, depending on the program. The huge variance



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in staffing ratios, combined with the uncertainty around the number of new residents who may be qualified for and seek services from HHS, make it very difficult to estimate the impact to the department.

Proposed Condition: Provide funding to hire additional HHS staff in the Tecopa office or to contract with appropriate service providers, should HHS caseloads significantly increase due to an increase in project-related population.

As identified on page 4.4-5 of the Preliminary Staff Assessment (PSA):

"Electricity generated by HHSEGS would be sent to substations 10 or 64 miles from the project site, depending on which option is implemented. The electricity would be connected to the California ISO-controlled grid and would come back into other parts of California. Natural gas used to augment the solar operation at HHSEGS would use all the natural gas provided by the 12-to-16-inch gas pipeline. Alternatively, given the fact that the 36-inch gas line would be only nine miles from the California border, it is possible that gas could be available for future development in the local area (Charleston View, Shoshone, and Tecopa). However, the scarcity of local groundwater resources and the existing land use designations are serious constraints to economic development."

Comment 105

Despite the scarcity of groundwater resources, bringing gas and electric lines to the project site could spur population growth. If so, non-project related population increases could have a larger potential impact to Health and Human Services, given that the needs of the new population would likely mirror the needs of the current population. In other words, an increase in non-project related population would have a greater, and ongoing, impact to the Department of Health and Human Services than the population growth related strictly to the project. Please refer to Table III.1 for current HHS caseload and capacity information.

Proposed Condition: Provide funding to hire additional HHS staff in the Tecopa office or to contract with appropriate service providers, should HHS caseloads significantly increase due to growth-inducing impacts.

The PSA sets forth a proposed condition requiring BSE to develop an Evacuation Procedure on page 4.5-17. In Inyo County, the HHS Social Services division is responsible for providing evacuation centers and shelter care during local disasters that result in evacuation. HHS is concerned that inadequate shelter space is available in the southeastern portion of Inyo County, in case a disaster closes evacuation routes to the east or south of the solar project.

Proposed Condition: Coordinate with Inyo County to identify and, if necessary, fund suitable shelter options should a disaster necessitate evacuation of the construction site.



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Health and Human Services continues to hope that there will be a number of positions (10% of project workforce) reserved for local employable adults who reside in Inyo County. Further, the Department hopes that the developer will work with the Health and Human Services Employment and Eligibility division to include work experience and training slots reserved for CalWORKs and WIA participants.

Table III.2 presents the current HHS caseload and staffing thresholds. We believe the above and the information contained in Table III.2 more than substantiate the estimated ongoing costs of \$188,115 per year for the Department of Health and Human Services. This cost is likely to escalate in the course of inflation.



Table III.2 Current HHS Caseload and Staffing Thresholds

Division	Approximate Caseload	How Caseload is Covered Now	How Many Additional Cases Can Be Absorbed	At what threshold do we need a new employee	If adding staff, what classification
Behavioral Health	Substance Use Disorders (SUD): 1 Drinking Driver Program (DDP): 3 Mental Health: 8	SUD, DDP, and mental health contacts by videoconferencing, plus Psychiatric Nurse travels to the area bi-monthly to provide outreach. Four consumers receive counseling services from a contract provider in Pahrump.	Approximately twice the current caseload	If there is consistently more than five people required to attend DDP classes, may need an additional class (class enrollment limited to 12 people), requiring additional part-time Addictions Counselor	One part-time Addictions Counselor
Social Services-Employment and Eligibility	CalWORKs: 8 County Medical Services Program: 5 Food Stamps: 17 MediCal: 14 General Assistance: 0	Occasional travel required from northern Inyo. Most applications are processed by phone, online, or by mail. Tecopa-based staff verify residency for programs, if required; collect required documentation; and do the fingerprinting, when necessary.	A small caseload increase could easily be absorbed by current staff in Bishop.	If caseload doubles, would need an additional HHS Specialist to facilitate application process.	One part-time of full-time HHS Specialist (para-professional)



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Table III.2 (cont.) Current HHS Caseload and Staffing Thresholds

Division	Approximate Caseload	How Caseload is Covered Now	How many additional cases can be absorbed?	At what threshold do we need a new employee?	If adding staff, what classification?
Social Services- Adult and Children's Services	Child Welfare (CPS): 1/quarter Adult Protective Services (APS): 1-2/quarter In-Home Supportive Services (IHSS): 12 Area Agency on Aging (AAA): avg. 85 for meals.	IHSS staff travels about once every two months for client assessments. CPS/APS responds as mandated 1-2 times/quarter. We rarely have cases in APS or CPS in southeastern Inyo, but did recently have to remove a child from a home out there and that case required travel more than once per month to facilitate visits with the parent. We utilized Tecopa-based staff to transport the parent half-way to minimize total travel time.	2 CPS and/or APS investigations per month would significantly strain the current staff.	2-4 investigations per month for CPS or APS that result in services would require a full time Social Worker in Tecopa. That worker would respond to investigations, provide appropriate services, and perform IHSS assessments. This would also require regular on-site supervision (probably a Bishop-based Social Worker Supervisor who travels regularly to Tecopa plus provides daily telephone contact).	One full time Social Worker in Tecopa plus one part-time Social Worker Supervisor in Bishop.



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Public Health	<p>CA Children's Services: 2-3/yr. Clinic Services: limited Women Infants & Children: avg. 1-2 cases Medical Marijuana ID Card (MMIC): 4</p>	<p>For clinical and immunization services: Professional staff travel to Tecopa area twice/yr. Clinic services provided by contractor in Furnace Creek. CCS: Case management provided by phone from Bishop on average once/mo./client. MMIC: Applications collected by Tecopa staff approx...4/year and processed in Bishop. WIC: quarterly contact with clients by phone or mail from Bishop.</p>		<p>Public Health- Not likely needed. CCS and WIC caseload would have to increase sizably to impact staffing patterns.</p>	
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Table III.2 (cont.) Current HHS Caseload and Staffing Thresholds

Division	Approximate Caseload	How Caseload is Covered Now	How many additional cases can be absorbed?	At what threshold do we need a new employee?	If adding staff, what classification?
Tecopa	<p>Residence verification for services; Transportation to services; Prevention/education direct services (Senior meals for AAA); Collect application paperwork and coordinate contact with professional staff.</p>	<p>Weekly trips (mileage for round-trip) to: Charleston View (55 mi); Pahrump (85 mi); Shoshone (16 mi). Travel to Stovepipe Wells as needed for meal pick-up (184 mi. round-trip) Travel to Bishop bi-monthly (480 mi. round trip).</p>	<p>A very small increase, especially in Employment and Eligibility program applications, could be absorbed.</p>	<p>Any increase in direct service, transportation, or resident verification would require additional staff in the Tecopa office.</p>	<p>One part-time of full-time HHS Specialist (para-professional)</p>



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Assessor

The County had estimated that the additional costs to the Assessor's Office during the first year and during the operational period will be \$120,000 per year. As stated on page 16 of the May CEC impact report to which we are responding, Gruen Gruen + Associates had previously pointed out that ongoing annual legal costs alone to the Assessor's Office could be \$50,000 (CEC-2012.D). The May CEC report rejects these costs by writing the following:

"However, given that the majority of these costs are for adversarial legal proceedings, it would be presumptive to require BSE to pay the County's legal fees prior to the determination of the outcomes of proceedings that may not even occur."
(page 16)

The historic experience that Inyo County has had in battling with geothermal energy producers amply documents the costs of litigation that are likely to be induced. Moreover, the suggestion that BSE should not be required to "pay" for the County's legal expenses misses the point of the required socioeconomic analysis. In order to determine the impacts to the County and whether such impacts will be covered by the project's anticipated economic benefits, all reasonably foreseeable costs are properly included in the calculation. Moreover, the decreased property tax revenues received by the County as a result of Revenue and Taxation Code section 73, a benefit not enjoyed by the geothermal energy producer, is also included in the calculation. The question then becomes whether the economic benefits derived from the project are sufficient to cover the economic impacts to the County.

It is ironic that the same paragraph on page 16 contains the following:

"The staff also believes that Inyo County can generate substantial savings by sharing information and resources with neighboring San Bernardino County, which will be assessing the virtually identical Ivanpah Solar Energy Generating Station."

Dr. Claude Gruen called officials in the Assessor's Office and the Department of Public Works, in order to obtain the benefit of their experience. Mr. Eric Endler, an appraiser in the Assessor's Office, was very familiar with the property tax assessment of the Ivanpah property. He indicated that San Bernardino would hope no reassessment is requested; however, they would not be surprised should such requests be presented to them in the future, and are already taking prudent steps to prepare themselves for that possibility.

What we have learned from San Bernardino does lend further credence to the County's estimate of costs likely to be faced by the Assessor's Office as the project is assessed.



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Sheriff

On page 16, the consultant's report concluded in the first sentence under Sheriff, "Reviewing the Energy Commission's staff assessment for 16 remote solar and natural gas fired power plants, project related increase in property damage and theft were not identified as issues that would substantially increase demands on police protection services. For the project reviewed, law enforcement response times ranged from three minutes to one hour." Yet on page 4.9-19 of the May, 2012 socioeconomic portion of the PSA, authored by Steven Kerr, it states that, "As such, response time to an emergency on the project site ranges between 30 minutes to 4 hours. Depending on the type of assistance needed and the geographic location of the other deputies, response time for any additional or specialized assistance could be an added 3 to 4 hours on top of the 30 minutes to 4 hours initial response time." Among other things, the differences in time between 3 minutes to 1 hour, and 30 minutes to 4 hours, would refute the validity of drawing conclusions about the demand for police protective services in and around the HHSEGS, with evidence drawn from the 16 remote solar and gas fired power plants sited by the Energy Commission staff assessment. What is not mentioned in the analysis is that the San Bernardino Sheriff has a well staffed substation in Baker, California, which is less than 51 miles (or about a 45 minute drive) from the site of the Ivanpah project now under construction.

Comment 106

The report continues,

"Discussions with San Bernardino County Sheriff's Departments have indicated that the Ivanpah, Kramer Junction, Daggett, and Harper Dry Lake Solar Energy Generating Systems have not increased the number of incidents requiring responses by the Sheriff's Department." (page 17)

Nowhere in any of the documents has any evidence been presented that the access, proximity to other activities, level of vandalism and other types of criminal activity, that ~~pertain to the site considered by those interviewed and data presented is similar to such~~

~~conditions at the proposed HHSEGS. In addition, the report fails to report increases in call for service in Primm, Nevada, where the Ivanpah labor force resided during construction. According to a conversation between Lt. Jeff Hollowell and the Clark County Sheriff's Department, calls for service in Primm, Nevada increased by 30% during the timeframe when the Ivanpah facility was being constructed. Unlike Ivanpah, the HHSEGS project site is surrounded by private land where intermittent squatting and illegal "camping" already sometimes occurs. Given the statements by BSE that the proposed project will be constructed under the terms of a project labor agreement, a fact completely disregarded by Dr. McCann, an increase in the local population during construction is reasonably foreseeable and, as experienced in Primm, a corresponding increase in calls for service will most certainly follow. The statements made in support of the lower demand for police services, the drastically reduced estimates of additional resident deputies, the conclusion that~~

Comment 107



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an additional substation building would be unnecessary, simply don't stand up. Further, using the U.S. Bureau of Justice Statistics national data to estimate the average tenure of sworn officers assigned to the Charleston View area of Inyo County ignores the unique quality of life factors associated with serving long stints assigned to Charleston View. None of the evidence presented in the preliminary staff report raises to the level of validly refuting the locally-based experience and police data presented by Sheriff Lutze.

In continuing support of his estimate of \$2,130,966 during construction and annual costs of \$1,269,120 in normative dollars, Sheriff Lutze and Lt. Jeff Hollowell have submitted a letter and comments on the Preliminary Staff Assessment (PSA) and the impact analysis authored by Dr. McCann. These comments are attached hereto as Appendix A.

Public Works

The CEC report reduces the one-time construction costs of \$8,157,000, presented in writing and testimony by Doug Wilson, the Interim Director of Inyo County's Public Works Department, by \$6,944,000, suggesting that the required overlay can be compensated for. Perhaps Mr. McCann was under the mistaken impression that the County proposed a total reconstruction of the road. This is not the case. If the roadway is to sustain the traffic, and Mr. Wilson certainly did not mean one or two trucks, it must be improved with an overlay at about the price estimated by the County. To totally reconstruct the road would cost much more.

The CEC staff report also seems to suggest that Mr. Wilson believes even one truck per day would require an overlay. This is also not the case. What Mr. Wilson has contended, and we believe would be supported by an outside expert on this matter, is that even if 5 percent of the truck traffic were to go west, the overlay would be required. In Mr. Wilson's own words, "If 100% requires an overlay, then it does not follow that 50% requires 50% of an overlay."

Comment 108

If we are reading the report correctly, the estimate of traffic conditions presented is based merely on the BSE statements, which the report argues are confirmed by Doug Wilson's testimony at the May 9 workshop, that "The County was unlikely to incur large costs on Old Spanish Trail west of plant site (CEC 201D)." The report continues that this would only be the case if there were a mechanism in place to assure that traffic does not use that route. Nowhere in the report is there any indication that such a mechanism has been set up by the California Energy Commission, or that funds have been appropriated for Inyo County or a third party to establish such a mechanism. It is therefore necessary that as a condition of certification, BSE, its contractors and subcontractors be required to use that route which does not include the portion of Old Spanish Trail west of the project site and further provide for a per truck fine should the condition be violated.

At the May 9 HHSEGS workshop, speakers familiar with conditions on the relevant section



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of the road voiced concern about the possible impact of an accident along Tecopa Road, resulting in the roadway being blocked for a substantial period of time. Such a blockage would prevent residents and emergency vehicles from accessing necessary services in Pahrump and/or Las Vegas, as Tecopa Road and the Old Spanish Trail are the only way in or out to the east. One citizen suggested that BSE pay for the paving of the County road currently being used by mining operations in San Bernardino County as an alternative to the routes vehicles presently intend to use to and from the project.

In the absence the condition noted above, the County believes Mr. Wilson's estimates stand. This most certainly applies as well to the estimate of annual operating cost of \$78,500, which the staff report also disputes.

Agricultural

Comment 109

The Fiscal Impact study prepared by the consultants for the California Energy Commission agrees that, "The costs projected by the Agricultural Commissioner appear consistent with weed management costs for other projects." However, the assessment goes on to argue that applicant is required by the conditions of certification "to develop and implement weed management plans." They contend that, "conditions of certification as described in the Biological Resources section of the HHSEGS PSA requiring HHSEGS to develop and implement a weed management plan, it is expected that additional weed management by the County will not be necessary." (page 19)

The County does not contest this, but feels the CEC doesn't answer the question of who will check on the weed management and take corrective action should that management not be up to the standards of the County Agricultural Commissioner. The increase in activity associated with the construction and operation of the HHSEGS correlates directly with the increase in the threat of weed introduction and a likely increase in the introduction of agricultural pests, not only on the project site but off site, which is not under the jurisdiction or monitoring of the CEC. The County Agricultural Commissioner believes the PSA underestimates the increase in vehicles and related interstate activity. He believes that monitoring and dealing with these threats requires a commensurate response from his office, increasing both demands on staff as well as travel expenses.

Waste Management

Comment 110

The response to the County's estimate of waste management costs seems superficial at best, concluding that, "At this time, the staff believes that no additional costs will be incurred by the County for this project." As far as we can tell, this belief is based on the fact that housing conditions at Ivanpah were such that no additional waste management costs were induced. Furthermore, it was stated that Ivanpah "is similarly remote." It is our understanding that Ivanpah is very close to Primm, which has a large supply of transient housing with



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considerable vacancies available in housing, and infrastructure capable of handling waste generated by additional residents.

Comment 111

As we read it, the position ascribed to the staff in the Socioeconomic and Fiscal Impact Report, authored by Dr. McCann, is that it is just too early to tell whether additional waste disposal services will be required during the construction or operation of the project. If and when the need for such facilities and costs arise as a result of the project, how will the County go about getting a determination that these costs are necessary for health and safety? Secondly, assuming that the need for such facilities is self-evident, who will be judged to be responsible for paying these costs, and how will that judgment be enforced?

Motor Pool

Comment 113

The Inyo County estimate of Motor Pool costs having trips to the area as a result of a broad variety of activities potentially related to the project, with the exception of the Sheriff's office, was \$33,200 during the construction period. The report indicated that staff forecast no costs would accrue to the County as a result of people having to drive to the area, even though similar cost estimates have been provided to other projects. The rationale given was, "The Commission is fully responsible for all compliance and inspection during both construction and operation, so the County need not incur any costs to visit the worksite or the operating facility." (page 20) However, the construction of the facility will result in service needs from the County off-the project site and, therefore, outside of the jurisdiction of the Commission. Given the geography of the County, those services will, in most cases, be provided from County offices located in the Owens Valley. As a result, demands on the County's motor pool system will also increase.

Water Department

The May CEC socioeconomic report failed to understand and appreciate the grant funding impacts the County may suffer should the County fail to comply with the mandates of SBX7-6 as a result of the project. Dr. Robert Harrington, Director of the Inyo County Water Department, provided the following detailed explanation to support his cost estimates:

The State of California enacted legislation in 2009 (SBX7-6, Statutes of 2009, Seventh Extraordinary Session, chaptered as Water Code 10920 et seq.) that requires all groundwater basins and subbasins delineated in *California's Groundwater*, the Department of Water Resources' (DWR) Bulletin 118-2003, to be monitored for seasonal and long-term trends in groundwater elevation. The data collected is required to be reported to DWR who will in turn compile the data in an online system that is accessible to the public. The law identifies numerous entities such as counties, cities, water districts, and groundwater monitoring cooperatives that may



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assume responsibility for the monitoring. Notably, state, tribal, and federal agencies are not among the eligible monitoring entities.

Comment 114

To fulfill the requirements of the legislation, DWR initiated the California Statewide Groundwater Elevation Monitoring Program (CASGEM). Participation in CASGEM by local entities is voluntary; however, if no eligible local party volunteers to become the designated monitoring entity, DWR may undertake the groundwater elevation monitoring. If DWR assumes responsibility for the groundwater monitoring, nonparticipating eligible monitoring entities may lose eligibility for water grants and loans awarded or administered by the state. Naturally, Inyo County is concerned about the potential for losing eligibility for these grant funds, and wishes to comply with the requirements of CASGEM. No funding was provided in the legislation for local entities to implement this new state program.

SBX7-6 does not allow for exceptions to its requirement that groundwater elevations be monitored in all groundwater basins. In many remote desert basins in Inyo County, designation as federal wilderness or military uses render it impossible to construct monitoring wells, and additionally, many other basins have no significant groundwater pumping. To address these flaws in the SBX7-6 legislation, in August 2011, legislation passed (AB 1152) amending Water Code Sections 10927, 10932, and 10933, and authorizing that a monitoring entity may report groundwater elevations using specified alternate monitoring techniques for certain groundwater basins and subbasins meeting prescribed conditions. AB 1152 allows that, at DWR's discretion, a monitoring entity may use alternative monitoring techniques to assess whether groundwater conditions in a basin are changing. Alternative monitoring techniques may be approved by DWR if groundwater elevations are unaffected by land use activities or planned land use activities.

Comment 115

Approval of HHSEGS will invalidate any argument by Inyo County that the California portion of Pahrump Valley, California Valley, and Middle Amargosa Valley are unaffected by land use activities; therefore, the County will be required to either develop a program for reporting groundwater elevations to DWR, or be ineligible for state water grants and loans. In order to comply with CASGEM requirements, the County could use the groundwater elevation monitoring data proposed in condition of certification Water Supply – 6 and Water Supply – 8 if those data are made available to the County. To that end, we request that the conditions of certification be modified to require that:

- 1) Groundwater elevations reported as part of this project should be provided to the County with the understanding that the County may report those data to DWR as part of the CASGEM program. These data would be publically available through the CASGEM program.



- 2) Groundwater elevations should be monitored throughout the duration of the project. Specifically, Water Supply – 6.C.4 and Water Supply – 8.C.5 should be modified to require that groundwater elevation monitoring and reporting continue for the duration of the project. Monitoring should be done at least twice each year.

For the reasons outlined by Dr. Harrington, above, the estimated impacts to the County Water Department under SBX7-6 are appropriately included and justified.

Reaction to Impact Report's Discussions of Changes in Indirect County Expenditures

The comments made by the Socioeconomic and Fiscal Impact Report in Section 5.2, under the heading "Changes in Indirect County Expenditures," seem gratuitous at best. The section starts off by stating, "The solar project could result in changes to local governmental expenses, primarily in two ways. The first is increased spending induced by increased population. The second is decreased spending caused by improved socioeconomic conditions." In the following paragraph, they argue, we believe correctly, that "The applicant's plans to employ up to 1,033 workers during the peak construction period should have a negligible effect on the County's current population of 18,546, and labor force of 9,550." (page 20)

The report goes on to indicate that a majority of the workers will reside in neighboring counties. This is true, but hardly relevant, because the indirect costs of the project are not primarily induced by increases in population, but in all of the many governmental activities required to deal with issues that would not exist without the proposed project. As the Commission well knows, the costs of dealing with the application itself and responding to a variety of relevant documents, such as the Socioeconomic and Fiscal Report that is the subject of these comments, has taken a significant amount of staff and consulting time, and the monitoring of activities in the project and services to it will continue to do so after the construction starts and the project becomes operational.

A quick look at the CEC report's own estimates (see Tables 4.1 and 4.2, page 11) indicates that increase in local jobs and earnings are relatively small during the construction period, and insignificant during the 25 years of operation. Thus, while in many situations we can see where the generalizations about the indirect benefits to the local economy may outweigh the indirect costs of the project, that generalization cannot be shown to apply to the effect of the proposed solar project on Inyo County's governmental activities.



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Appendix A

Response from Sheriff's Department

Date: June 14, 2012

To: Dana Crom, Deputy County Counsel

From: Sheriff William Lutze

RE: Response to Hidden Hills Project

Dana,

My staff and I have reviewed the Bechtel Security Plan, Dr. McCann's report, and the PSA.

There are a variety of issues and concerns, as detailed in Lt. Jeff Hollowell's document (attached). The Hidden Hills Project documents make many assumptions, that in some cases are not based on facts, and others simply cannot be done by law. The report, on several occasions, makes reference to other sites that are managed by Bright Source. Quite frankly, as I have stated in several meetings, the other sites are not in Inyo County; and although they are a reference, as Sheriff I have a responsibility to serve the people and protect the property within Inyo County. Law enforcement is a specialized field and there are many factors to consider when reviewing this type of impact to the area that I am responsible for.

After reviewing the Hidden Hills Project documents I have determined that as presented they have not addressed the issues regarding law enforcement and emergency services; and I remain with my original plan as presented to ensure that adequate services will be provided.

Sincerely,

William R. Lutze, Sheriff

Attachment: Staff report by Lt. Jeff Hollowell



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Sheriff Lutze,

I have reviewed the Bechtel Security Plan, Dr. McCann's Report and the PSA. There are several glaring issues that I'd like to address:

Site Security Plan:

1. The plan calls for one ingress/egress point to be manned 24/7 by a security guard with various duties related to the gate and parking areas. There is no mention in the security plan of what the security guard's responsibilities are if either a conflict, theft, or other criminal issue arises in regard to contacting law enforcement.
2. The plan calls for an 8-foot chain link security fence; however, it does not mention any cameras, sensors, security lighting or roving patrols. The plan does mention inner fencing around structures, but again, no other security components mentioned.
3. The plan states the security firm has a right to search any vehicles, persons or personal equipment; and if contraband is located they will notify law enforcement if deemed appropriate by the "company". Clarification is needed.
4. They have an extensive section on "bomb threats", most likely due to homeland security concerns. As for their responsibilities regarding bombs, according to the current plan, the Site Manager is to come up with a strategy for responding to a bomb threat with the assistance of the Manager of Security out of the San Francisco office; and as for notifications, the plan states the Site Manager is to report any bomb threats to the Construction manager, Project manager and other appropriate management personnel. It does not say if or when law enforcement will be notified. This plan as written is not acceptable.
5. The security plan provided is for "construction phase" only and does not address the operational phase of the project.
6. The plan does not indicate the size of the "security force"
7. Based on the Security plan, we are at the same figures as originally proposed to the County for fiscal impacts.

Dr. McCann's Report:

1. Dr. McCann's report underestimates the responsibilities of the Sheriff's Department. Perhaps Dr. McCann is not familiar with the duties and responsibilities of the Sheriff?
2. The report assumes there will be sufficient security at the site, thereby diminishing the responsibility of the Sheriff.
3. The report further assumes there will be no project labor agreement (PLA). If there isn't one, their assumptions may be close as to workforce, housing, waste management and taxable income. If there is one, the workforce will come from California first and only after that fill from Nevada. Having said that, if the



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workforce comes from California the transient occupancy within the County of Inyo would be far more than their anticipated six (existing) people. As you stated in Sacramento, we believe people will not want to stay in Nevada Hotels when they can camp, rent or just stay somewhere close to the worksite. This creates a larger demand on emergency response needs.

4. On Page 10 of the report, Dr. McCann states "...of the 18,589 construction personnel employed...." I have not seen that figure before.
5. On Page 12 Dr. McCann states that we will have only two to three additional calls a year for fire and police. I believe he is basing this assumption on Bright Sources' belief that they can contract with Nevada for law enforcement (due to 50 mile radius for mutual aid) and EMS. As has been stated before on several occasions, this can't happen.
6. On Page 13 Dr. McCann states that the primary burden the solar project places on police services is the need for additional patrols to prevent and investigate crimes against property. It further states their security devices (fence and gate guard) and appropriate facility design may minimize this need. We don't know what that is as it has not been outlined in the security plan or agreed to.
7. Dr. McCann's report indicates the County would also benefit from sales tax as employees will be spending their disposable income on food, appliances and clothing locally. Not in the area.
8. Dr. McCann's report states SBCSD calls for service have not increased due to the generating plants located there. I have placed a call to SBCSD and anticipate a response soon from them regarding calls for service at their multiple plants.

Preliminary Staff Assessment (PSA):

1. The PSA does not address the issues and fiscal impacts on the Sheriff's Department and eludes to the security plan may mitigating or removing impacts on the Sheriff's Department.
2. It further leaves the impression that Nye County Nevada law enforcement and EMS services are under contract with us, therefore allowing them to handle emergency calls within our county. Law Enforcement of any kind cannot by law be contracted.
3. ICEMA has a mutual aid agreement with Pahrump, but they will not allow them to contractually enter into agreement with Bright Source and provide medical services unless under mutual aid.

As you can see there are many assumptions and miss-information regarding law enforcement's role in this project. As soon as I receive the stats from San Bernardino County I will forward them to you.

Conclusion:



**REPONSES TO THE MAY, 2012 "SOCIOECONOMIC AND
FISCAL IMPACTS OF THE HIDDEN HILLS SOLAR
ELECTRIC GENERATING SYSTEM ON INYO COUNTY"**

July 20, 2012

Based on the findings of the PSA, Dr. McCann's report and the security plan provided by Bechtel, I wouldn't change any of our responses to the CEC. Their security plan is a band-aid on what would be necessary for a 2.9 billion dollar project, especially one that will become a target of potential terrorist strikes, thefts and vandalism; as well as our responsibilities to the work force and infrastructure with regard to Emergency Service and the citizens living in the area.





United States Department of the Interior



BUREAU OF LAND MANAGEMENT

Nevada State Office
1340 Financial Blvd
Reno, NV 89502

California State Office
2800 Cottage Way, Suite W-1623
Sacramento, CA 95825

Comments on the Preliminary Staff Assessment of the BrightSource Hidden Hills Solar Energy Generating System

JUL 16 2012

In Reference Reply to:
2801 (LLNV930)

Comment 1

~~Mr. Mike Monasmith~~
Project Manager
Siting, Transmission and Environmental Protection (STEP) Division
California Energy Commission
1516 Ninth Street, MS-2000
Sacramento, California 95814

Dear Mr. Monasmith:

This letter transmits the water-related concerns of the California and Nevada offices of the Bureau of Land Management (BLM) resulting from our review of the California Energy Commission's (CEC's) Preliminary Staff Assessment (PSA) of the Hidden Hills Solar Electric Generating System (HHSEGS). Our comments are part of our on-going effort to minimize or mitigate for impacts to BLM water-dependent public trust resources in Nevada and California.

The Nevada BLM is analyzing an associated right-of-way (ROW) application for a transmission line and a gas pipeline in Nevada, together called the Hidden Valley Electric Transmission Line (HVETL) Project, that will provide grid connection and natural gas for the HHSEGS located on private land just over the California state border.

The BLM understands that HHSEGSs would require up to 140 acre-feet per year (afy) of water, pumped from the Pahrump Valley groundwater basin. As stated in an earlier letter, the BLM is concerned that pumping from this water source, combined with cumulative impacts of other pumping, may cause impacts to the Amargosa Wild and Scenic River (W&SR) located in California, and to the Stump Spring Area of Critical Environmental Concern (ACEC) located in Pahrump Valley, Nevada.

The following items are concerns raised by BLM staff during review of the CEC's PSA and the public hearing that occurred on June 14, 2012 in Pahrump, Nevada.

Cumulative Effects:

The cumulative effects analysis should take into account all proposed development within the groundwater basin, including potential agricultural pumping as discussed at the June 14 meeting. Staff at the Pahrump and Barstow Field Offices can provide lists of all pending proposals on BLM land within their respective districts.

Biological Resources:

Condition of certification BIO-23 would require the applicant to conduct vegetation monitoring within groundwater-dependent vegetation communities located east of the project, including those within the BLM Stump Spring ACEC. The dual purpose of such monitoring would be to determine changes to biological resources and to distinguish project effects from background effects or a regional drought. A statistically significant change in biological resources is defined as a “decline in vegetation health of any groundwater-dependent species of 20 percent or more as compared to baseline values and values from offsite reference plots” (page 4.2-234). While the BLM supports this measure, additional clarification is needed to define what is meant by a 20 percent decline in vegetation health.

Soils and Surface Water:

An assumption is made in Table 6 (page 4.10-12) of the PSA that there will be negligible soil disturbance throughout the heliostat fields. Soil disturbance is a direct result of the installation of solar cells or mirrors and, to date, all technologies require some level of disturbance. Ground disturbance can occur even in relatively level areas. See attached Figure 1, where the ground surface in ISEGS disturbed heliostat fields differs markedly in appearance compared to adjacent undisturbed areas.

The applicant proposes to use the western perimeter roadway as a berm that would impound water into a retention basin, flooding a portion of the heliostat field during a 100-year storm event (PSA Figure 7). As the PSA points out, during such a storm event this berm would be insufficient to prevent flow across the roadway. Neither the applicant’s plan of development nor the PSA’s proposed SOILS-5 condition of certification address the possibility that flow across the roadway may cause this berm to fail, nor do they address any potential impacts of the resulting offsite flooding and scour. In particular, SOILS-5 does not require the berm to be stabilized with riprap, gunnite, or similar material that would prevent piping around the 18-inch culvert that would be the sole drainage point. Armoring of key points in this berm will be necessary to minimize risk to offsite soil resources. Alternatively, the applicant may choose not to install a berm along the western perimeter and simply allow floodwaters to pass through the heliostat field unimpaired, although this may result in heliostats being damaged or washed away.

Water Supply:

The applicant has performed an on-site well pump test, which lasted 4.5 days. We fully support the PSA’s pump test review (Appendix A), which questions the assumptions, procedures, and conclusions of the applicant’s pump test report. We recommend that another pump test be performed, lasting at least one week. This new pump test, combined with curve fitting for determination of the rate of drawdown stabilization at the monitoring wells, would better determine whether there is a direct link between the alluvial aquifer and the underlying carbonate aquifer. This information would help estimate the degree to which pumping may affect water resources to the east and west of the project, as well as the timing of such impacts. To get the best estimation of key subsurface parameters and impacts, it would be important for at least two of the monitoring wells to penetrate the carbonate aquifer. As shown in Figure 4 of Section 4.15 in the PSA, there are locations close to the project area where the carbonate aquifer is at or near ground surface.

Comment 5

Comment 4

Comment 3

The lack of any physical logs for any onsite or nearby wells impedes the ability to draw clear conclusions as to aquifer parameters and the impact of pumping on the aquifer. If well logs are available, the applicant should utilize them to validate its conclusions regarding the impact of pumping on groundwater. At least some of the monitoring wells should be screened in the same stratigraphic interval as the pumping well. Actual physical data from well logs rather than assumed values for aquifer parameters is critical for analyzing pump test results, and for using these results to construct a conceptual model of local and regional groundwater flow and the impacts of the HHSEGS project on this flow. If any of the above data reveal that the initial pump test conclusions were incorrect, the water supply and mitigation plans may need to be revised.

The BLM supports implementation of condition of certification WATER SUPPLY-1, which would require the applicant to replace all extracted groundwater. This is similar to a mitigation measure being developed by California BLM in discussion with the developer of the Desert Harvest solar project in the Chuckwalla Valley, as well as future developers in that basin. Unlike the Desert Harvest mitigation, however, the PSA recommendation is to require BrightSource to simply replace the extracted water at some point during the 30-year life of the project. At least some of this replacement should be required to occur early in the life of the project. Reinforcing this need is the existence of large ground cracks approximately 4 miles north of the HHSEGS site, which appear to be subsidence cracks caused by groundwater extraction in the area (see attached Figure 2); these features suggest that the basin is already experiencing an irreparable loss of storativity by diminishing local groundwater aquifers.

The groundwater monitoring network suggested by the CEC will be more robust if the number of monitoring wells is increased. The hydrologists for the BLM's Southern Nevada District and California Desert District recommend a groundwater monitoring system that would differentiate project impacts from other impacts such as climate change and other groundwater pumping within the basin. Item A1 of condition of certification WATER-SUPPLY-8 would require a monitoring network of ten wells, but only three of these would be outside the project boundary. We recommend that additional wells be included in the monitoring network. East of the project site on Nevada BLM land, we suggest five additional monitoring wells to supplement the CEC-proposed wells. Specifically, the BLM suggests two additional wells directly up-gradient from Power Block 1 and two additional wells directly up-gradient from Power Block 2 to supplement CEC-identified BLM Mesquite Bosque Wells 1 and 2, respectively. These wells should be placed at regular intervals 0.5 to 1.5 miles from the project boundary. One additional well should be installed east of the Stump Spring ACEC so as to help differentiate any drawdown east of the ACEC, for example drawdown extending from the proposed BrightSource Sandy Valley SEGS project, from drawdown emanating from the HHSEGS site. If any drawdown is measured over time at the Mesquite Bosque Wells, monitoring wells placed in the configuration described above should provide adequate information to determine whether this drawdown is originating from the project site or is due to other factors identified above.

Condition of certification WATER-SUPPLY-8 recommends only one well to the west of the project, between 2 and 3 miles from the project boundary; this well would be on the far side of an inferred fault (Figure 13 of the PSA), which may delay drawdown at that well. The BLM recommends four additional wells; like the wells recommended above, one would be placed at

Comment 8

Comment 7

regular intervals up to two miles west of the project boundary. As stated above, it is imperative that the best estimates of the degree and timing of any potential impacts of the project on the Amargosa River be determined and mitigated for prior to approval of the project.

The BLM supports items C3 and C4 of WATER-SUPPLY-8, which would require the project owner to “substantially reduce, modify, or stop project pumping” if impacts are seen either at the eastern project boundary or at either of the BLM Mesquite Bosque Wells. However, these two items require pumping to cease only if the water table at the BLM Mesquite Bosque Wells drops 0.5 feet (that is, 0.5 feet below the level predicted by current trends) and plant vigor drops below the threshold set in BIO-23. We recommend a more rigorous and protective set of trigger requirements. First, we recommend that drawdown triggers also be determined for other wells closer to the project, the locations of which are discussed above. These trigger depths would be graduated based on the expected drawdown at these wells that would correlate to an 0.5-foot drawdown at the Mesquite Bosque Wells, based on results of the additional pump test and curve-fitting procedure discussed above. Second, we recommend that pumping be immediately curtailed or ceased if any of these drawdown triggers are crossed, regardless of whether impacts appear in the vegetation. By the time vegetation is noticeably affected, it may be too late for pumping curtailment to save these bosques.

The BLM appreciates having the opportunity to provide comments on the HHSEGS project. If you have any questions please contact Sarah Peterson, Nevada State Lead for Soil, Water, Air & Riparian programs at 775-861-6516; Dr. Boris Poff, District Hydrologist for the Southern Nevada District office at 702-515-5154; Peter Godfrey, Hydrologist, California Desert District, at 951-697-5385; or Dr. Noel Ludwig, Hydrologist, California Desert District, at 951-697-5368.

Sincerely,



James G. Kenna
California State Director



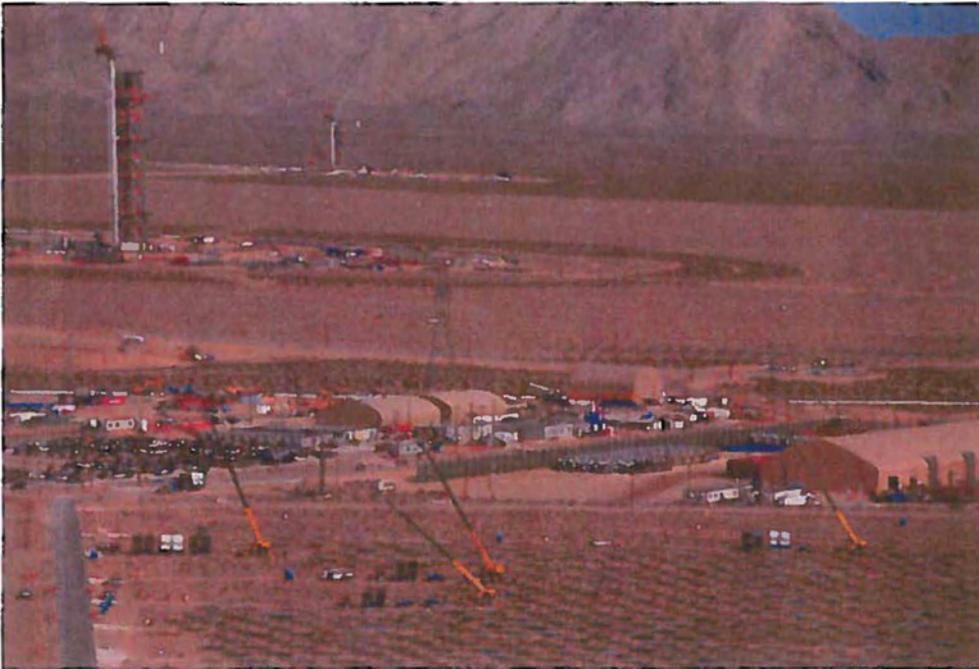
Amy Lueders
Nevada State Director

cc:

Mary Jo Rugwell, District Manager, Southern Nevada District Office
Erika Schumacher, Acting Field Manager, Pahrump Field Office
Bob Ross, Field Manager, Las Vegas Field Office
Teresa A. Raml, District Manager, California Desert District
William Quillman, Acting Field Manager, Barstow Field Office

Comment 11

Comment 10



The view of the entire project as seen from the top of the Unit #1 tower, with Unit #2 (left) and Unit #3 (center) in the distance.

Figure 1. Oblique view of Ivanpah Solar Energy Generating System construction, showing disturbance within heliostat fields.



Figure 2. Large ground cracks located approximately 4 miles north of the HHSEGS site.



United States Department of the Interior



NATIONAL PARK SERVICE
National Trails –Intermountain Region
P.O. Box 728
Santa Fe, New Mexico 87504-0728

IN REPLY REFER TO:
NPS-NTIR Hidden Hills Solar Energy Generating Station Comments

July 23, 2012

Mr. Mike Monasmith
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Dear Mr. Monasmith:

Please accept the following comments from the National Park Service National Trails Intermountain Region office regarding the Hidden Hills Solar Energy Generating Station Application for Certification.

Thank you,

A handwritten signature in black ink that reads "Michael L. Elliott".

Michael L. Elliott
Cultural Resources Specialist

Introduction

The National Park Service National Trails Intermountain Region office in Santa Fe, New Mexico co-administers the Old Spanish National Historic Trail (NHT) with the Bureau of Land Management. Our office has reviewed documents and other material associated with the proposed Hidden Hills Solar Energy Generating Station (HHSEGS) project in the Pahrump Valley in California on the Nevada border. The project as proposed will consist of two 750-foot tall power tower concentrating solar collectors surrounded by thousands of heliostat mirrors over about 3,277 acres of private land in the Pahrump Valley at the California-Nevada border. The California Energy Commission is reviewing the application from the project proponent since the project area is on private land. We have been on the mailing list from the Commission for some time, and have received the updates from the proponent, the staff

assessments, and through agreement with the Commission, the cultural resources inventory and associated documents for review. We are concerned about the effects of the project on the cultural corridor that constitutes the Old Spanish NHT. The Old Spanish NHT is not just a line on the ground. It is a corridor of varying width that may not contain visible archaeological features. Moreover, the cultural resources investigations conducted for the project do not appear adequate in terms of level of effort, methodology, or assumptions to assess adequately the impacts of the project. Even given the limitations of the cultural resources work, it appears to us that there will be significant impacts to the Old Spanish NHT setting and possibly features. We believe that the results of our review, as documented below, justify our conclusions.

The Cultural Resources Investigations

The Cultural Resources Technical Report

Comment 1

The body of the report itself is very brief, containing only about 50 pages of text (most of the pages are not numbered), with attached appendices containing maps, site forms, isolate descriptions, consultation letters, and a few photos. Fifty pages do not seem adequate to discuss the results of a 3,499 acre survey, particularly when much of the material is boilerplate cultural resources background material. We request that the report be greatly expanded to cover all aspects of the project area in greater detail, particularly in regard to Old Spanish NHT resources.

The area surveyed for this report has been inadequately defined to encompass just slightly more than the actual lease area. Impacts from this project will extend far beyond the lease boundaries. The pair of 750-foot tall towers will be highly visible from as far away as 20 miles. Within five miles, the towers will loom over the currently nearly uncluttered landscape. We request that cultural resources inventory be expanded by at least five miles in all directions from the lease boundaries to include potential impacts from associated activities, visual impacts to National and State Register eligible sites, and all impacts to the nationally significant Old Spanish National Historic Trail.

Comment 2

The preparers do not specify the number of hours they spent in the field. It appears that the survey occurred over a period of about 19 field days. The number of people working each of those days is not identified. We ask that the total number of person-hours spent in the various phases of the project (background research, field work, report preparation) be specified so that we can evaluate the level of effort, intensity, adequacy of the work.

Comment 3

The preparers did not really describe their goals for the survey, or interpret their results in terms of archaeological or historical implications. They describe walking transects at a 10-15 meter interval. While these are standard transect intervals for general archaeological surveys, they are not adequate to identify subtle trail features that may be just a meter wide. We request that when additional on the ground survey is conducted, that it be conducted at an intensive survey interval of 3 meters or less.

Comment 4

The references cited do not include many important Old Spanish Trail references, including the National Park Service's feasibility study (2001), Elizabeth Warren's thesis on the Armijo Route (1974), Leroy and

Comment 5

Comment 5, cont'd

Ann Hafen's standard Old Spanish Trail reference (1954), and Hal Steiner's book on the Mojave Road section of the trail (1999). These should be incorporated into the report and discussed.

Historic Trails and Roads Technical Report

Comment 6

The project proponent and their cultural resources contractor prepared a specific study related to historic trails and roads in response to CEC staff information requests. This report shares some of the same shortcomings as the more generic cultural resources inventory report. The contractor primarily conducted a narrowly defined remote sensing study. They did not conduct additional field survey, only reconnaissance and reanalysis of "pre-existing data" (p. 3-1). Our chief argument with the findings of this report are that they clearly state that they did not consider the presence of segments of the Old Spanish NHT that are neither visible on the ground nor in satellite imagery. They further state that "The principal criterion selected for the identification of potentially historic roads and trails within 1 mile of the PAA has an archaeological foundation: In order to be included in this inventory the road or trail *must be identifiable on the ground* (emphasis added by authors, p. 3-2). This statement dooms the utility of this study in our opinion. Cultural resources include more than just tangible archaeological features or artifacts. Cultural landscapes, traditional cultural properties, and historic trails are all examples of such resources.

It is our contention that segments of the Old Spanish NHT may well lie within the project survey area, and certainly lie within the area of potential visual impacts of the project. The Old Spanish Trail Association has been working in the vicinity for years, and has identified possible traces of the trail that they documented as intervenors on this project. These may or not be visible using the methods employed by contractor, however, that does not mean they are not there and are not potentially detectable by finer-grained remote sensing techniques such as lidar, ground-penetrating radar, magnetometry/gradiometry, metal detecting, or electrical resistivity studies. Moreover, the presence of on-the-ground features is not required for eligibility of a property under National Register Criterion A.

Comment 7

The contractor also did not consider recent roads as later manifestations of older trail corridors if they did not appear on old maps. We believe this is an artificial distinction. We administer thousands of miles of National Historic Trails that lie under current roadways or railroads. Old maps often do not show old trails or road accurately.

Comment 8

The study actually identified several historic trails or roads that they did not investigate further and which may be part of the Old Spanish NHT. These resources may be eligible and will almost certainly be subject to adverse setting impacts if the HHSEGS is built. This is why we request survey of a much larger area. We do not agree with the contractor's eligibility recommendations.

Comment 9

On a positive note, we did see the standard Old Spanish Trail references missing from the original survey report in the bibliography for this report.

The Staff Assessment

We have reviewed the supplemental CEC staff cultural resources assessment. We think the staff did an excellent job in evaluating the impacts of the HHSEGS on cultural resources, including the Old Spanish NHT. The staff assessment was over 100 pages in length. The summary of their assessment of impacts to the Old Spanish NHT was: “At least one historical built-environment resource, the Old Spanish Trail-Mormon Road, has been identified in the HHSEGS PAA thus far. Substantial information, including the National Register of Historic Places nomination of the Nevada segments of the Old Spanish Trail, has led staff to conclude that, within the PAA, this resource is not represented by a single route, but as a corridor of converging and intermingled tracks and trails. The project site is located within this corridor, with traces running throughout the project site. Staff has concluded that that the impacts of the proposed HHSGS project to this Old Spanish Trail-Mormon Road Northern Corridor (Corridor) would be significant and, even with full implementation of [mitigation measures] CUL-9 and CUL-12, would not be mitigated to a less than significant level.” We agree with these findings.

Conclusions

Many historic sites exhibit no currently visible surface archaeological manifestations. These include trails, battle sites, cultural water routes, traditional cultural properties, cultural landscapes, shipwrecks, treaty trees, and others. All these sites can have great historical significance, often under Criterion A, so the question of their eligibility revolves around integrity. The seven aspects of integrity are location, design, setting, feeling, association, materials, and workmanship. With no tangible surface remains, non-feature sites must exhibit a high degree of integrity in location, setting, feeling, and location. Any undertaking that diminishes the integrity of a property along any of these aspects must be considered an adverse effect.

The National Register Bulletin 15 states: “All properties change over time. It is not necessary for a property to retain all its historic physical features or characteristics. The property must retain, however, the essential physical features that enable it to convey its historic identity. The essential physical features are those features that define both *why* a property is significant (Applicable Criteria and Areas of Significance) and *when* it was significant (Periods of Significance).”

Designation of a National Historic Trail is a rigorous process. The National Park Service conducted exhaustive research—both documentary and in the field—to document the significance, integrity, and location of the Old Spanish NHT as part of the feasibility study for its designation. The language of the National Trails System Act of 1968 (as amended) states: (To be designated as a National Historic Trail...) “It must be a trail or route established by historic use and must be historically significant as a result of that use. The route need not currently exist as a discernible trail to qualify, but its location must be sufficiently known to permit evaluation of public recreation and historical interest potential.” The trail was determined to be nationally significant (NPS 2001:23) in terms of National Historic Trail criteria—a much more restrictive standard than National Register evaluation. Congress agreed, designating the Old Spanish NHT in 2002.

Comment 10

The Old Spanish NHT is a nationally significant cultural and historic resource. We do not believe that the nature and extent of the impacts of this project on the Old Spanish NHT have been adequately documented and evaluated because of the limited extent of the cultural resources investigations. But even given these limitations, it is reasonable and foreseeable to assume that the direct, indirect, and cumulative impacts from this project and associated activities upon the trail will be great.

For all of these reasons, it is our professional opinion that the Old Spanish National Historic Trail is present in the area of potential effects for the HHSEGS, that it has been proven to be significant, and that the project will adversely affect trail resources and the setting of the trail, and destroy its association, feeling, and location. We do not believe that these effects can be mitigated. We ask that the application for certification as currently configured be rejected in this location. Thank you for considering our comments. The National Park Service National Trails Intermountain Region office stands ready to consult with the project proponent and agency officials to choose a different and less damaging location, or a revised project with shorter and less visible towers.

Comment 11

Mr. Mike Monasmith
Senior Project Manager
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

**Subject: Hidden Hills Solar Energy Generating System
California Energy Commission Preliminary Staff Assessment
Comments by The Nature Conservancy on Water Supply Assessment**

Dear Mr. Monasmith,

The Nature Conservancy is a worldwide conservation organization devoted to conserving the lands and waters on which all life depends. To help reduce adverse effects of impending climate change and meet the State of California's Renewable Portfolio Standard, The Nature Conservancy supports significantly increasing renewable energy generation and transmission. We believe that we can both meet the state's goals for renewable energy production and protect desert species, communities, and ecosystems.

Our organization has been directly involved in the federal and state solar development siting and environmental review processes. The Nature Conservancy's role has focused on encouraging siting of large solar facilities in locations that are both economically sound and compatible with retaining the desert's vital ecological resources, including groundwater that supplies critical imperiled desert springs and wetlands.

Since the early 1970's, The Nature Conservancy has pursued conservation of the uniquely rich and fragile aquatic and riparian systems in the bi-state Amargosa basin. This region is home to more endemic, rare and listed species than any other area of similar size in the continental U.S. It depends almost entirely on perennial groundwater flow to support both its natural and human communities. Protection of groundwater resources is thus the paramount concern for The Nature Conservancy --as well as for federal and state resource agencies and local residents.

The proposed Hidden Hills Solar Energy Generating System (HHSEGS) plants propose to pump groundwater from aquifers in Pahrump Valley, within the Death Valley regional groundwater flow system. We commend Bright Source for employing dry cooling technology and otherwise agreeing to reduce water use to low levels, an especially significant effort, given the amount of power that will be produced by the planned Hidden Hills plants. However, additional pumping, even of small amounts of groundwater, from already stressed desert groundwater basins

such as the Pahrump Valley Groundwater Basin (PVGB), where the HHSEGS site is located, can lower critical groundwater levels and adversely affect springs, seeps and wetlands, protected species, as well as other water dependent resources and domestic and municipal water supplies in the area. Reductions of even a foot in groundwater levels, for example, can cause losses and severe declines of aquatic and riparian species such as spring snails, voles, and desert fishes found nowhere else in the world¹.

The Pahrump Valley alluvial and deeper carbonate aquifers are nested within the Death Valley regional groundwater flow system. These aquifers supply water to local springs, mesquite woodlands and other groundwater dependent vegetation, as well as local residential wells. These aquifers are also thought to be linked to, and, after an uncertain transit time, to supply water to the Amargosa River and its vital spring tributaries in the Tecopa and Shoshone California area².

The hydrogeology in this portion of the Death Valley regional flow system is not well known. The US Geological Survey (USGS) has done the most extensive work in the region. USGS has constructed a regional groundwater flow model that, based on limited data for this southern portion of the flow system, predicts that precipitation high in the Spring Mountains in Nevada enters the groundwater system there and flows southwest as groundwater into California, beneath and through the Pahrump Basin, under the Nopah Range, and eventually makes its way into the Wild and Scenic Amargosa River and its stream, spring and seep tributaries. The California Energy Commission (CEC) Preliminary Staff Assessment (PSA) Water Supply (WS) analysis references this understanding stating that, based on local gradients, "the basin-fill in Pahrump discharges through most of the Nopah Range." PSA WS at 4.15-11.

However, because the hydrogeology in this portion of the Amargosa is particularly complex and poorly understood, a collaboration between the USGS, the Bureau of Land Management (in both California and Nevada), Inyo County (prospectively), The Nature Conservancy, and the Amargosa Conservancy is funding a series of studies to probe and then model, in fine scale, the subsurface natural "plumbing" of this portion of the Death Valley flow system. These studies are ongoing, and are not yet fully funded. Final results are approximately five years away³.

¹ The Devil's Hole pupfish, while a unique example, demonstrates that water level declines of even inches can cause significant negative impacts to protected species.

² The CEC PSA water supply analysis agrees that HHSEGS proposed pumping and the Amargosa system are linked, but discounts the effects of the pumping based on hypotheses about time and distance. We believe the effects cannot be so dismissed (see Attachment 1), and we propose below reasons why this linkage is important and steps to ensure that adverse effects on the Amargosa River and its rich ecological communities will not occur.

³ A proposed program of studies has been prepared by the USGS and is available from that agency's Henderson, NV office. The goal is to develop an adequate understanding of the hydrology and populate a fine-scale groundwater flow model that can be used to predict the effects of pumping and other stresses on the system.

The HHSEGS applicant proposes to drill six new wells within the project's boundaries. These wells would be drilled into the Pahrump Valley alluvial aquifer to depths and in locations not yet finally specified. The wells would be used to extract a total of 288 acre feet of water per year during an approximate three year (29 month) construction period, followed by 140 acre feet per year during an assumed 30 year initial operating life. ⁴

The CEC's PSA water supply analysis concludes that three conditions require mitigation to address the likely adverse effects of HHSEGS groundwater use, and proposes monitoring and mitigation requirements to compensate for the 1) exacerbation of overdraft conditions in the Pahrump Valley Groundwater Basin, 2) water level declines potentially affecting the Stump Springs BLM ACEC and other groundwater-dependent vegetation, and 3) lowering of water levels in local domestic wells. While the PSA rejects compensation for effects on the Amargosa River and its tributaries, the PSA WS would require a single offsite monitoring well in the direction of the Nopah Range and California Valley to detect future effects on the Amargosa.

The effects of the proposed HHSEGS pumping on local as well as regional groundwater dependent resources are remarkably indeterminate, and predictions of long term effects exceedingly unreliable. The applicant asserts, based on a truncated 4½ day aquifer performance test (APT, or pump test) and the use of a simplified groundwater model that HHSEGS groundwater pumping will not cause significant effects beyond the boundaries of the project site over 30 years. ⁵

The CEC PSA critically reviewed the applicant's conclusions based on the abbreviated pump test (Water Supply Assessment, Appendix A). The Nature Conservancy also contracted for a summary review of that test, the applicant's model and the CEC PSA water supply analysis by an independent hydrological consultant, Johnson Wright, Inc., This review is included as Attachment 1. The Johnson Wright analysis questions the validity of the applicant's conclusions based on the test and modeling results. The admitted deficiencies in the applicant's groundwater model and aquifer test dramatically underscore the nearly total absence of data and consequent lack of science-based understanding of what

⁴ The applicant's power tower technology uses much less groundwater than parabolic mirror facilities, but more than photovoltaic facilities generating equivalent amounts of electrical energy.

⁵ Two other prior pump tests were conducted that resulted in widely varying transmissivity values. Raw data from those tests were not made available, nor, based on confidentiality issues, were well logs from the limited number of local wells that CEC staff and applicant may have used their analyses. Applicant apparently made limited use of these two previous pump tests, and it is difficult to determine the extent to which publicly unavailable well log or water level data was used by the CEC or Applicant. We believe that any reliance on undisclosed or unavailable information is inappropriate in reaching conclusions about the effects of groundwater use.

direction and how far and fast the HHSEGS pumping cone of depression will propagate and how the withdrawals will affect the regional water balance.⁶

The Johnson Wright review included consideration of the PSA Water Supply analysis and the most recent presentation by CardnoEntrix on behalf of Applicant at the June 14th workshop in Pahrump. That review emphasizes that the CardnoEntrix and CEC PSA conclusions on the effects of proposed groundwater pumping based on such limited information are clearly not warranted.

The PSA correctly notes that the proposed HHSEGS pumping would represent a relatively modest fraction of existing groundwater extraction from the Pahrump Valley Groundwater Basin, and a quite small fraction of outstanding water rights in the basin in Nevada.⁷ However, pumping from the basin exceeded sustainable levels for decades, and water levels recorded in wells across the entire Pahrump Valley Basin already show a sustained decline over recent decades.

Beyond the ongoing regional water level declines, other factors make the HHSEGS pumping significant from an ecological and groundwater mitigation perspective:

- The HHSEGS is only the first of a series of likely solar facilities that would be dependent on pumping groundwater from the basin—including another pending application by Bright Source for a power tower plant named Sandy Valley, but actually located in the southern Pahrump Basin.
- Unlike agricultural water use, solar water use is “hard”— in the sense that all of the water will be consumptively and steadily used, very likely for periods of many decades, perhaps centuries, beyond the initial 30 year operations window.
- While there has been considerable pumping from the northern Pahrump Valley basin in Nevada, there have apparently been only a handful of wells drilled and modest quantities of water extracted from aquifers in the

⁶ As Applicant’s groundwater expert report observes: “Typically, several hydraulic aquifer coefficients and parameters are required when creating a groundwater model. These parameters include transmissivity, storage, specific yield, boundary conditions such as leakance, aquifer thickness, recharge, and depth of the pumping wells. For this site only an approximate measurement of transmissivity is available. This lack of detailed aquifer property information constrains the modeling approach that can be employed to only a simplified model package that assumes homogeneous aquifer properties.” HHSEGS AFC , Appendix 5-15G at 3.0.

⁷The project will average 167 acre feet per year, including the construction period pumping. Estimated pumping from the basin is 13,000+/- acre feet year. Outstanding water rights in the basin in Nevada , including rights that attached to approved but unbuilt residential lots, probably exceeds 70,000 acre feet.

southern portion of the basin in either California or Nevada⁸, accordingly, information about the effects of pumping on ecological resources and other water users in this relatively undeveloped portion of basin is notably sparse.

- Finally, pumping to support solar development is a new use of groundwater, and, as such, is subject to limitations based on the priority of the Amargosa Wild and Scenic River designation.

The Nature Conservancy believes there is justification for considering water use by this facility as essentially permanent; as a result, we recommend analyzing the effects of project pumping over a much longer period. The PSA analysis does not adequately take into account potential long-term consequences of the HHSEGS pumping and that of other cumulative groundwater uses in the Pahrump Valley⁹. We believe that the PSA analysis should be extended using assumptions that the HHSEGS pumping will be continued for at least 200 years, and that the effects of additional PVGB groundwater pumpers, including, but not limited to, the facilities listed in the PSA, should be added to the analysis to provide better approximation of the cumulative effects of this facility's pumping combined with that of other reasonably probable water users.

Comment 1

Comment 2

This analysis of longer-term impacts is critical and justified because adverse effects from groundwater withdrawal can take a very long time to propagate through to distant springs and water dependent resources, even following the cessation of pumping. By the time effects are noticed through monitoring, it is often far too late to restore the health of these resources.¹⁰

⁸ The PSAWS analysis of effects is in fact based upon bifurcating the PVG Basin into north and south sub basins. WS at 4.15-11 et seq. As noted, water levels in the entire basin have been in decline for decades, with decline rates in the southern portion slower than in the north (~.25 ft/yr/ vs ~1 ft/yr), where agricultural pumping and residential wells have been concentrated.

⁹ Note that in the EIS analysis of the effects of pumping by the Solar Millennium facility in Amargosa Valley NV, the time period considered was 200 years. See: Amargosa Farm Road Solar Project Final EIS, (NVN-084359), Volume II, Appendix B--Groundwater Modeling Report: http://www.blm.gov/nv/st/en/fo/lvfo/blm_programs/energy/proposed_solar_millenium.html

¹⁰ This is the reason, for example, that the Nevada State Engineer (SE) and BLM, in the context of the approval of the Southern Nevada Water Authority (SNWA) requested permits to pump groundwater from aquifers in rural Nevada counties and pipe it to Las Vegas analyzed the effects of groundwater pumping over more than 200 years, based on well documented groundwater flow models. The SE has approved only a portion of the SNWA's requested pumping, requiring, in essence, a very long term aquifer test prior to allowing additional pumping, and providing that pumping can be halted in the event that adverse effects are noted. See BLM-- Clark, Lincoln, and White Pine Counties Groundwater Development Project Draft EIS, Volume 1A, Chapter 3.3 (water resources) June 10, 2011; http://www.blm.gov/nv/st/en/prog/planning/groundwater_projects/snwa_groundwater_project.html. See, also, a short paper by John Brehehoeft at http://aquadoc.typepad.com/files/groundwater-monitoringfor-mitigation_will-it-work.pdf, and The Nature Conservancy's critical comments on the BLM's draft EIS, dated September 16, 2011, included in public comments section at http://www.blm.gov/nv/st/en/prog/planning/groundwater_projects/snwa_groundwater_project/draft_eis_public_comments.html.

Placed in a cumulative and long run perspective, the HHSEGS pumping potentially will initiate very significant new burdens on this segment of the regional flow system and its dependent springs and ecological communities – including Stump Spring, nearby mesquite dune vegetation, and the Wild and Scenic Amargosa River and its protected resources¹¹.

The Nature Conservancy believes that the CEC staff analysis of effects is about as thorough and theoretically correct as possible under the prevailing factual circumstances, but, given the almost total lack of understanding of local hydrology and the long-term effects of pumping in this desert system, the PSA conditions provide insufficient protection for high value and unique protected ecological resources.

The monitoring and mitigation steps outlined in the PSA represent a good start. However, we believe that the program must be augmented to more accurately predict, and more quickly detect and compensate for possible harm in the face of significant long-term hydrologic uncertainties. The high level of uncertainty warrants a very conservative approach, imposing reasonable but clear and effective conditions that would halt HHSEGS pumping if adverse effects are likely. Accordingly, we have the following recommendations.

Comment 3

Monitoring

Given the lack of information about the effects of pumping from the Pahrump Valley aquifer in the Hidden Hills location on local and distant resources, a well-designed monitoring program, including an adequate number of properly placed monitoring wells and enforceable and public reporting requirements, is especially critical. Condition WS-8 in the PSA states that the monitoring network “protects areas that maybe within the influence of project pumping during the project life.” We believe that the intended design of the network should be extended to areas or resources that may be influenced by project pumping well beyond the project period and for a minimum of 100 years, given that operations at the HHSEGS facilities are almost certain to continue well beyond the first licensing period. It is simply unrealistic to expect that renewal of the plant’s operating franchise would be withdrawn three decades hence, even if severe groundwater problems were encountered.

The PSA WS recommends requiring the applicant to drill and periodically sample water quality and levels in a minimum of 10 monitoring wells. We support requiring an array of monitoring wells located in sites selected as best for detecting offsite

¹¹ An excellent summary of the Amargosa River system’s ecological resources is contained in the Biological Resources section of the PSA at page 4.2-43 et seq. While neither the river nor any of its tributary springs are shown as being located within the unrealistically uniform concentric drawdown isopleths in the PSA WS Figure 23, several important springs are shown to be within 5000 meters of the outer ring and many more within 2-3 miles.

effects from HHSEGS pumping and other groundwater withdrawals on key ecological resources, drilled to at least the same depths as HHSEGS production wells and equipped with continuous recording devices. However, we recommend that additional wells be required, that well locations be more clearly specified in the final staff assessment, that all drilling logs and other data on well construction, testing, and performance be made public.

We also recommend that applicant conduct at least one additional reasonable length pump test to supplement the results of the initial truncated test, using newly drilled production and monitoring wells. This additional pre-construction pump testing is warranted because of the limitations of the recent aquifer performance test and accompanying model, and the lack of geological and aquifer data in the area.

Comment 4 ing at **Comment 5** il-de: **Comment 6** -performance test after in **Comment 7**

one or more planned production wells and several associated monitoring wells-- prior to the commencement of construction and permanent installation of the rest of the wells--would provide the applicant and the CEC with valuable data about how to site other wells and whether the initial assumptions about the aquifer configuration and the absence of off-site drawdown were correct.

Although the terms of applicant's lease have not been revealed, it seems reasonable that additional wells could be drilled this summer (2012) and tested prior to the Commission's issuance of final Conditions of Certification. Review of the aquifer testing results can then be used to confirm whether the applicant's initial assumptions were correct; if not, the plan and CEC's Conditions for Approval should be appropriately revised. We recommend that, as in the case of other required pre-approval resource investigations (e.g., biological, cultural), gathering critical information about effects on the groundwater resource should be done before approvals are issued.

Further, The Nature Conservancy recommends that the CEC require a total of three offsite monitoring wells (i.e. adding 2 wells) to the southwest of the HHSEGS site to detect possible effects on the Amargosa River and its protected resources. In particular, these wells should be designed to determine levels, direction, and flow in the alluvial aquifer and also to probe whether there is communication between the alluvial aquifer and the regional carbonate aquifer. If significant drawdown is detected or carbonate/alluvial aquifer communication is established, conditions on project pumping should be specified.

Additionally, because of the intense public interest in groundwater issues, WS-9 should provide that all of the monitoring wells should include continuous data logging and recording devices and that the raw data and all reports be promptly placed on a public CEC website .

Mitigation

TNC applauds the PSA approach to mitigation—requiring both permanent reduction in water use in the Pahrump Valley Groundwater Basin and monitoring-based triggers requiring reduction or cessation of pumping occasioned by adverse effects on ecological resources. However, we believe that these mitigation measures need to be clarified and strengthened.

Reductions in Basin Groundwater Use

The Water Use Offset plan (WS -1) requires the applicant to submit a Water Supply Plan that outlines how a total of 4900 acre feet of water, or 163 acre feet per year over the 30 year life of the project, will be replaced through as yet unidentified “activities.” The applicant’s plan must be approved by the CPM prior to construction or well operations. We support this plan approval condition; moreover, because of its importance in determining the adequacy of groundwater mitigation, we recommend that the complete plan should be submitted prior to and included with the final staff assessment, and be subject to public review prior to its approval by the Commission.

Comment 9

We recommend that WS-1 be interpreted to require actual, steady, contemporaneous reductions in PVGB pumping equivalent to the pumping by HHSEGS, we also strongly recommend replacement of groundwater use at a ratio of greater than 1:1¹², for several reasons:

- Given the severe over-allocation of water rights in the basin (65,000+ acre feet allocated versus 12,000-19,000 acre feet of perennial yield) it is unclear whether the retirement of even senior, active and historically exercised water rights will be effective to reduce water use over a 30-year period. This fact, in itself, warrants acquisition and retirement of water rights well in excess of project pumping rates.
- Little pumping from wells in the southern section of the basin has occurred in the past. Most of the active water rights that could be acquired by the applicant for compensation are apparently located in the northern section of the basin. Long-term water levels have declined in the southern area, but only about a quarter as rapidly as in the north, but presumably as a result of the propagation of pumping effects from north to south in the PVGB. The estimated average rate of water level drop is 0.25 foot per year in the south vs 1.0 foot per year in the north. Roughly, then, if acquisition of northern basin water rights are to be permissible compensation, our recommendation is that acquired rights should be at a 4:1 ratio to project pumping to

¹² Applicant’s technical report originally committed to acquire up to 400 acre feet for mitigation, a commitment which was then withdrawn as an error. Applicant is now apparently committed to offset its water usage, and has listed a number of possible options, many of which would not represent permanent retirement of active water rights. See Applicant’s Data Responses 1-A, ##s 39 and 40 at pp 33-34.

effectively compensate for long term storage reductions in the southern portion of the basin.

- If, as seems likely, the water rights proposed for acquisition are agricultural rights, the relative certainty of pumping (hardness of the water use) for the solar facility as compared with agricultural use further justifies requiring a compensation ratio that is significantly greater than 1:1.

We also encourage the CEC to provide more clarity around how the PSA compensatory mitigation obligation would work in practice. The PSA appears to allow the applicant to acquire either an annual 167 acre feet/year or a gross quantity of water rights (4,900 acre feet) with no specified time period for the acquisition. While we do not think the PSA contemplates this result, the mitigation obligation theoretically could be satisfied, as an extreme example, by a single-year lease of 4,900 acre feet of water, promised to be executed at the end of the 30-year operating period. Moreover, the mitigation obligation is framed as “one or more activities,” which would apparently not compel the applicant to actually acquire and retire active, senior water rights in the PVG Basin¹³.

Comment 10

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Comment 12

We recommend that the mitigation obligation be stated categorically to require contemporaneous acquisition and permanent retirement of actively used, senior water rights in the Pahrump Valley groundwater basin of four times the projected annual average project pumping rates of 167 acre feet/year— a total of 668 acre feet/year.

Triggers for reduction in water use by HHSEGS

We strongly support the PSA requirement to reduce or cease groundwater pumping in the event that adverse effects to ecological resources are occasioned by HHSEGS water use. This requirement is of cardinal importance given the lack of information about the hydrology of the area and the importance of the potentially affected ecological resources.

However, we object to the specific trigger conditions proposed in PSA’s biological resources (BIO-23 and 24) and water supply (WS-8) sections as Conditions for Certification, because these Conditions will not adequately protect groundwater-dependent ecological resources before they are likely to experience significant harm.

¹³ Several of the compensatory mitigation options listed by Applicant in its data responses (see footnote 12, above) would not require acquisition and permanent retirement of water rights. In light of the gross over-allocation of water rights in the Pahrump Valley basin and the fact that Applicant’s use of water is very likely to be perpetual, if mitigation is not limited to acquisition and permanent retirement of active, senior water rights in multiples of proposed use, further and more rapid declines in the southern basin water levels—and the Amargosa system-- are likely.

This statement from the Biological Resources section of the PSA (4.2-170) reveals the PSA's sound underlying rationale for imposing adaptive action in the event of predicted adverse effects on protected ecological communities:

*Given the cumulative concerns..., combined with the limited quantity and reliability of the data, and the ecological significance and sensitivity of the resources at risk, a conservative approach must be applied that combines long-term groundwater elevation monitoring and monitoring the health of the mesquite, with clear and detailed triggers for adaptive action if **impending** impacts are detected. (emphasis added).*

BIO 24 states:

*"Thresholds for remedial action... are designed to **avoid impacts to the mesquite woodlands and other groundwater-dependent (GDE) near the project before they result in a loss of resources, or a significant impact to habitat functions and values.**" (emphasis added)*

Con

Comment 12a

However, the PSA's trigger conditions will not satisfy these goals. Rather than averting the harmful effects on the ecologically important Stump Springs and Pahrump Valley mesquite Metapatch before resources are lost, the PSA conditions would essentially require proof of a 20% decline in the health of the baseline resource, plus a showing of a statistically significant water level decline, combined with demonstrations that the declines are attributable to the applicant's activities and cannot be attributed to regional drought conditions or other pumping. This is an unwieldy and unworkably difficult test; and, if it were proposed to be invoked to limit pumping, protracted litigation would almost certainly ensue.

Despite a very detailed, sophisticated proposal in the biological resources analysis that would be used determine when the 20% effects level is reached, this trigger would not provide the intended result of avoiding adverse impacts. Once the 20% level is reached, irreversible harm is likely inevitable because of the usual nature of groundwater systems. That is, by the time adverse effects are first detected in resources remote from the pumping location, the time lag to recovery after pumping ceases will cause further and prolonged declines in water levels before they begin to recover, resulting in permanent loss of habitat and dependent ecological resources. Lastly, there are significant difficulties in establishing that decreases in water levels are not due to drought or other extraneous factors, including other groundwater pumping.

We recommend that the CEC establish clearer and more effective trigger conditions. Given that we lack understanding of the local and regional hydrology and an accompanying detailed groundwater flow model that could be used to predict and avoid adverse impacts, the only reasonable alternative is to set very conservative trigger conditions. We recommend that Applicant cease groundwater pumping when specified, measurable water level declines are detected in offsite groundwater

monitoring wells, sited to predict whether the cone of depression caused by HHSEGS pumping is moving toward Stump Spring or other ecologically protected resources, including the Amargosa River. The currently proposed tripartite test, which requires that the agency show offsite water level declines, plus adverse effects on ecological resources, and to exclude other possible reasons for the effects will not protect resources. Most importantly, once a triggering water level decline occurs, applicant should have the burden to establish that any water level declines are wholly caused by drought or other circumstances for which they are not responsible.

We thus advocate permit conditions requiring, once offsite water levels decline or any decline in vegetation health is detected, that the applicant demonstrate that those effects are not the result of their pumping.

We note that this test would be compatible with the applicant's assertions that the effects of its groundwater pumping will not propagate offsite or affect ecological resources.

Comment 2

The Amargosa River

In 2009, a 27-mile perennially flowing reach of the Amargosa River in California was added to the national Wild and Scenic River System, adding inchoate but legally effective federal water rights protections to BLM's previous Area of Critical Environmental Concern. This area of the river and its vital fresh water tributaries support many listed, sensitive and endemic species. The PSA WS analysis states:

...the proposed project has the opportunity to reduce groundwater flow that would otherwise be received down-gradient. If this was the case, the project could have the opportunity to capture water that would otherwise flow to the Amargosa River. WS at 4.15-19

However, the PSA concludes that because "potential impact(s) are ... so far into the future and so distant from the proposed project that it could not be reasonably discerned from other stresses in the regional hydrologic system" (id), "The proposed HHSEGS project would not be expected to have a measurable impact to the Amargosa River or its tributaries." WS 4.15-1

While minimizing the potential effect of the HHSEGS pumping on the Amargosa, the staff report acknowledges that its analysis is not supported by subsurface data because these data are not available. For this reason it recommends the drilling and monitoring of a single well between the HHSEGS site and the Amargosa River to detect project-induced water level declines in the aquifer between the project site and the river.

We recommend that at least three monitoring wells be required between the project site and the Nopah Range, adequate to determine both water levels in, and effects of

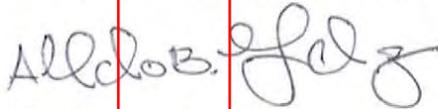
pumping on, the alluvial aquifer, as well as whether the alluvial aquifer and deeper carbonate aquifer are in communication¹⁴. We also recommend that CEC specify mitigation requirements, including pumping cessation or reduction in the event that specified water level declines (greater than one foot) are noted in any of the monitoring wells or other adverse effects are detected.

The Amargosa River is a critically important regional ecological feature. Wild and Scenic River status protects and lends priority to the river's flows over new uses of water that may adversely affect the river and its tributaries. The CEC should ensure that the river, its spring tributaries, and ecological resources are adequately protected by conservative conditions on project groundwater use to avoid adverse effects before they occur. This will require a well- designed monitoring network, development and use of a predictive groundwater model, and adaptive trigger

Comment 14 as.

Comment 15

Thank you for the opportunity to comment.



Alfredo Gonzalez
Regional Director
South Coast & Deserts

¹⁴ We have attached a proposal for the location and costs for the three wells prepared by Johnson Wight, Inc., the firm whose principal investigators have done significant hydrology work in this region.

Date: July 17, 2012

To: Project File – JW11305

From: Jon Philipp, Andy Zdon

Subject: Summary Memorandum - Review of Hydrogeologic Analysis, Proposed Hidden Hills Solar Electric Generating System Project, Inyo County, California

The following memorandum summarizes three previous documents prepared by Johnson Wright, Inc. (JWI), providing comments on hydrogeologic analyses conducted to evaluate the potential impacts to groundwater of the proposed Hidden Hills Solar Electric Generating System (HHSEGS). Based on the following assessment, the project applicant has not provided the requisite supplemental hydrogeologic knowledge regarding the site or surrounding areas to justify the conclusions its consultants have reached. Little is known about the subsurface in this area, and attempting to make general land management decisions based on “assumed understandings” of the groundwater system in the project area is not appropriate. Moreover, recent investigations in the Amargosa Basin indicate that the conceptual hydrogeologic model for the area may vary considerably from that which has been long-held. For example, a recently installed monitoring well along the Amargosa River north of Shoshone, California suggests a considerably different relationship between the Amargosa River and groundwater flow beneath it at that point than previously believed. Additional hydrogeologic characterization is clearly needed to support a reasonable analysis of the potential impacts of the proposed project, and to provide the basis for sound land management decision-making. For example, a properly-run and documented aquifer test has not yet been completed at the site and should be conducted. As well, the hydrogeologic investigation conducted thus far has not established (and was not designed to evaluate) a disconnect between project pumping and flow in the federally-designated Amargosa Wild and Scenic River flow system.

Groundwater Modeling – Impact Analysis

As part of the Bright Source Energy August 2011 Application for Certification (AFC) for the Hidden Hills Solar Electric Generation System (HHSEGS), Cardno-Entrix (Entrix) authored two documents both titled ‘Groundwater Modeling Technical Memorandum.’ These two documents were included in the HHSEGS AFC as Appendix 5.15F (July 12, 2011) and Appendix 5.15G (July 20, 2011). The documents describe the results of a modeling exercise

designed to predict the extent of groundwater drawdown in response to a range of potential short and long-term groundwater pumping scenarios at the HHSEGS site. A review of both documents shows that minimal site-specific hydrogeologic information was available, which necessitated the use of a very simplistic groundwater model that does not represent known hydrogeologic conditions (for example the presence of geologic structures such as faults and non-basin fill materials). At the time these documents were written, the applicant's aquifer testing on site-specific wells had not yet been conducted and the results of that testing were not available. The results of previous aquifer testing that were used in the analysis have not been presented and therefore the quality of that work which forms the basis of the analysis cannot be evaluated. There was an absence of site characterization by the applicant prior to the modeling analysis, and modeling was solely based on the sparse existing data for this part of the Pahrump Groundwater Basin. Thus, the results of the modeling have substantial uncertainty and the current model is inadequate as a predictive tool.

In general, the Appendices detail the modeled results of two primary scenarios:

1. The effect on the regional aquifer as a result of the planned pumping of 200 to 280 acre-feet per year (ac-ft/yr) during the two to three year construction period of the HHSEGS facility is detailed in Appendix 5.15F.
2. The effect on the regional aquifer as a result of the planned pumping of 140 ac-ft/yr during the 25 year lifespan of the HHSEGS facility is detailed in Appendix 5.15G.

The primary issue is the technical basis on which the model was built. In Appendix 5.15F, which focuses almost exclusively on modeling results, Entrix states, "The set-up and results of the original model were discussed in a previously submitted technical memorandum (dated July 3, 2011)." This July 3, 2011 memo was not included in the HHSEGS AFC and is not included in the list of documents related to the HHSEGS facility on the California Energy Commission (CEC) website. However, the Appendix 5.15G document does offer more information as to what was apparently relied upon to create the model used in both scenarios.

In Appendix 5.15G, Entrix acknowledges that water for the HHSEGS facility will be pumped from the Basin-Fill aquifer and that, "in the project area, wells of 300-400 feet deep are likely sufficient to provide the required yields for the Project." A 1966 APT conducted in the vicinity of the proposed HHSEGS facility by Geotechnical Consultants estimated aquifer transmissivity to be 7,225 gallons per day per foot (gpd/ft). No additional details of the Geotechnical Consultants APT were included. Another similarly located APT performed in 2003 by Broadbent and Associates estimated the aquifer transmissivity to be 4,675 gpd/ft.

Entrix noted that the short duration of the Broadbent and Associates APT precluded obtaining reliable storage coefficient values or estimating leakage.

Entrix does not mention what model was used to simulate the various pumping scenarios. They understand that "several hydraulic aquifer coefficients and parameter are required when creating a groundwater model." Entrix then acknowledges that "For this site only an approximate measurement of transmissivity is available. This lack of detailed aquifer property information constrains the modeling approach that can be employed to only a simplified model package that assumes homogeneous aquifer properties". For the model, the transmissivity value of 7,225 gpd/ft was used. To represent a "typical semi-confined [aquifer] condition", a storage coefficient of 0.01 was used. The analytical method used for calculating drawdown was Theis (1935), which is a confined aquifer solution. A regional groundwater gradient of 0.01, taken from groundwater surface maps, was applied to the model. In order to account for uncertainty in the one aquifer parameter Entrix had to work with, they ran each model scenario with a transmissivity of 7,225 gpd/ft, followed by runs with half that transmissivity value and with twice that transmissivity value, respectively. The model results can be seen in Appendix 5.15F and Appendix 5.15G in table format and graphically as nearly concentric circles of drawdown around the pumping center-- as would be expected from such a simple modeling approach.

The inherent simplicity of the model employed combined with the absence of site specific data (i.e. the only physical value used in the model was aquifer transmissivity derived from the Geotechnical Consultants APT) disconnects the model results from a reasonable simulation of existing conditions. The lack of site specific information then imposes no reliable constraints on the model; therefore, the model is not useful as a tool for predicting drawdown impacts related to any pumping scenarios.

The most important piece of missing information is the detailed geology under the HHSEGS site to the depth of proposed project production wells (the maximum depth Entrix believes a well would have to be drilled for adequate water to meet project needs is 400 feet, although applicant has recently suggested that deeper wells may be employed). This information could easily be obtained by supplemental drilling and collecting soil core data. Currently, neither the depth of the actual water bearing zone is known, nor if there are multiple water bearing zones. The water bearing zone materials are also unknown. Without APT-derived pumping test data, a primitive site conceptual model could still be prepared based on the soil core information, leading to some better informed assumptions as to what appropriate aquifer coefficients and parameters should be used in an analytical model. **Comments Regarding Aquifer Testing**

The March 2012 document titled 'Long-Term Aquifer Performance Test Report' (APT Report) by Entrix summarizes the design, implementation, analysis and conclusions of an aquifer performance test (APT) conducted at the future site of the HHSEGS. A thorough review of the document has revealed deficiencies in the design, implementation and analysis of the APT that question the conclusions reached by Entrix regarding the proposed HHSEGS long term project pumping impacts. The following paragraphs highlight the deficiencies, and their relevance to the Entrix conclusions.

In general, the biggest deficiency is the lack of a data-based conceptual site model of subsurface conditions. It is important to the proper design of an APT to identify the water bearing zones (aquifers) and the low permeability zones (aquitards) separating them. Entrix has compiled a narrative of regional geologic conditions based on previous investigations around other portions of Pahrump Valley and has made some assumptions as to what they believe geologic conditions are like under the HHSEGS site. In general, Entrix summarizes HHSEGS site conditions as follows:

The HHSEGS site is underlain by Quaternary sediments, which form the primary water bearing units within the basin. Channel gravels become finer grained upward, becoming mudstone near the top of the sequence. The mudstones are overlain by silt and thin gravel beds. These deposits record a change from a fluvial and lacustrine condition during the most recent glacial cycle to the arid conditions found today (Flynn, et al 2006). The maximum thickness of the alluvium is at least 800 feet (DWR, 1964).

The summary suggests variable subsurface conditions ranging from mudstones, which would likely act as an aquitard, to gravel beds, which would likely act as an aquifer. However, no HHSEGS site specific information has been collected below a depth of 200-feet below ground surface (bgs), which was done during the installation of the observation wells Entrix used for the APT. In short, knowledge was lacking regarding site specific conditions below that depth when the APT was designed, run and analyzed.

The pumping wells used during the APT were wells already in existence on the HHSEGS site, including the Orchard Well and Well #3. Well #3 was evaluated using a down-hole camera. This well was found to be cased to a depth of 790-feet bgs and open hole from 790 to 970-feet bgs, which indicates that; 1) water is being drawn from a depth of 790-feet or greater and 2) the surrounding formation from 790-feet bgs and below is lithified enough to not collapse on itself in the absence of a well screen. The Orchard well was only evaluated

for total depth, which remains unknown as the device used to measure total depth was not long enough. Thus, one of the pumping wells has an inlet below 790-feet bgs while the inlet of the other pumped well is unknown. In both cases, the boring logs for the pumped wells were not included in the APT Report, so the assumption is they were not made available to Entrix. Accordingly, geologic conditions in and surrounding the pumping wells are unknown. In contrast to the pumping wells, the observation wells were installed to a shallower depth of 200-feet bgs. With the partial exception of well MW-6, all of the observation wells were screened within clay and silt formations which are generally considered aquitard material rather than aquifer material. In short, the Entrix APT pumping wells are in unknown geologic formations (potentially lithified) and, in the case of the Orchard Well, the pumping inlet is at an unknown depth, while the observation wells are set many hundreds of feet shallower in geologic formations generally more akin to aquitard material.

Entrix encountered several difficulties during the data collection phase of the APT. The most significant was the premature end to the APT when the pumping equipment in Well #3 fell to the bottom of the well. In general, the longer the duration of the APT, the better and more informative the results, as the cone of depression will continue to expand as pumping continues. The foreshortening of the test introduces additional uncertainty to the test results, especially when using the results to make long term predictions related to water availability.

Other issues surrounding the Entrix data collection efforts related to the APT which have to potential to add uncertainty to the APT results include:

1. Something happened to the transducer in pumping Well #3 50 minutes into the test. There is a nearly two hour gap in data collection from 50 minutes into the test to 2 hours and 40 minutes into the test.
2. Manual depth to water measurements in the pumping Orchard Well do not match the data collected by the transducer. At some points, the difference is as much as five feet.
3. It seems as if there were only four data points collected from observation well MW-1 during the first 5 hours and 42 minutes of the test. It also seems that drawdown was 'zeroed' at 5 hours and 42 minutes into the test.
4. It seems as if there was only four data points collected from observation well MW-2 during the first 5 hours and 39 minutes of the test. It also seems that drawdown was 'zeroed' at 5 hours and 39 minutes into the test.
5. There are only two manually collected data points from observation well MW-6 during pumping portion of the APT.

6. A seemingly arbitrary 'zero' point was chosen for the transducer data collected from Stump Springs. Although this method would still show a response in the monitoring well, this is another example of how the field work conducted during the APT varies from standard water resource investigation techniques and adds concern to the data collection efforts. Future aquifer testing should be conducted with independent oversight.

Entrix used the commercially available software package Aqtesolv to analyze their APT data. According to Section 5.2 of the APT Report, Entrix used Aqtesolv to fit each observation well's time vs. drawdown curve "to the appropriate type curve" to determine aquifer properties. Although not explicitly stated, this suggests that multiple solutions were tried until a best fit was encountered. In all cases, the best curve fits were from the family of curves used to describe leaky aquifers: Entrix specifically called out both a Hantush-Jacob solution curve and a Neuman-Witherspoon solution curve for specific data sets. Both of these solutions specifically describe a situation where the aquifer being tested resides beneath another aquifer separated by an aquitard. The solutions take into account water sourced from both the pumped aquifer and from water leaking through the aquitard to the pumped aquifer from the aquifer above.

Despite the fact that the solution curves fit the data generated by the recorders in the observation wells, due to the lack of subsurface information, the geologic situation the solution curves solve for has not been established at the HHSEGS site. It should also be noted that Entrix assumed a 1000-foot aquifer thickness in their solutions, which may be contradictory with the leaky aquifer concept, and suggests the pumping well and the observation wells are all in one continuous water bearing formation. If this situation is true, an unconfined aquifer solution may be more appropriate for the data. Finally, one primary caveat related to the curve fit aquifer solutions is that the pumping well fully penetrates the aquifer and that flow to the pumping well is horizontal. This cannot be true, assuming that Entrix's 1000-foot aquifer thickness is valid, which would introduce additional error to the analysis. In short, there is a lack of information about the local geology or depths to aquifers and aquitards, a significant difference between the depth of the pumping wells and the depth of the observation wells, and a seemingly arbitrary application of aquifer test solution curves and aquifer thickness values.

In summary, there are significant deficiencies related to the design, implementation, and analysis of the APT conducted at the HHSEGS site. The most critical is that there is an absence of knowledge of local geologic and hydrologic conditions from which to design a successful test. Entrix designed their APT with no local knowledge of the subsurface below

200-foot bgs, used pumping wells installed into unknown formations and at unknown depths, and used observation wells that were between 300 and nearly 800 feet vertically offset from the pumping wells, and which does not follow standard practice. Any conclusions drawn from such a test are suspect. Additional concerns regarding the collection of data, the duration of the APT, and the way the data were analyzed only add to the uncertainty of the APT results.

California Energy Commission (CEC) Preliminary Staff Assessment (PSA)

The PSA for the HHSEGS was released by the CEC during May 2012. The Water Supply section of the PSA (Section 4.15) addresses **Comment 16** potential impacts on groundwater resources by the proposed HHSEGS, including impacts to the Amargosa River. In the summary of conclusions for the Water Supply section, the PSA states "The proposed HHSEGS project would not be expected to have a measureable impact on the Amargosa River or its tributaries." JWJ believes there is an insufficient technical basis to support this statement.

In general, there is a scarcity of data related to the hydrology of the southern Pahrump Valley, California Valley, Chicago Valley and the Amargosa River. Also poorly understood are the groundwater interconnections between these aforementioned areas. Data supplied by the applicant has not increased the base of knowledge.

The applicant has attempted to quantify the effects of direct groundwater impacts related to the proposed pumping at the HHSEGS site via two methods. The first method was the use of a simple analytical groundwater model to show the cone of depression likely resulting from 25 years of project pumping. The available data for use in the model was limited to a value for aquifer transmissivity derived from a 1966 aquifer performance test (APT) conducted near the HHSEGS site. All other aquifer parameters were assumed values. The resulting cone of depression extended into the Nopah Range suggesting impacts might extend into California Valley (which is hydrologically linked to the Amargosa River), but not as far as the Amargosa River itself. The second method used by the applicant was to conduct an APT at the HHSEGS site using two pumping wells and an array of monitoring wells. The results of the applicant's APT suggested that the cone of groundwater depression resulting from 25 years of project pumping might not extend past the HHSEGS site boundaries. As described earlier, these results are suspect based on significant concerns related to the applicant's design, implementation and analysis of their APT. Further, it is not appropriate to use an APT to make long-term conclusions regarding impacts. An APT solely allows for the evaluation of hydraulic characteristics which are then used as input in a subsequent analysis to evaluate long-term impacts. In summary, the applicant's APT and modeling efforts have

not added to the understanding of the groundwater flow system at the HHSEGS site or in the surrounding areas.

In order to determine if groundwater pumping at the proposed HHSEGS site might have an impact on the Amargosa River, the PSA used a model similar to the applicant's model to show the possible cone of depression resulting from 30 years of project pumping. Using a range of values for aquifer parameters based on the CEC Staff's best estimates, groundwater surfaces were generated for 30 years of proposed project pumping at the HHSEGS site. The resulting cone of depression extended into both Chicago Valley and California Valley. While these assumed drawdowns did not directly intersect the Amargosa River, the amount of pumping could potentially affect groundwater levels in these valleys that have a defined connection with the Amargosa River.

Comment 17

Comm

The PSA also utilized the existing dataset to make general statements about regional groundwater flow. Regarding regional flow from the HHSEGS site, they state,

“Although a map of the potentiometric surface constructed from available water level data suggests that groundwater in Pahrump [Valley] has a southwesterly flow direction, limited data is available to suggest that groundwater flow in the southern portion of the Pahrump Valley would discharge at the Amargosa River. Potentiometric contours suggest the possibility that groundwater that could be captured by the proposed HHSEGS site has a flow path that may not intersect the river, but would instead flow to the south.”

There is no significant data to support or refute the scenario suggested by the above paragraph. The PSA acknowledges this lack of information in the next paragraph by stating,

“...that flow from the Pahrump Valley, to Chicago Valley, to the Amargosa River could be limited, based on preliminary geochemistry data (ARM 2011a). Unfortunately very few wells exist in between the proposed project and the Amargosa River, which would help to identify flow paths and potential discharge to the Amargosa River.”

The PSA is entirely correct in acknowledging the lack of adequate subsurface data supporting or refuting groundwater flow connections between the HHSEGS site and the Amargosa River through the intervening valleys. Impact(s) to the Amargosa River related to project pumping cannot and should not be discounted.

Finally, the PSA performed a travel time calculation for groundwater flowing between the HHSEGS site and the Amargosa River assuming a direct connection. Assuming a travel distance of 20 miles, a hydraulic conductivity (K) value of 1 foot per day (ft/d), a porosity of 0.2 and a gradient based on the difference in groundwater elevation between the site and the river, the calculated groundwater travel time was over 3,000 years. Increasing K to 15 ft/d reduced the travel time to 214 years. These calculations do not reflect the potential for the actual groundwater flow path between the HHSEGS site and the Amargosa River (assuming it exists) to significantly reduce those travel times. For instance, Willow Creek Wash, located at the southern end of California Valley, is a very narrow canyon filled with very recent and unconsolidated alluvium through which groundwater could potentially travel at much higher velocities than those calculated in the PSA. Additionally, the water flowing in this wash often becomes surface flow in the China Ranch area and often remains so all the way to the confluence with the Wild and Scenic Amargosa River. Both of these flow properties would have the effect of shortening the groundwater travel time from the HHSEGS site to the Amargosa River. Groundwater flow system specifics are not accounted for in the PSA travel time calculations due to lack of data, and thus should not be discounted by assuming “no effect.”

More critically, the travel time for a particle of water to reach the Amargosa River from Pahrump Valley has little relationship to hydraulic effects, which can be transmitted nearly instantaneously over long distances within a confined aquifer. The result is that an estimate of travel time from Pahrump Valley is not a conservative assessment of potential effects to the Amargosa River.

In conclusion, the applicant has not substantially added to the needed body of hydrogeologic knowledge regarding the site or the surrounding areas. Additionally, the CEC PSA forms conclusions about the potential for the HHSEGS project to impact flows in the Amargosa River based on an inadequate base of knowledge about the local and regional flow systems. Falling back on ‘assumed understandings’ about the system is not appropriate based on recent drilling along the Amargosa River which altered 50+ years of one ‘assumed understanding’ regarding the relationship between the Amargosa River and the underlying groundwater. Ultimately, additional data points, most significantly monitoring wells both at the HHSEGS site and along suspected flow paths to the Amargosa River, will be needed to answer the question of connectivity.



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July 21, 2012

Commissioner Karen Douglas, Presiding Member
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: Hidden Hills Solar Electric Generation System: Comments by the
Amargosa Conservancy on the California Energy Commission
Preliminary Staff Assessment

Dear Commissioner Douglas:

The Amargosa Conservancy, with headquarters in Shoshone, California, is a non-profit conservation organization devoted to preserving the land, water and beauty of the Amargosa region. We appreciate the very open process that the Commission staff has conducted in addressing the Hidden Hills Solar Energy Generation System (HHSEGS), Application for Certification (AFC) and for providing ample opportunities to comment and sponsoring several local workshops where a wide range of views and opinions from the applicant, residents and organizations can be exchanged and fully aired.

As it is described in the PSA, the Amargosa Conservancy opposes the HHSEGS project. If the Commission were to approve the project, substantial mitigation, above and beyond what the PSA has recommended, would be necessary. We outline below our objections and concerns--as well as mitigation and other recommendations--for this massive \$3 billion industrial facility that will be the bellwether of additional development.

We encourage the Commission and its staff to continue providing additional public workshops prior to and after the publication of the Final Staff Report. We believe that this project, if approved, will have very significant negative long-term effects on the natural communities in this region, and widely varying effects on the human population in two states.

I. Groundwater

Previous comment issues unresolved

The Conservancy has previously submitted extensive comments to the California Energy Commission (CEC) on detecting and averting effects from proposed groundwater pumping by the Hidden Hills Solar Energy Generation System (HHSEGS) from aquifers that are hydrologically connected to the Wild and Scenic Amargosa River and its groundwater-fed tributaries. Unfortunately, none of the issues our organization raised in those prior comments on groundwater use have been resolved. If anything, we have become even more concerned about proposed water use by this plant and by that of other utility-scale solar generation plants and the related regional development projects that are quite likely to follow in its wake.

Data absent

In particular, the data relevant to assessing groundwater impacts in this region are extremely limited, and the Applicant's repeated assurances that its long term pumping will have no off-site effects, based largely on guesswork rather than on collection and analysis of additional subsurface information, are distressingly dismissive of concerns raised by this organization, the BLM, and Inyo County, among others.

The Applicant's and the PSA's predictions unsupported

Applicant asserts that project pumping over the life of the project will not affect biological resources or wells beyond (or much beyond) its property boundaries, relying on scant geologic mapping, scattered, publicly undisclosed well logs, inadequate pump test data, and simplistic groundwater modeling. The latest assertions by Applicant's groundwater consultant are contained in a PowerPoint slideshow that was aired at the June Pahrump workshop. The slides speculatively propose one possible version of subsurface conditions to predict effects of HHSEGS pumping over a 25-year period, but add little or nothing to the real understanding of this complex system. Predictions are only as reliable as the data used to prepare the presentation; and it does not appear that any new information was obtained or used to buttress the very slim portfolio of available information. The PSA analysis uses the same sparse data and simplistic modeling techniques as the Applicant's consultants to predict the effects of the project's groundwater pumping.

Uncertainty

The key issue facing the CEC is what to do in the face of great uncertainty in the hydrogeologic properties of the area—and thus whether and how pumping impacts will propagate and affect off site resources.

Effects on the Wild and Scenic Amargosa River—Monitoring and Mitigation Required

One principal concern of the Conservancy is that groundwater pumping in the southern portion of the Pahrump Valley will affect the Wild and Scenic Amargosa River and its spring tributaries. Despite the fact that little pumping has occurred to date in the southern portion of the valley, water levels have been steadily dropping in most of the wells in this area from which data is available, apparently the result of pumping further north in the Pahrump Valley. The USGS regional groundwater flow model posits flow from the Spring Mountains through Pahrump Valley under the Nopah Range and through California Valley and thence into the Amargosa River. To us, this raises a serious unresolved issue of whether long term HHSEGS pumping will adversely affect the river and its tributaries. The solution, in the face of significant uncertainty, is to require clear and enforceable monitoring and mitigation conditions that will require reductions or cessation in pumping if monitoring predicts effects are likely to occur.

Amargosa effects could be rapid and significant

Although the PSA water supply analysis acknowledges that HHSEGS pumping might affect the Amargosa, it discounts that effect based on calculations of the length of time that the pumping effects might take to affect the river— using the same inadequate body of data discussed above. The attached analysis commissioned by the Nature Conservancy by Johnson Wright, Inc., hydrogeological consultants, posits other likely routes by which the HHSEGS pumping might well affect the river much more quickly and directly than the PSA analysis estimates. We believe that it is incumbent on the Applicant and the CEC to rule out these effects and to require mitigation (e.g., pumping cessation) if effects are predicted by water level declines in appropriately sited monitoring wells.

Comment 1

Longer term analysis required

The analyses by the Applicant and included in the PSA are limited to predicting effects of pumping for the first 30 years the plant will be operating. We believe this analysis period is far too short for two reasons: first, the plant will undoubtedly operate and pump groundwater far beyond the 30 year first period. Second, the effects of groundwater pumping usually propagate for long periods after pumping has stopped, and by the time that effects are detected in critical resources, it is too late. By the time recovery starts to occur after pumping ceases, water dependent life is often eliminated. Other analyses (e.g., the BLM environmental assessments of the Amargosa Valley solar plant and the Southern Nevada Water Authority's proposal to pump water from remote valleys to Las Vegas) have appropriately predicted effects over much longer terms—200 years or more. If that same standard were to be applied here, the likely effects on the Amargosa system would undoubtedly be apparent.

Monitoring and mitigation recommendations

The PSA proposes that Applicant install a single monitoring well between the project and California Valley, but would propose no mitigation conditions in the event that water level declines are detected. This is clearly inadequate. We suggest that at least three monitoring wells be located west of the project site, completed in the alluvial aquifer in the producing horizon from which the project will be pumping water. Moreover, to establish whether the HHSEGS pumping will affect the carbonate aquifer, at least one well should have a dual completion in the alluvial and carbonate aquifers. (We note that the BLM's recent comments on the PSA support installing monitoring wells penetrating the carbonate aquifer.) If future water level declines in these wells predict effects on the Wild and Scenic Amargosa River, pumping should cease or be curtailed; however, the Applicant should first be given a reasonable opportunity to demonstrate that the water level changes are not due to its operations.

Comment 2

With regard to the groundwater dependent resources, in an attempt to protect groundwater dependent resources, the PSA water supply and biological resources conditions would require mitigation in the form of a temporary pumping cessation; however, before groundwater pumping is modified or discontinued over the long-term, the PSA requires the CEC to meet the burden of satisfying three difficult conditions: a water level decline of .5 foot, that the health of water dependent vegetation had declined by 20%, and that these effects were not due to actions or conditions beyond the control of the Applicant. This is nearly an impossible burden, and enforcement would be extraordinarily expensive, difficult, and protracted even in the face of clear adverse changes. Moreover, by first requiring a demonstrable decline in the health of vegetation, remediation would very likely be too late to avert permanent harm to the target resources.

The Conservancy believes that declines in the water level in off-site monitoring wells sited to detect impending effects on key resources alone is a sufficient trigger for mitigation requirements, both for the groundwater dependent resources and the Amargosa River. In addition, vegetation effects should be included as a triggering condition as an independent basis for pumping reduction.

Comment 2a

Mitigation burden of proof is key

In our view if a clear and easily enforceable groundwater level trigger is reached, the Applicant should have the burden of proof to establish that their operations are not the cause of the decline and, if the Applicant cannot meet this burden within a reasonable period time, groundwater pumping should cease.

Comment 3

Compensatory mitigation: purchase of water rights

Both the PSA and the Applicant propose compensatory mitigation for groundwater pumping by employing some (largely undefined) method to offset project water use on a 1:1 ratio. The Amargosa Conservancy supports such compensatory mitigation, but

Comment 4

Comment 4, cont'd

believes that the nature of the obligation as proposed in the PSA and by the Applicant poses significant issues and requires clarification and improvement.

The offset obligation, if framed to require reduction of Pahrump Valley basin water use, should be limited to permanent retirement of active senior water rights with a long and documented history of steady use, located closest to the project site, approved by Nye County and the Nevada State Engineer—and in multiples of the proposed project use. Multiple retirements are necessary for compensation because of the fact that the Pahrump basin is grossly over allocated, so retirement of even senior active rights may well have no positive effect on reducing basin water use, even in the short run. Also, because offsetting rights may likely be available only in the distant northern section of the Pahrump Basin in Nevada, effective mitigation for impacts of project water use on nearby resources also justifies a higher ratio. Accordingly, we suggest at least a 4:1 permanent retirement ratio.

II. Alternatives

The PSA acknowledges that the project will have significant adverse impacts on the environment. Under such circumstances, California law requires that there be an analysis of alternatives to the project that would avoid or substantially reduce the impacts of the project. The alternatives analysis in the PSA is inadequate and should be significantly expanded.

Comment 5

The Final Staff Assessment should analyze alternative sources of water to supply the project in the event that trigger conditions require the cessation or reduction in groundwater pumping. In addition, the Commission should more seriously examine alternative locations such as Sandy Valley and other technologies such as solar PV and distributed generation. Alternative locations would avoid or substantially reduce the necessity to pump groundwater from an over allocated desert basin in which water resources are in secular decline because of pumping beyond sustainable amounts. Solar PV would eliminate the need for two 750 foot-high towers.

III. Cumulative Impacts

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.*)

Comment 6

The proposed natural gas pipeline and transmission line associated with the project are likely to draw and accommodate both additional electrical generation capacity as well as collateral development. The Hidden Hills plant is not only the first development, but it is also the proximate cause of additional economic activity in the Pahrump area that will require significant new water usage. Because the electrical and natural gas transmission lines associated with the project are subject to approval by the BLM and are being addressed in an EIS being prepared by the BLM, the PSA largely defers analysis of the cumulative impacts of the projects to the BLM. In its comment letter on the PSA, the BLM requests that the CEC conduct a more rigorous cumulative impact analysis. The Conservancy agrees with the BLM. The EIS is not currently available; thus, a complete cumulative impact analysis is not available to the CEC or to the public and the cumulative impacts of the project have not been fully assessed as required by law. In the absence of such an analysis, California law requires that the CEC conduct such an analysis and include it in the Final Staff Assessment.

Comment 7

We believe that the CEC is required to take a much more serious look at the potential, long term effects of all of the existing and allocated water rights in the Pahrump Valley basin and of the potential cumulative impacts of groundwater pumping by the project in combination with groundwater pumping by other reasonably foreseeable projects on the Amargosa River and on other groundwater dependent resources. While the PSA has included a short list of current and future projects, the list is not complete, and does not include other forms of water pumping and use (e.g., agricultural pumping).

IV. Cultural and Visual Resources

The HHSEGS plants, if built, will cause unacceptable changes in the character of our rural desert area. The massive 750 foot high towers, mirror fields and generation equipment will industrialize our area but provide little economic benefit for our small local California communities or Inyo County. The viewshed from the Old Spanish Trail Highway will be very substantially altered. The segment of Old Spanish Trail from the Spring Mountains through the Amargosa Canyon, a portion of which is documented to pass through or vary near the HHSEGS site, is one of the least disturbed and intact sections of any historic trail in the US southwest. Mule and wagon traces can still be easily seen, with the vistas yet unchanged and the rigors, solitude and grandeur of the trail imagined. Native American religious, burial and ceremonial sites and practices will be adversely affected. The obtrusiveness of 750 foot night-lighted towers will be ever apparent and will destroy dark sky views.

Comment 8

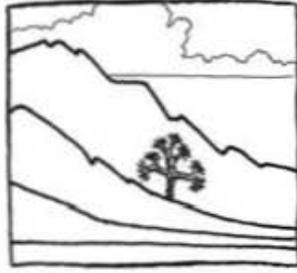
Comment 9

The Final Staff Assessment should more seriously examine alternative locations such as Sandy Valley and other technologies such as solar PV and distributed generation. Alternative locations and distributed generation would avoid the visual and cultural impacts of the project to the Amargosa region and solar PV would eliminate the need for the two 750 foot-high towers.

Comment 10

Respectfully submitted,

Donna Lamm
Executive Director, Amargosa Conservancy



Basin and Range Watch

July 21, 2012,

To: Mike Monosmith
Project Manager
Sitting, Transmission and Environmental Protection (STEP) Division
California Energy Commission
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E-mail: mmonasmi@energy.state.ca.us

Dear Mike,

We would like to submit the following comments for the Preliminary Staff Assessment (PSA) for the California Energy Commission staff's independent analysis of the proposed Hidden Hills Solar Electric Generating System (HHSEGS). CEC-700-2012-003-PSA DOCKET NUMBER 11-AFC-02.

Basin and Range Watch is a group of volunteers who live in the deserts of Nevada and California, working to stop the destruction of our desert homeland. Industrial renewable energy companies are seeking to develop millions of acres of unspoiled habitat in our region. Our goal is to identify the problems of energy sprawl and find solutions that will preserve our natural ecosystems and open spaces.

Alternatives:

The PSA fails to analyze a full range of reasonable alternatives. Missing from the PSA are alternatives that would consider private lands outside of the area.

Comment 1

An off – site alternative should be considered in areas like the Central Valley of California or other disturbed or degraded lands.

Comment 2

The US Environmental Protection Agency has identified over 15 million acres of degraded lands or “brown-fields” in the United States that would be appropriate for large scale renewable energy development. <http://www.sustainablebusiness.com/index.cfm/go/news.display/id/23646>

While siting the project outside of the area may not be financially feasible for BrightSource, many exceptions have been made in both the NEPA and CEQA review process for their Ivanpah project to expedite construction. This favors the goals of the developer, but over-rides the concerns of those of us who oppose these projects.

Comment 3

The CEC fails to analyze the distributed generation alternative which is a win/win energy situation for all of us. The justification is for the convenience of BrightSource. The CEC reviewed the DG alternative for other projects including Ivanpah, Genesis and the now bankrupt but approved Imperial Project.

Comment 4

Distributed generation in the built environment should be given much more full analysis, as it is a completely viable alternative. This project will need just as much dispatchable baseload behind it, and also does not have storage. But environmental costs are negligible with distributed generation, compared with this project. Distributed generation cannot be “done overnight,” but neither can large transmission lines across hundreds of miles from remote central station plants to load centers. Most importantly, distributed generation will not reduce the natural carbon-storing ability of healthy desert ecosystems, will not disturb biological soil crusts, and will not degrade and fragment habitats of protected, sensitive, and rare species.

Alternatives should be looked at that are in load centers, not closest to the project site. There is a need to consider the “macro” picture, the entire state, to look at maximum efficiency.

Comment 5

A master comprehensive plan should exist before large expensive inefficient solar plants are sited and built out in the wildlands. This plan should carefully analyze the recreational and biodiversity resources on public lands. A list of assumptions should be included detailing the plan for integrating various fuels mixes and technologies into each utility's plan, an overall state plan, and a national plan. Loads should be carefully analyzed to determine whether additional capacity is needed for peaking, intermediate, or baseload purposes. Unit size, which impacts capital and operating costs and unit capacity factors, has a direct bearing on the relative economics of one technology over another. A plan might recommend that smaller units built in cities and spaced in time offer a less risky solution than one large unit built immediately.

Comment 6

Right now there is no utility plan, no state plan, and no national plan. Large-scale central station energy projects have been sited very far from load centers out in remote deserts, with the only criterion being nearness to existing transmission lines and natural gas lines. Very little thought has been given to the richness of biological resources, the cumulative impacts on visual scenery to tourists, the proximity to ratepayers, or the level of disturbance of the site.

There will be a need to build many new efficient natural gas peaker or baseload plants to back up the renewable projects planned. Instead, the renewables should be distributed generation in load centers, which will provide much more efficiency, rather than inefficient remote central station plants that reduce biodiversity and require expensive transmission lines. This reduces the risk, as distributed generation is a known technology and has been proven in countries like Germany where incentive programs have been tested. Incentive programs can be designed in an intelligent manner to vastly increase distributed generation. Incentives for large remote projects are unproven to lower risk and may actually raise debt levels with runaway costs associated with poor siting and higher-than-anticipated

Comment 7

operating and maintenance costs. Many renewable project developers have failed to consider reasonable or viable alternatives that could serve as solutions that everybody could live with. In the case of this particular project, conflicts with endangered species, cultural resources, storm water drainage erosion, views from National Parks and wilderness areas could all be avoided with a distributed generation alternative. **Comment 7**

The CEC rejects a smaller project footprint alternative because “The applicant concludes that a smaller plant “would not feasibly accomplish most of the basic objectives of the project and would not avoid or substantially lessen one or more of the significant effects. Furthermore, a smaller plant may result in an inefficient use of the land by failing to fully realize the solar potential of the area.” **Comment 8**

It appears that the CEC rejected this alternative for the benefit of BrightSource. The people who oppose this project are not concerned with the problems of feasibility and solar potential for BrightSource. Alternatives that are not feasible for the applicant should still be considered. If the applicant cannot meet the objectives of these alternatives, it could be a justification for No Action or considering another application. Such alternatives could still be considered for potential future applicants. **Comment 9**

Visual Resources: Even though the project would be built on private lands, the massive horizontal and vertical scale of the project will have three-dimensional cumulative visual resource impacts that could have damage view-sheds over 50 miles away. We agree with the statement on page 4-13-2: “Project impacts, in combination with existing and foreseeable future solar and other development projects within the greater Pahrump Valley, including both California and Nevada, would contribute to a perceived sense of industrialization of the open, undeveloped desert landscape and impact views of scenic resources in the Pahrump Valley viewshed, having the potential to be significant and unavoidable.” **Comment 10**

All of the viewsheds that could be potentially be impacted by HHSEGS should be viewed under BLM Class One VRM standards due to the immense size of the project footprint. Just about every acre of the project has the potential to impact the view from surrounding wilderness and residential areas. BLM VRM analysis are often insufficient to review projects spanning 3 to ten square miles. **Comment 11**

The KOP Visual simulations are incomplete. There are not enough simulations representing upper bajada or mid-elevations from wilderness areas. There are not enough simulations from high elevations from BLM and Forest Service Wilderness Areas. There is no simulation of night lighting. There are no KOP simulations of flash-glare events. There are no KOP simulations of dust plumes that would occur from construction. **Comment 12**

The below photo was taken looking towards the project site from Bonanza Peak, about 9,500 feet up in the Mt. Charleston Wilderness Area, in the Toiyabe National Forest, Nevada. Glare from the towers and the heliostats will be visible from this view. A KOP representing high elevations is needed. **Comment 12**



Flash Glare from heliostats can occur from many different locations at different times of day at different times of year. It will be more likely to occur and be seen from mid-bajada to mountain top locations. We would like to see at least 4 KOP simulations of flash glare from different elevations around the project area.

Comment 13

The below photo is actual flash glare from the Nevada Solar One plant near Boulder City, Nevada. While this is a different technology, it still incorporated the reflective use of sun. Similar events can be expected from the HHSEGS Project.

Comment 14



Comment 15

More KOP simulations should be made of the Stump Spring Area of Critical Environmental Concern (ACEC). Because part of the conservation management objective for this ACEC is to maintain the historic quality of the area for the Old Spanish Trail, we believe the visual impacts will be particularly impossible to mitigate. Not only would the power towers and heliostat flash glare impact the ACEC, but the Valley

Comment 16

Electric Transmission Project will be sited right next to Stump Spring. Efforts to mitigate the visual impacts with planted trees will not be effective because the towers and the powerlines will be very tall. Planted trees will look unnatural and require too much water to maintain. It is not likely that they will all survive. Efforts to mitigate visual impacts by building interpretive signs and a visitor center will also be ineffective. Again, there is no way that these efforts can hide such large industrial visual intrusions. It is a value call by the agencies to determine that a visitor center would somehow offset a visual intrusion. It is not a value that makes sense to us.

Comment 17

Below is a view from Stump Spring looking towards the location of the proposed 550 KV Valley Electric Transmission Line. A KOP simulation of the transmission line should be provided from this view:

**Comments 18a-18g**

We believe the following Key Observation Points should be analyzed and added:

1. More from the 5,000 foot elevations from adjacent wilderness areas such as the Nopah Range Wilderness.
2. KOP simulations from higher elevations from the Spring Mountains National Recreation Area
3. Dark Sky and night lighting KOP simulations
4. More simulations from the Stump Spring Area of Critical Environmental Concern.
5. Multiple simulations depicting flash glare events from different locations.
6. Simulations of worst case scenario dust plumes during construction.
7. There should be one KOP depicting browning or dying vegetation at Stump Spring to simulate the worst case scenario of water draw down and how it may impact the spring. Water draw-down at Stump Spring can be considered a visual impact as well as an ecological impact.

Cultural Resources: We agree with the conclusions in the PSA that the Hidden Hills Project and the proposed Valley Electric Transmission Project will have adverse impacts to the Old Spanish Trail.

Dust from construction, noise from construction, flash glare events from the project, very bright receiver towers, and flashing night time aviation lights will all degrade the remote and historical feel of Stump Spring.

We agree with the following statement in the PSA: "While not all of the traces on the project site have been ground truthed, it is clear that the project site lies squarely among all of these tracks/traces and, therefore, within the OST-MR Northern Corridor, a regionally and nationally significant travel/trade

corridor that aided the exploration and shaped the development of the southwestern United States. Although not formally included in the Act, staff has concluded that these tracks/traces should also be considered part of the Old Spanish National Historic Trail. As such the Corridor is a historical resource for the purposes of the CA Environmental Quality Act and potential impacts resulting from the proposed project must be evaluated. The proposed project has the potential to significantly impact the OST-MR Northern Corridor by erasing traces/trails on site and visually impacting traces/tracks off site, which could jeopardize the integrity of the OST-MR segment in the Pahrump Valley." (quoted from pp. 70-71)

The CEC is recommending the following mitigation measures for damage to cultural landscapes:

"CUL-9 calls for the project owner to fund and contract for a study by OSTA of the OST-MR Northern Corridor. CUL-9 details steps that must be included in the study."

" CUL-10 calls for the project owner to construct and maintain an Interpretive Center, with parking, and interpretive panels highlighting the visual and cultural resources that will be adversely impacted by the HHSEGS project. Again, CUL-10 details steps and features that must be included in the interpretive center."

Comment 19

These are value judgments by the CEC. We do not think that funding a study will do much of anything to offset the intrusions to the experience that large power towers and transmission lines would have on the visitor to Stump Spring or the Old Spanish Trail in general. It's almost as if you are telling us that we would feel better looking at these intrusions knowing that BrightSource is funding a study. That is a far stretch for mitigation.

Even more ridiculous is the idea that a visitor center with a lot of parking spaces would somehow off set the impacts to the Old Spanish Trail. If anything, a new visitor center will add a modern looking component to the Old Spanish Trail and the presence of more big bulldozers and dust plumes is exactly what we are trying to avoid out there.

Comment 20

The impacts to the Old Spanish Trail and Stump Spring should be reason enough for the CEC to choose either the No Action Alternative or look at an alternative for a different location or a different technology.

Socio-Economics: Large energy projects like this tend create a boom and bust effect on small economies. In the case of the Hidden Hills Project, BrightSource is proposing to place intrusive industry right next to a small residential community and close to the communities of Sandy Valley and Pahrump. Initially, the economy would boom to a point during construction, but after construction, a limited amount of full time jobs would be created and any future potential for a housing community or increased tourism has been sacrificed for one company. Placing an unsightly industrial complex on the Old Spanish Trail Highway will tend to drive people away from places like Tecopa and the businesses there. The community of Pahrump originally was quite supportive of the Hidden Hills Project until they realized that BrightSource is more committed to employing Union workers from the State of California. Like their Ivanpah Project right next to the Nevada border, they are closer to a workforce in Nevada, but are having people travel a long way from California to satisfy the commitment to California unions. The state of Nevada gets a small economic benefit from all of this. Only about ten percent of the workers come from Nevada.

Comment 21

Inyo County, California has been concerned about having to flip the bill for emergency response to fires, medical, etc. and they do not have the resources to pay for all emergency services. These BrightSource projects have never been tested at the large scale they are being built. The Ivanpah Project has been reconfigured a few times. The site has been flash flooded and the company wants to change the design to burn more natural gas.

Comment 22

As residents and tax payers of Nye County just over the state line, we are concerned that our county will be financially burdened with dealing with any potential emergencies that come up for this project. We do not want to have to flip the bill for the consequences of a poorly planned and expedited review for this project. The CEC did not give the public nearly enough time to adequately review the 1,159 page PSA. We would like to once again ask the CEC to slow things down, give us another two to five years to review this project before you make a decision that we will all be sorry for. Please resist the temptation to "Over-Ride" all of the issues that cannot be mitigated. We are very concerned about the way the CEC gives very thorough review to these projects and as in the case of the Imperial Project (and several others), implemented "Over-Rides" to all of the issues they could not come up with mitigation solutions for. In the case of the Imperial Project, that was about 90 percent of the issues.

Comment 22a

Biological Resources:

The PSA does a thorough job of analyzing the impacts that the HHSEGS Project would have on biological resources. We would like to emphasize our concerns in the comments below:

The CEC has determined that the Stump Spring Area of Critical Environmental Concern could be in danger of water draw down from efforts by BrightSource to control dust, wash heliostats, and cooling turbines. Stump Spring has already been impacted by water over-draft in the basin. Water draw down has impacted the spring to the point where surface water is now only confined to 3 seasonal pools, but there is still an abundance of riparian habitat that supports much of the wildlife in the region. The potential removal of this spring could have unrivaled consequences to the biological diversity in the region.

The close proximity of the HHSEGS Project to Stump Spring makes the region's wildlife particularly susceptible to the solar flux treat. Stump Spring provides a very important habitat for the region's avian fauna.

Mesquite is abundant and provides ample wildlife habitat. The PSA states that the mesquite in the area predate the sand dunes. Because it is difficult for mesquite seeds to germinate in sand, Stump Springs may be a unique, relic population of mesquite which would make it even more vulnerable to water draw down.

Comment 23

Stump Spring will likely see impacts from invasive weeds that will spread as a result of the industrial removal of 3,300 acres of habitat.

Avian Fauna: The PSA provides a list of bird species that were observed during the surveys. The PSA also provides a list of rare and sensitive birds that may occur at the spring.

Comment 24

We would like to add these photos of a juvenile Swainson's hawk (*Buteo swainsoni*) that we observed at the spring in June of 2012. The Swainson's hawk is a California Department of Fish and Game Threatened Species and a Species of Special Concern with the Fish and Wildlife Service.

Comment 25



Comment 26

Solar Flux: The solar flux issue is documented from the old Daggett Power Tower (now taken down). The issue of avian fauna getting injured or burned to death from power tower solar flux is not close to being resolved. This is primarily because the largest power tower in operation is in Spain and is not much taller than 150 feet. The only official study that we are aware of is the paper AVIAN MORTALITY AT A SOLAR ENERGY POWER PLANT, by Michael D. McCrary, Robert L. McKernan, Ralph W. Schreiber, William D. Wagner, and Terry C. Sciarrotta, *Journal of Field Ornithology*, 57(2): 135-141, found that Solar 1 during 40 weeks of study, caused 70 bird fatalities involving 26 species, most from collisions with both heliostats and tower, but thirteen (19%) birds (of 7 species) **died from burning in the standby point.** Heavily singed flight and contour feathers indicated that the birds burned to death. Six (46%) of these

fatalities involved aerial foragers (swifts and swallows) which are apparently more susceptible to this form of mortality because of their feeding behavior.

Comment 27

Other than a study being conducted for the 100 foot BrightSource power tower in Israel, there is very little data out there other than the fact that we expect this to be a big problem with avian mortality. The solar flux issue came up in extended debate during the Ivanpah Solar Electric Generating System proceedings. At the time (and this still stands because Ivanpah has not been activated yet), there was no resolution for the solar flux issue in Ivanpah Valley. Even though Clark Mountain is a sky island and is known to have a series of rare birds that migrate and utilize the white fir forest close to the summit, the project was approved with no adequate mitigation to prevent solar flux from killing the birds. The HHSEGS project may have an identical issue with birds using the relic white fir forest located on Kingston Peak within view of the HHSEGS project. Many may be the same birds that use the Clark Mountain Sky Island.

The PSA also fails to analyze the full impacts that flux could have on many individual species. The burrowing owl does not glide, but can fly to very high elevations. While it is more likely for a turkey vulture or a golden eagle to be injured or killed by flux, species like the burrowing owl are still at risk.

Comment 28

The Altamont Pass Wind Farm is estimated to kill 100 burrowing owls (*Athene cunicularia hypugaea*) per year. Of course, a wind turbine and a solar receiver tower with heliostats are two different things, but many feel that solar flux may be more dangerous to birds than wind turbines.

Comment 29

We would like to request a study on which birds would and could be impacted by flux. The PSA should list flux as a risk to the burrowing owl.

Here is the link for the Altamont Pass wind farm burrowing owl kill numbers:

https://www.biologicaldiversity.org/campaigns/protecting_birds_of_prey_at_altamont_pass/pdfs/Burrowing_Owl_Fatalities_APWRA.pdf

The three towers at Ivanpah are 450 feet tall and nobody has any clue as to how many birds will be killed by flux. The HHSEGS Project towers will be over 700 feet tall and it appears that the agencies are ready to approve this before they even know the scope of risk that would be caused by flux.

Comment 30

We would like to request that the solar flux issue be studied in Ivanpah Valley after the BrightSource plant is activated. This study should go on for 3 years before approval of the HHSEGS Project is even considered. You simply do not have enough data and information to convince us that the HHSEGS Project will not cause a permanent reduction of the avian fauna in the region.

Golden Eagle (*Aquila chrysaetos*):

Comment 31

The HHSEGS Project will remove 3,200 acres of foraging habitat for golden eagles and eagles stand a good chance of getting killed by the solar flux problem. The project area has been known as a golden eagle hot spot for some time now. Surveys uncovered 19 golden eagle nests within ten miles of the project site. As it stands now, Take permits are very difficult to issue under the Bald and Golden Eagle Protection Act. Attempts to issue the first Take permit for eagles for the West Butte Wind Farm in Oregon are currently under litigation.

At this point, we see no ideas for mitigating or preventing golden eagle kills with the solar flux issue.

Comment 32

Desert Bighorn Sheep (*Ovis canadensis nelsoni*):

Part of a carcass of a bighorn sheep was found on the project site years ago; Bighorn sheep do not "accidentally" use habitat, sheep have reasons for occupying an area and the Hidden Hills project site may be connectivity habitat between the Spring Range, the Kingston Range, and the Nopah Range. This occurrence should not be looked at as an anomaly, but as part of the normal range of the bighorn sheep here. These metapopulations need to maintain connectivity for genetic health, and landscape-level obstacles and barriers will hinder movement across valleys and alluvial valley sides. No mitigation can replace this function of habitat and regional geographic movement corridors. Some lower areas, fans, and valley floors are only used on rainy years when vegetation provides forage, making these habitats even more important to protect. Wherever an animal is found is its habitat.

The goal of conservation biology is not to protect individual animals, but to protect populations in a landscape, as well as the ecological processes that occur at the landscape level. This must include all habitat areas including those with irregular use such as valley floors.

Comment 33

In order to understand and possibly be able to mitigate bighorn movement corridors in the area that may be impacted by the project, a study and monitoring plan should be undertaken. This plan should seek to understand population connectivity in this landscape, and could use such methods as least-cost modeling of dispersal costs for each habitat type in Pahrump Valley and surrounding mountain ranges, and dispersal paths between metapopulations based on genetic studies and expert opinions. The plan should include a GIS map of migration rates for bighorn sheep and connectivity models. After this modeling has been completed and a reasonable hypothesis of gene flow predicted for the area, a conservation strategy can then be developed for the bighorn in the local area (see Optimizing dispersal and corridor models using landscape genetics. 2007. Epps, C. W., Wehausen, J. D., Bleich, V. C., Torres, S. G. and Brashares, J. S. *Journal of Applied Ecology* 44: 714–724).

Kit fox (*Vulpes macrotis*) and American badger (*Taxidea taxus*):

Comment 34

Because of the growing outbreak of canine distemper in Desert kit foxes along the I-10 corridor in Riverside County, possibly associated with passive relocation and hazing of the kit foxes from their home territories on large-scale solar project construction areas and associated transmission lines, we request the applicant be responsible for a Regional Kit Fox Monitoring Plan in the Pahrump Valley. There is a possibility the disease could spread to Inyo County, or a new outbreak occur, and monitoring must be undertaken to ensure the Desert kit fox does not decline in population.

Because of the potential declines observed over much of the range of the kit fox (see Meaney et al. 2006) the kit fox should be treated as a potential sensitive species or species of special concern. It is a fully protected fur-bearing mammal in California Department of Fish and Game code.

Comment 35

The applicant should be required to test for canine distemper in kit foxes impacted directly and indirectly by the project. Fenced areas should be monitored for any kit foxes climbing back into active construction areas. Surveys should be undertaken to count how many kit foxes are in the area and ten-mile buffer zone around the project, to set a baseline for an ongoing monitoring program. Fencing to exclude kit foxes should be described. Hazing techniques should be explained in full detail for public review. A plan to address any distemper outbreak should be formulated. A plan for contacting California Department of Fish and Game and a veterinarian should be in place. A monitoring plan should be ongoing for five years after construction.

The American badger should also be included in a monitoring plan, in addition to kit fox.

Reference:

Meaney, C.A., M. Reed-Eckert, and G.P. Beauvais. (2006, August 21). Kit Fox (*Vulpes macrotis*): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/kitfox.pdf> [date of access].

Desert Tortoise: (*Gopherus agassizii*)

Comment 36

We request that mitigation ratios for shadscale scrub habitat on the project site be mitigated at a 3:1 ratio when purchasing compensatory habitat, similar to the ratio proposed for Mojave Desert creosote scrub. Although sometimes thought of as "lower quality" habitat, the shadscale scrub we examined near the project site appeared to be very good Desert tortoise habitat, with many active tortoise burrows among the shadscale. Basing habitat occupancy estimates by merely looking at maps or models should not replace on-the-ground surveys for sign and animals. We believe the shadscale scrub habitat in this area is high quality tortoise habitat and should be mitigated at a higher ratio than 1:1.

Below is a photo of an active desert tortoise burrow that we found in shadscale scrub habitat adjacent to the site:



Comment 37

Tortoise Relocation: At the workshop in Bishop, California, BrightSource stated that they wanted to move the tortoises to a small strip of land near the Nevada border. They would put them on the California side in order to avoid regulations that prohibit moving tortoises from state to state. BrightSource is going to request that state agencies change the rules for this project. We understand that BrightSource feels that this is the best habitat to move the tortoise to, but we also feel that state regulations can be useful tools in conservation. We are concerned that any changes to state law would set a precedent and overall weaken conservation laws. We are worried that these rule changes could be used for other big utility scale solar and wind projects.

The HHSEGS Project will cut off and remove 3,200 acres of desert tortoise habitat. The massive footprint will not only destroy habitat, but also block connectivity corridors. According to the PSA, as many as 33 adults, 34 juveniles and 158 eggs could be on the site. This indicates a healthy, functioning population.

Complications from relocation could lead to respiratory disease outbreaks and predation. BrightSource has already removed and compromised a good functioning desert tortoise population in Ivanpah Valley. The CEC should think twice before permitting removal of yet another 3,200 acres of habitat.

Rare Plants:

Below is the list of rare plants we have that could occur on the site and in the area. Some are in the PSA, some are not:

Aliciella humillima (medium – soon to be listed by CNPS)

Aliciella triodon (medium)

Arctomecon merriamii (medium)

Asclepias nyctaginifolia (low)

Astragalus geyeri var. *geyeri* (low)

Astragalus mohavensis var. *hemigyus* (low)

Astragalus nyensis (low)

Astragalus preussii var. *preussii* (likely)

Astragalus sabulonum (known)

Astragalus tidestromii (high)

Atriplex longitrichoma (high)

Bouteloua trifida (low)

Camissonia boothii ssp *alyssoides* (low)

Camissonia boothii ssp *boothii* (low)

Chaetadelpa wheeleri (low)

Chamaesyce parryi (medium)

Cryptantha costata (medium)

Cryptantha insolita (low)

Coryphantha chlorantha (low)
Cordylanthus parviflorus (medium)
Cymopterus gilmanii (medium)
Cymopterus multinervatus (low)
Enceliopsis covillei (low)
Enceliopsis nudicaulis var. *corrugata* (low)
Eriogonum bifurcatum (high)
Eriogonum contiguum (medium)
Eriogonum hoffmannii var. *robustius* (low but habitat present)
Gilmania luteola (low)
Iva acerosa (low)
Loeseliastrum depressum (low)
Mentzelia leucophylla (low but habitat present)
Mentzelia polita (medium)
Mortonia utahensis (low)
Oenothera cavernae (low)
Pediomelum castoreum (medium)
Penstemon bicolor ssp. *bicolor* (low)
Penstemon bicolor ssp. *roseus* (low)
Penstemon fruticiformis ssp. *amargosae* (low)
Penstemon stephensii (low)
Penstemon utahensis (low)
Perityle intricata (low)
Petalonyx thurberi ssp. *gilmanii* (low)
Phacelia coerulea (low but habitat present)

Phacelia filiae (low)

Phacelia parishii (medium)

Phacelia pulchella var. *gooddingii* (known)

Physalis lobata (medium)

Polygala heterorhyncha (low)

Sclerocactus johnstonii (medium)

Sibara deserti (low)

Sphaeralcea rusbyi var. *eremicola* (high)

Stipa arida (low)

Tripterocalyx micranthus (low)

Water:

Stump Springs to the east of the project is a valuable resource, and the wells of local residents in Charleston Heights are also an issue that need protection. Groundwater declines from project pumping should be limited to close to zero at the springs. The applicant did a well pump test at the request of the California Energy Commission to learn more about the aquifer in the area, but the interpretations of the data were widely divergent between the applicant and the Energy Commission hydrologists.

There was disagreement about the characterization of the groundwater basin at a June 14, 2012 workshop in Pahrump. The CEC hydrologist said the data fit a fully confined aquifer characterization better. They believed drawdown could reach Stump Springs at 30 years, and could even be several feet of lowering. There is still enough uncertainty. As for leakance, the hydrologist said not enough data was collected for a long period, there could be temporary leakance. The recharge must be looked at not locally but for the whole aquifer, and all evidence indicated the Pahrump Valley aquifer was not recharging.

Storage is extremely low other tests showed. There may be confining units such as clay beds at Stump Springs, that a drawdown could impact. The Energy Commission hydrologist said the applicant needed to reach out much farther in their analysis, and we agree. A gradient in a confined system is not a source of recharge.

Comment 38

CEC wanted the applicant to have 3 monitoring wells outside the project in a line with the proposed project wells, all at 1,000 feet deep, and we recommend this as well. Two upstream from the project and one downstream. Triggers should be required as new mitigation, such as sending out biologists to monitor how the deep-rooted mesquite at Stump Spring react, and if they appear to be adversely affected. CEC said if they see a half-foot drop in water at the project boundary, then the assumption could be made that pumping might be affecting Stump Spring.

We agree with the CEC that groundwater pumping by the project would need mitigation. Mitigation Measures Water Supply 1, 6, 7, and 8 to offset impacts to overdraft in the basin and potential impacts to

Comment 39

local well owners and nearby springs are needed. We also recommend, in contrast with CEC, that there might be potential impacts to the Amargosa River drainage from unstudied connections with the Pahrump Valley aquifer; mitigation measures should be enacted.

Comment 40

A Water Supply Plan showing how the applicant will replace 163 AFY per year as a condition of certification in Water Supply-1 should be completed before approval and certification of the project so that the public can review this important plan. How do we know there are even enough private wells and water rights to purchase and retire?

Comment 41

Similarly, a Groundwater Level Monitoring, Mitigation, and Reporting Plan (Water Supply-6) should be prepared now, before certification, so that the public -- and especially local residents -- can review the plan. There is a lot of deferred mitigation in this review. If project pumping lowers residents' well levels by 1.5 feet then the applicant should reimburse the well owners. We believe ten feet lowering is too much and damage may already be done to resident's ability to have a reliable water supply.

Comment 42

Saying that the applicant will simply reimburse local well owners if their well goes dry to dig a deeper well, is not acceptable. There may come a point when no depth can be reached to water, so extreme is overdraft. The project should be not be approved if this is a possibility.

The Amargosa Conservancy pointed out that their pump tests in cooperation with US Geological Survey in the Amargosa Valley showed surprising results. Some areas that were supposed to have water did not. Past Yucca Mountain Nuclear Repository testing, which was very extensive in Amargosa Valley, showed a complex picture of drilling hitting carbonate rocks at 200 feet and in other areas 2,000 feet -- there are buried mountain ranges under the valley sediments, it is not just a big fill basin. The Conservancy said the applicant's pump test was inadequate. They want more monitoring wells farther out, towards California where unknown and potential connections with Amargosa Valley could be present. We support this recommendation, as more needs to be studied about the complex hydrology of the region before more drawdown is allowed. A regional groundwater map should be made, and more well testing should be undertaken before approval of this project.

Comment 43

Impacts to Local Communities:

We see this all of the time. A big energy developer (usually subsidized) comes to a small community, promises everyone a job and offers to buy the town something like a community center. The projects are usually built right next to people's homes (as in the case of Charleston View). Most of the people have trouble selling their property and do not have the resources or finances to move. Their quality of life goes downhill while the developer makes money and usually does not share that with anybody. It is a dead end for these people.

Comment 44

The Cumulative Scenario:

On the one hand, BrightSource promises the most minimum impacts from the HHSEGS Project. On the other hand, BrightSource has publically stated that they would like to build up to three more of these massive projects in the same region! That would multiply their water use for HHSGS by 4. It would multiply their removal of habitat for biological resources by 4. All of the people living in the area would be forced to look at these developments from many different perspectives. Any attempts to turn the whole area into a solar energy farm will likely be met with bitter opposition. It is quite unfortunate that

politicians and energy developers like BrightSource have chosen the most environmentally unfriendly way to use solar energy. Please visit the following link for the right way: www.solardoneright.org.

Conclusion: The CEC should not permit the HHS GS Project to go forward. There are simply too many impacts that cannot be mitigated. At the very least, the CEC should delay approval of this project for at least another 5 years so more studies can be conducted concerning hydrologic, biological, cultural, visual and socioeconomic resources can be better evaluated. It does not work to “approve now, mitigate later”. The agencies tried that and it has failed miserably.

Comment 45

Thank you,

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Hidden Hills Solar Electric Generating System, 11-AFC-2

Preliminary Staff Assessment

General Comments

by: the Pahrump Paiute Tribe

California Energy Commission

DOCKETED

11-AFC-2

TN # 66323

JUL 25 2012

In the history told by the dominant culture in the United States, Europeans “discovered” a vast, unexplored continent unknown to any before them and “claimed” it in the name of their countries. They went on to “civilize” the land and the ignorant peoples they encountered, eventually creating a venerable democratic government that provided for “freedom” in religion, speech, and other personal rights. They created a military to protect the civilized people from invaders, and now, as in most governmental systems, people are taught to honor and revere both the government and the military.

In Native history, in the reality that is *our* past and *our* present, Europeans were the invaders. They took over lands that were already occupied by established functioning governments. They blatantly stole land that was already tended by peoples who co-existed with the land. The Europeans eventually killed between 80 to 95 percent of the Native peoples on the continent, primarily from intentionally introduced diseases to which the Native Americans had no resistance. With the goal of either eliminating or suppressing resistance achieved, the Europeans then began possessing, bargaining with, and using the land for monetary gain rather than sustenance and survival. The European advance into what is now the United States stripped away virtually all rights of the Native Americans, and continued to do so throughout history through broken treaties and empty promises. And now, as American citizens, we are expected to proudly honor and revere both the dominant government and military installations.

The problem with this expectation is that the dominant culture and the government associated with the dominant culture have never stopped in their attempts to “civilize” the Native Americans. They have never stopped stripping away the rights of peoples who have a government and a culture and a lifestyle that is different from theirs. They have never stopped believing that their claims to the land override the responsibility that the Creator gave Native Americans to watch over the land and all that is in it, and that their plans and uses for the land override our historical and current use of the land. This has been proven to our tribe time and again as the town of Pahrump and the surrounding areas have been settled and have grown far past the point of balance with nature. Large areas of our ancestral lands have been taken over, physical evidence of our history has been stolen and placed in facilities for the dominant culture to enjoy, our tribal encampments have been stolen, our tribal members have been forcibly removed from their homes, and our burial grounds have been taken over by those who moved here and have since been turned into an all-purpose graveyard.

The dominant government has put into place a number of legal “safeguards” that are supposed to provide for the protection of Native artifacts and other objects or areas of spiritual or religious

significance. In most cases, however, these safeguards are interpreted based solely on physical manifestations of Native American presence, such as artifacts or burials. The fact that the religious and spiritual existence of the Native Americans is both intertwined and inseparable from the land and its resources is largely ignored by the dominant culture in favor of personal wishes and monetary pursuits. The language used in the Cultural Resources Policy of Inyo County's General Plan is evidence of this: "Preserve and protect key resources that have contributed to the social...history and prehistory of the area, *unless overriding circumstances are warranted.*"

Our tribe is once again in a position in which perceived "overriding circumstances" may be a factor. The California Energy Commission will have before them a decision whereby they determine whether the greater good achieved by a solar facility is more important than the spiritual and natural relevance of Pahrump Paiute ancestral territory. We disagree with the concept that this "greater good" is more important. First, it is not the responsibility of the Pahrump Paiute to shoulder the burden of those that moved into our territory and did not pay attention to the teachings about resource management that are automatically embedded in Native life. Instead, they have chosen to overpopulate, requiring more food, more oil, more land, more energy – more, more, more. The solution to this need for more resources is simple: control the growth of the population enough so that the available resources become sufficient. Second, if the need for energy were the sole factor driving the potential construction of this facility, other alternatives could be devised whereby current urban development could be utilized. It is not solely the need for energy driving the project, however; it is primarily the desire for profit. Thus, other alternatives are counterproductive. So, as illustrated before, the approval of this project would simply become one more way in which tribal ancestral lands have been acquired and developed in the name of the dollar.

Obviously, we support the denial of the project. We concur with the finding on page 61 of the PSA that there is no action that would "directly avoid or substantially minimize the significant effects that the proposed project would have on the three ethnographic landscapes and associated Native American practices." Since we are ultimately not the deciding vote, however, our tribe has reviewed the proposed compensatory mitigation in the event that the project is approved. Specific comments regarding PSA mitigations will follow in a separate document.

Hidden Hills Solar Electric Generating System, 11-AFC-2

Preliminary Staff Assessment

Specific Comments

by: the Pahrump Paiute Tribe

- 1) CUL-10 to CUL-12: The applicant would like to place a solar plant on over 3,000 acres of Pahrump Paiute ancestral land, which would cause significant impacts to the visual landscape, the wildlife in the area, nearby Native American cultural sites that would likely be disturbed or destroyed through cumulative-impact population growth, and the area's water and water-related biology. This land falls within the path of the Salt Song, a religious trail the deceased of the Southern Paiute (including the Pahrump Paiute) follow to the afterlife. If this path is broken, the spirits of our deceased may not make it to the appropriate place in the afterlife. In exchange for negatively impacting all of the above, the PSA proposes that appropriate compensatory mitigation would be a few panels at an Interpretive Center addressing Native American history and land use, research of an area of historical tribal land use, and restoration of the project site in the event of closure. While our tribe feels these mitigations are proposed in good faith, we do not feel their level of compensation is commensurate with the level of impact this project will have. We ask that Staff consider some of the further comments below.

Comment 1

Comment 2

Comment 3

- 2) Our tribe has made, and is making, our best effort to engage in effective communication with CEC, the lead agency for the project. CEC Staff have made themselves readily available to us in order to assist us in navigating the path to the FSA. However, the reality of our tribe is that we do not have a staff. The majority of us have day jobs that do not allow us to contribute the amount of time necessary to thoroughly and successfully address all the aspects this project encompasses. If this project is approved, the mitigations will take on lives of its own. CEC Staff will move on to new projects and cannot be expected to have the resources to continue helping us on the many points with which we will need assistance. We do not have the knowledge to navigate this process alone, and we do not have the financial resources necessary to hire someone who does know how to navigate the process. The applicant, on the other hand, has ample legal representation. Since we would not otherwise have had need for legal services, we find it appropriate that the applicant pay for a lawyer of our choosing to represent and advise the Pahrump Paiute in all dealings that relate to this project and the mitigations associated with this project for the life of the project so that we are able to meet the applicant on equal ground.

Comment 4

- 3) Salt Song Landscape pgs. 57-59: We agree with the information on page 59 written under this section regarding the inability to substitute or replace the Salt Song Landscape and the inability to modify the process by which we deliver our deceased to the afterlife. We are also, along with CEC Staff, unaware of means by which one could reduce the impact of building in this area to a

less than significant level or even a means by which our tribe, and all the other Southern Paiute whose deceased would be affected by the project, could be compensated. On this basis, we continue to advocate for denial of the project.

Comment 5

- 4) In the event the project is approved, based on cumulative impacts to the three landscapes identified in the PSA (pg 53), we would like to propose that lands, identified in conjunction with the Pahrump Paiute tribe, including, but not limited to, lands having religious, cultural, or spiritual value, and of equal size to the project, be acquired for the Tribe, in perpetuity, as we anticipate this project will be profitable and will extend past the original lease. We propose this on the basis that over 3,000 acres of tribal ancestral land and all associated uses are being eliminated, and on the basis that our rights to watch over and protect the land as the Creator tasked us to do are being violated by the construction of this project. We wish to fulfill our promise to the Creator, and if we fail in this endeavor by being forced to accept the approval of this project, we feel it is appropriate compensation to exchange land that we were not able to watch over for land that we are able to protect by putting it into our hands.

Comment 6

- 5) CUL-10: We have not had the opportunity to review mitigations in other portions of the PSA outside of the Cultural Resources section (see #2 above). As such, we are unaware if this request conflicts with VIS Conditions of Certification. However, if it does not, we would like to request that "Interpretive Center" be adjusted to read "Interpretive Building," or otherwise incorporate the word "building" into the Condition of Certification. As the Condition reads now, it seems as though the Condition could be fulfilled by panels on a stake. In the event of the project's approval, our tribe feels that wayside information panels would not be an appropriate exchange for the loss of land, habitat, gathering grounds, and educational opportunities caused by the project's existence. We also wish to request that the Condition include "interpretive panels and exhibits" in its language. An appropriate educational facility, for Natives and non-Natives alike, will include interactive exhibits. In addition, if the presence of a federal curator would qualify the interpretive facility to curate artifacts according to federal requirements, our tribe would like to request that a federal curator be employed at the interpretive facility for the life of the facility.
- 6) Verifications of some conditions of certification require the applicant to notify particular parties of interest when the verification has been completed (for example, CUL-10). When the PSA references the location of the proposed Interpretive Center, the verifications require notification of Inyo County. We believe it is preliminary to assume the Interpretive Center will be located in Inyo County and still be able to fulfill all conditions of certification. We request this language be replaced with "the county of locale" or equivalent.
- 7) CUL-10, Verification 2: We request that Native American tribal representatives be added (as in Verification 1) to the list of those who shall be notified that the site is ready for inspection.

Comment 7

8) Though we have not had the time and resources to read through the conditions of certification for biology or water (see #2 above), we wish to reiterate that the appropriation and development of tribal ancestral lands has occurred repeatedly throughout history. A direct effect of development is the relocation of wildlife from their native territory. When the next development occurs, the wildlife is moved again – then again – then again. This has occurred repeatedly over the course of development in the Pahrump Valley. Animals do not always

adjust to new territory and sometimes die. Animals die in the process of development. Another

effect to development is water usage, as illustrated by the lack of springs that once existed in

Comment 8

the Pahrump Valley. When you eventually consider the cumulative impacts of past, present, and proposed development, the impact is significant. The plants, wildlife, and water are highly important to our culture and our tribe would like to be involved in management plans or mitigations regarding plants, wildlife, and water.

Comment 9

9) CUL-6, Paragraph 3: We would like to be part of the decision regarding who serves as Native American monitors. While we currently receive preference as a monitor as the only Native Americans with traditional ties to the area, if no or too few Pahrump Paiute are qualified or available to serve as monitors, we would like input as to what tribe then has preference.

Comment 10

PAHRUMP PAIUTE TRIBE

Mr. Mike Monasmith, Project Manager
State of California
California Energy Commission
1516 Ninth Street,
Sacramento, CA

RE: Preliminary Staff Assessment for the
Proposed Hidden Hills Solar Electric Generating System Project

Dear Mr. Monasmith:

In addition to the multiple comments expressed you have received about Preliminary Staff Assessment (PSA) for the Hidden Hills Solar Electric Generating System (HHSEGS) at the June 27, 2012 in Bishop, CA, I am writing to amplify our concerns relating to specific items contained within and/or omitted from the PSA. While my focus is on the PSA, you will note that I refer to certain elements identified in the ethnographic study, as a foundation.

As you have heard and we have shared during multiple public workshops and other forums, the Pahrump Paiute Tribe is concerned with the PSAs failure to discuss and/or consider certain items, which we believe are critical in the CEC's deliberations.

Based upon our review of the PSA, the document does not appear to thoroughly evaluate many of the cultural concerns we consider essential for the perpetuation of our culture. One contributing factor at the forefront of these concerns is the manner in which the ethnographic information was collected through an approved informed consent process. This agreed upon process provides for the reassurance that culturally sensitive information would be protected and kept confidential. We fully support the opportunity to redact culturally sensitive prior to posting on the CEC web site for the public to gain a glimpse into our culture and concerns.

Comment 1

Secondly, the PSA fails to address American Indian Environmental Justice issues relating to the citing of the proposed project within our traditional homelands and within culturally sensitive areas. The traditional stories of the Southern Paiutes passed down for generations, describes our place of creation or origin, which emanates from the Spring Mountains. The Pahrump Valley is considered our traditional holy lands and is known to possess the greatest of spiritual and physical resources within our cultural landscape. Traditional ceremonies that are conducted occur in the southern portion of the Pahrump Valley and incorporate the Hidden Hills area. According to tradition, these ceremonies must be done with the intention of spiritually assisting Southern Paiutes throughout Southern Nevada, Utah, Northern Arizona and Southern California. These culturally and linguistically

connected groups share these same perspectives and rely on our important resources for our mutual cultural survival. Violations to this holy land will be perpetuated by the impact from the proposed HHSEGS to the Southern Paiute cultural landscape and most directly in holy lands specifically the proposed Project Area of Analysis (PAA).

The Hidden Hills area is central to the lives of our people and is near our Creation place in the Spring Mountains. The Pahrump Paiute considers the disregard for our holy lands as constituting both Environmental Justice and equity violations. No other people have had their holy lands impacted by these types of projects causing perceived environmental and/or cultural pollution or damage. There is no question that Southern Paiutes from Nevada, Utah, Arizona and California will continue to lose cultural traditions attributed to the siting of this inappropriate project. Accordingly, the HHSEGS will forever alter and obstruct the visual, auditory and spiritual connection to the resources integral to important cultural ceremonies essential to our existence.

Comment 2

Comment 3

It is our contention the denial of access where certain ceremonies occurred resulting to from this project, notwithstanding the collection of traditional use plants and animals needed for our cultural survival is not thoroughly understood nor conveyed in the PSA. These particular issues are deep-rooted and steeped in our rich cultural traditions that are an integral part of proprietary songs and ceremonies. It is our position that if consideration is given to releasing vetted ethnographic information, a broader understanding about the complex issues relating to our cultural traditions will be better understood.

Comment 4

The lives and health of the Pahrump Paiutes who have occupied this area since our creation have been seriously threatened by the continuous expansion of projects that adversely impact our culture. This threat is not limited to Indian people who live in the immediate vicinity to the HHSEGS and use its resources on a regular basis, but extends to other Southern Paiutes who share resources that have been collecting and using area in or near the proposed PAA. As such, Southern Paiutes fear the continuous invisible peril of auditory, visual, cultural and spiritual contamination of our resources and its cumulative effects on future generations of Indian people. We continue to experience health effects from other energy projects and encounter the perceived risks from impacts to cultural resources needed for survival.

Comment 5

One of the most detrimental consequences of the HHSEGS for the survival of American Indian culture, religion, and society has been the denial of access to their traditional lands and resources. Losses of access to traditional foodstuffs medicine and other important resources have greatly contributed to the undermining the cultural well being of Indian people. Our people will continue to experience breakdowns in the process of cultural transmission due to the lack of access to the Hidden Hills area and the resources within. Although mitigative measures may be suggested by the project proponent and considered by the CEC, allowing our access to the area with impacts derived from the proposed land disturbance, as being with irreparable contamination compounded by the disturbance of the soil and

Comment 6

Comment 6, cont'd

underground water that ultimately renders these locations unusable. Any impacts to the hydrology and other important resources associated with the HHSEGS will elevate the risks of us maintaining cultural and ecological balance within and adjacent to the proposed Project Area and most importantly, to our cultural landscape.

It is well known among our people that within the PAA are an inordinate amount of cultural and archaeological resources that are more than merely remnants of the past. These resources are still used by our people and needed for our cultural survival. Any impact to these resources must be thoroughly and systematically evaluated and protected for future generations. As such, the area within or surrounding the proposed project should be designated as an Archaeological Landscape.

Comment 7

Further, the CEC must identify efforts to insure cultural conservation easements to include threatened and endangered plant and animal species are designated for the proper management by Southern Paiutes. Our people are tied to the land and resources. When speaking at the June 27th meeting, I provided a short overview of our epistemology relating to the Desert Tortoise. This important "relative" is highly revered and is known to bring good luck, protection to the people environment and the area, it brings one good luck and most importantly, allows one to live a long life. These attributes must not be forgotten and can disrupt the natural balance of the area. The Bighorn Sheep that are known to exist in the area is considered our teacher who brings our songs, stories and knowledge that is vitally needed. Clearly, the approach of keeping these animals and preserving the areas where they were traditionally placed will insure proper protection of the area and the continuity of our culture.

Comment 8

Lastly, as you are aware, the HHSEGS is being proposed near the St. Therese Mission now currently under construction. It is important to note, the Pahrump Paiute Tribe does not have any affiliation with this undertaking or plans to become aligned with this particular income generating private venture. Any consideration by the project proponent to suggest or the CEC to consider an agreement to incorporate the Pahrump Paiute Tribe in a shared mitigation strategy is highly inappropriate and considered culturally unacceptable.

Comment 9

Sincerely,

Richard W. Arnold

Richard W. Arnold, Traditional Practitioner, and
Tribal Chairman
Pahrump Paiute Tribe

cc: Thomas Gates



BIG PINE PAIUTE TRIBE OF THE OWENS VALLEY

Big Pine Paiute Indian Reservation

July 23, 2012

Mike Monasmith,
Senior Project Manager
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512
email: mike.monasmith@energy.ca.gov

RE: Comments on the Preliminary Staff Assessment and Supplemental Staff Assessment of the BrightSource Hidden Hills Solar Energy Generating System

Dear Mr. Monasmith:

The following comments address the Preliminary Staff Assessment and Supplemental Staff Assessment of the BrightSource Hidden Hills Solar Energy Generating System.

The Big Pine Paiute Tribe of the Owens Valley (Tribe) recommends the “No Project” Alternative for the project. This area of southeastern Inyo County is not appropriate for industrial-scale solar development which would produce significant impacts on cultural, historical, biological, and visual resources which can’t be mitigated to a less than significant level. The 500 megawatt power plant would have approximately 85,000 elevated mirrors which would be used to focus the sun's rays on a solar receiver steam generator that would produce steam to generate electricity. There would be two solar receiver steam generators on 740 ft. towers.

Cultural Resources—Cultural Landscapes Adversely Effected

The Supplemental Staff Assessment provides an excellent description of three cultural landscapes which would be adversely effected by the project: Salt Song Landscape, Pahrump Paiute Home Landscape, and the Mo hav Landscape. The Tribe supports the Pahrump Paiute Tribe’s opposition to the project and the staff report’s assessment of the project’s significant impacts to cultural resources which can’t be mitigated:

“The construction of the proposed project would cause a substantial adverse change in the significance of the three ethnographic landscapes. The presence of the heliostat fields and the 750 foot tall solar power towers would be a stark visual intrusion that would profoundly and irreparably degrade the ability of the landscapes to convey historical significance under CRHR

Criterion 1. In particular, the mass of the looming towers, in combination with the operational glare from the solar receiver steam generators atop each one, would compromise the setting, feeling, and association aspects of the resource integrity, aspects critical to the resource's ability to convey its associative values under Criterion 1. Subsequent to the construction of the facility, one would no longer be able to experience the sense of the landscape as it was during its period of significance" (p. 56).

Historic Resources—Old Spanish Trail/Mormon Road Adversely Effected

The Supplemental Staff Assessment states: "At least one historical built-environment resource, the Old Spanish Trail-Mormon Road, has been identified in the HHSEGS PAA thus far. Substantial information, including the National Register of Historic Places nomination of the Nevada segments of the Old Spanish Trail, has led staff to conclude that, within the PAA, this resource is not represented by a single route, but as a corridor of converging and intermingled tracks and trails. The project site is located within this corridor, with traces running throughout the project site. Staff has concluded that that the impacts of the proposed HHSGS project to this Old Spanish Trail-Mormon Road Northern Corridor (Corridor) would be significant and, even with full implementation of CUL-9 and CUL-12, would not be mitigated to a less than significant level" (p. 2).

In addition, the two 750 foot tall towers will have significant adverse visual impacts on the Old Spanish Trail, a National Historic Trail. Bill Helmer, the Tribal Historic Preservation Officer for the Big Pine Paiute Tribe, studied this area in 1998 as part of the National Park Service team which conducted the preliminary research for the Old Spanish Trail Feasibility Study. He also hiked a 350 mile segment of the Old Spanish Trail in 1983, with a 22 mile walk from Resting Springs on the west, past the project site to Stump Spring. Industrial-scale developments definitely would encroach upon the historic qualities of this landscape and would compromise the integrity of the Old Spanish Trail in this area.

Comment 1

Preliminary Staff Assessment (PSA), Biological Resources

The project will use approximately 140 acre feet of water a year. The Pahrump Valley groundwater basin has been in a state of overdraft for decades. The additional amount of water depletion for this project could have severe impacts on fragile desert vegetation such as the nearby mesquite bosques and other sensitive plant associations. Some last surviving cottonwoods and willows at Stump Spring not mentioned in the report may also be severely threatened with even minimal impacts to groundwater depletion.

Comment 2

The PSA recommends a monitoring plan in case the project produces adverse impacts to vegetation. This monitoring plan is inadequate because it seems that impacts to vegetation due to the project would be discovered after the damage had already been done. The project's impact on water resources and water-sensitive species and habitat would be significant, and could not be mitigated to a non-significant level.

Comment 3

Distributed Generation Alternative Needed

It is well known that Distributed Generation is a viable alternative to the industrial-scale projects which require huge adverse impacts to cultural, historical, biological, and visual resources (Bill Powers and Sheila Bowers, *Distributed Solar PV – Why It Should Be The Centerpiece Of U.S. Solar Energy Policy* (http://solardoneright.org/index.php/briefings/post/distributed_solar_pv_why_it_should_be_the_centerpiece_of_u.s._solar_energy_/)). However, this alternative is not included in the PSA. It is recommended that a Distributed Generation Alternative be included in the Alternatives section.

Sincerely,



Virgil Moose
Tribal Chairperson

STATE OF CALIFORNIA

**Energy Resources Conservation
and Development Commission**

In the Matter of:

APPLICATION FOR CERTIFICATION
FOR THE HIDDEN HILLS SOLAR
ELECTRIC GENERATING SYSTEM
(SEGS)

DOCKET NO. 11-AFC-2

**INTERVENOR CENTER FOR BIOLOGICAL DIVERSITY'S
COMMENTS ON THE PRELIMINARY STAFF ASSESSMENT MAY 2012
CEC-700-2012-003-PSA
HIDDEN HILLS SOLAR ELECTRIC GENERATING SYSTEM
(HHSEGS)**

July 21, 2012

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**STATE OF CALIFORNIA
Energy Resources Conservation
and Development Commission**

In the Matter of:

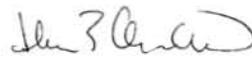
APPLICATION FOR CERTIFICATION
FOR THE HIDDEN HILLS SOLAR
ELECTRIC GENERATING SYSTEM
(SEGS)

DOCKET NO. 11-AFC-2

The Center for Biological Diversity (“Center”) submits the following comments on the Preliminary Staff Assessment May 2012 CEC-700-2012-003-PSA– Hidden Hills Solar Electric Generating System (HHSEGS).

Dated: July 21, 2012

Respectfully submitted,



Ilene Anderson
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July 21, 2012

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RE: Application For Certification For The Hidden Hills Solar Electric Generating System Docket No. 11-AFC-02: Comments on the Preliminary Staff Assessment May 2012 CEC-700-2012-003-PSA– Hidden Hills Solar Electric Generating System (HHSEGS)

Dear Mr. Monasmith,

The Center for Biological Diversity (“Center”) is a non-profit environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center has over 378,000 members and supporters throughout California, Nevada and the western United States, including members that live nearby the vicinity of the proposed Hidden Hills Solar Electric Generating System (HHSEGS) and recreate in the nearby public lands. On December 22, 2011, the Center was granted leave to intervene in this proceeding. The Center submits these comments regarding the May 2012 Preliminary Staff Assessment (“PSA”) on behalf of our board, staff and members.

I. INTRODUCTION

The development of renewable energy is a critical component of efforts to reduce greenhouse gas emissions, avoid the worst consequences of global warming, and to assist California in meeting its mandated emission reductions. The Center strongly supports the development of renewable energy production, and the generation of electricity from solar power, in particular. However, like any project, proposed solar power projects should be thoughtfully planned to minimize impacts to the environment. In particular, renewable energy projects should avoid impacts to sensitive species and habitat, and should be sited in proximity to the areas of electricity end-use in order to reduce the need for extensive new transmission lines and the efficiency loss associated with extended energy transmission. Only by maintaining the highest environmental standards with regard to local impacts, and effects on species and habitat, can renewable energy production be truly sustainable.

The current site proposed for this project in the Pahrump Valley in Inyo County, California is relatively devoid of human disturbance except for some dirt roads and the abandoned agricultural orchard. We concur with the Preliminary Staff Assessment which states, “The Hidden Hills Solar Electric Generating System project (HHSEGS or project)

would have significant direct and indirect impacts on biological resources.” PSA at pg.4.2-1.

For biological resources and other topics, the PSA is incomplete, making it impossible to assess much less comment on the all of the proposed project impacts. However, based on the information provided in the incomplete PSA, significant impacts have been identified for a suite of species (PSA pg 4.2-63-67) including groundwater dependent vegetation, special status plant species, migratory/special status resident avian species and potentially golden eagle and negative impacts to numerous other rare plants and animals, including the beleaguered desert kit fox and the declining state threatened desert tortoise. Additionally, six “blue line” stream and an unidentified number of ephemeral drainages covering 28.33 acres of waters of the state would be impacted by the HHSEGS on the proposed site. The proposed project intends to pump groundwater from the already overdrafted aquifer further impacting precious desert water resources. The following comments address these issues:

II. COMMENTS ON THE MAY 2012 PSA

A. The Alternatives Analysis Outlined in the PSA Fails to Comply with CEQA

Comment 1

Pursuant to CEQA, the “policy of the state” is that projects with significant environmental impacts may not be approved “if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects...” Pub. Res. Code § 21002; Guidelines § 15021(a)(2). A Project should not be approved if environmentally superior alternatives exist “even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly.” Pub. Res. Code §§ 21002; Guidelines §§ 15021(a)(2), 15126.6. The Project must be rejected if an alternative available for consideration would accomplish “most [not all] of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects.” Guidelines § 15126.6(c).

Comment 2

Accordingly, the environmental review documents must consider a range of alternatives that would achieve the basic objectives of the project while avoiding or substantially lessening significant environmental effects, and it is essential that the “EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project.” CEQA Guidelines § 15126.6. Alternative sites must also be considered where relocating the project would substantially lessen the significant impacts of the project. Guidelines Section 15126.6(f)(2). *See Citizens of Goleta Valley v County of Santa Barbara* (1988) 197 Cal.App.3d 1167; *Save Round Valley Alliance v. County of Inyo* (2007) 157 Cal.App.4th 1437 (whether an alternative site may be feasible even where it requires a change in land use designation; to determine feasibility requires detailed analysis of the alternatives; and even if an alternative is less profitable than the project as proposed it may still be a feasible alternative).

Comment 2, cont'd

Because the agency is charged with considering alternatives to avoid and minimize impacts, it cannot lawfully fulfill this duty based on the limited alternatives analysis presented in the PSA. Most importantly in this instance, the PSA must look at alternative sites that could avoid impacts to desert including resources where significant unmitigable impacts would occur. Alternatives could minimize or eliminate even supposedly “mitigable” impacts to species and communities such as water dependent vegetation by significantly reducing the need to pump more groundwater out of an already overdrafted groundwater system, or move the tortoises out of their native home ranges – a so-called mitigation measure that in practice has proved to be a disaster for the species. Therefore, the PSA should fully explore other alternatives that would achieve the same level of renewable energy production—the basic objective of the project—but without the significant impacts of the proposed project.

Comment 3

While the PSA provides review of five alternatives, we do not believe that the agency has as yet adequately explored alternative sites. This is evidenced by the fact that only one alternative site was discussed in any detail—Sandy Valley—although it would have substantially fewer impacts to biological resources than the proposed project. PSA at 6.1-24-25. Clearly this alternative is a feasible alternative that achieves the proposed project’s goals while significantly reducing impacts to biological resources.

However, simply looking at one alternative site with fewer impacts as the proposed project does nothing to fulfill the agency’s duty under CEQA. It strains credulity to believe that there are no other sites in California where the valid project objectives could be accomplished while further reducing the impacts (for example from required transmission infrastructure and gas pipeline which are essential infrastructure for this project but are not being analyzed in the PSA – see below discussion). Furthermore, it is unclear if this alternative is actually a currently proposed project, called Sandy Valley SEGs.

Comment 4**Comment 5**

The remaining alternatives in the PSA explore different types of technologies on the same site. Several of the alternative technologies appear to be superior to the proposed project both in reaching and surpassing the goals of the proposed project and minimizing environmental impacts. For example, the photovoltaic alternative, based on the MW/acre presented in Alternatives Table 5 (PSA at 6.1-60-61), shows that the proposed project acreage could easily accommodate a 500 MW solar photovoltaic project, which would significantly reduce the need for ground water pumping in the already over-drafted Pahrump aquifer (PSA at 6.1-68), which may very well have hydrologic connection to the Amargosa River. It would also significantly reduce some of the unmitigable visual resources impacts by eliminating the two 750-foot towers, lower fire risks through the elimination of superheated fluids on-site, reduce air quality issues (PSA at 6.1-62), eliminate the need for construction of a gas pipeline, reduce noise and vibration impacts (PSA at 6.1-64), reduce public health impacts (PSA at 6.1-64), reduce glint and glare to adjacent traffic and transportation (PSA at 6.1-65), significantly reduce biological impacts to water dependent vegetation and avian species (PSA at 6.1-63), cultural resources (PSA at 6.1-63), and geology and paleontology (PSA at 6.1-63). With

Comment 5, cont'd

all of these identified reductions in impacts, clearly a solar photovoltaic project would be a better project choice in avoiding and minimizing impacts.

Comment 6

These alternative-technology alternatives appear to be eliminated not because they are infeasible but because of their “effectiveness” (PSA at 6.1-78), although the PSA does point out that the difference between the “effectiveness” of the proposed technology and single-axis tracking PV panels is “insignificant” (PSA at 6.1-79). The overall analysis of “effectiveness” is unacceptable because it fails to take into consideration flexibility of different technologies in avoiding impacts. The PSA is deficient because it failed to meet the requirements of CEQA as outlined in *Preservation Action Council v City of San Jose* (2006) 141 Cal App 4th 1336. In *Preservation Action Council*, the Respondent lead agency relied heavily on the Real Parties’ project objectives and the EIR rejected a smaller alternative that would have met all project objectives except for size, and would have been environmentally superior. *Id.* at 1355. The Court rejected the EIR finding that it did not meet the information requirements of CEQA because the inadequacies in the EIR’s analysis “meant that the public and the City Council were not properly informed of the requisite facts that would permit them to evaluate the feasibility of this alternative.” *Id.* at 1355. The PSA draft provided to date is similarly deficient.

Comment 7

Comment 8

The PSA provides a basic description of the objectives of the project (PSA at 6.1-3), but it then unreasonably narrows the objectives used to consider the viability of alternatives and unreasonably includes timing of the environmental review as a basic objective of the project and fails to evaluate at all if the proposed project actually will result in competitively priced renewable energy. PSA at 6.1-3. Given that the staff has

Comment 8a

stated that the applicant has to date failed to complete necessary studies and provide other information needed for the environmental review (*see, e.g.*, PSA at 4.2-62 (applicant has not provided results of all rare plant surveys) and a CEC workshop is currently being scheduled on the impacts of solar flux on avian species), the timing of the environmental review cannot fairly be used as a “basic objective” of the project such that it limits the consideration and evaluation of alternatives that would avoid significant impacts to environmental resources of California. Indeed, to the contrary, it appears from the available documents filed to date that the applicant has thus far been unable to provide the complete surveys and information regarding the impacts to the rare plants, desert kit fox and other resources, which indicates that this site may be inappropriate for such a large-scale industrial development project. This further underscores the need for the agency to comprehensively explore a range of alternative sites that will avoid these and other significant impacts of the project.

Comment 9

The basic objectives of the project are to provide 500-MW of renewable power in California. This goal can be met in a number of ways by feasible alternatives that would avoid impacts to the desert tortoise and intact habitat, rare plants, water resources, and waters of the state. While “high solarity” may be necessary for the type of large-scale solar thermal plant that the applicant prefers to build, the added costs and energy losses from transmission, which is not being analyzed as part of this project, although new transmission and a gas pipeline are essential infrastructure for this project, may make it more cost effective to locate a solar power generating facility closer to load centers such

Comment 9, cont'd

as the cities such as Los Angeles and San Diego which have significant “solarity” even if it is not the very highest amount. In evaluating this factor the agency should assess whether re-use of disturbed sites near existing population centers could both meet the project objectives and avoid many of the significant environmental impacts of the project including impacts to rare species, natural communities and water. Given the economic set-backs in the past year, there are more and more large-scale industrial areas that are under-utilized in many parts of southern and central California. These industrial parks, malls and auto rows long ago replaced native habitat, they are connected to the power grid, and are readily accessible to workers for jobs in California. Converting these areas to solar centers is a feasible alternative that would have many societal benefits (including maintaining robust economic zones and avoiding urban blight) and would avoid nearly all of the environmental impacts of siting this project in ecologically functioning habitat in the Mojave Desert that supports many rare and less common species and communities. Accordingly, the PSA should also explore the use of distributed smaller-scale solar as an alternative.

Comment 10

B. Additional Analysis is Needed to Assess All Impacts that Require Avoidance and Minimization

Even if the Project is eventually approved to go forward at the Hidden Hills site which it should not be based on feasible alternatives, significant impacts must be avoided to the extent feasible and minimized. Some impacts that were not fully analyzed in the PSA that will need to be avoided or minimized and mitigated include growth-inducing impacts and habitat fragmentation.

Comment 11

Growth-Inducing Impacts: CEQA requires environmental analysis to consider the ways in which the proposed project could foster economic, housing, or population growth, whether directly or indirectly in the surrounding environment. Guidelines § 15126.2(d); *see also* 14 Cal. Code Regs § 15358(a)(1) (“Indirect or secondary effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems.”). The Guidelines specifically require that the EIR should “discuss the characteristics of [] projects which may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively.” Guidelines § 15126.2(d). Growth-inducing impacts from the proposed project in the Pahrump Valley include encouraging additional large-scale solar projects to be sited in this same area across the state line in Nevada and making it more likely that additional solar development projects could be approved in this same area. For example, the placement of one industrial project with a new powerline connection, substations, gas pipeline and/or new access roads may make it more likely that a second or third project will be sited in this area. Siting multiple projects in this area could lead to complete collapse of the habitat values in this valley due to habitat loss and fragmentation. This would be a significant change to an area which now contains a significant amount of contiguous, high value, intact habitat for the desert tortoise and other species and exacerbate the groundwater overdraft. The need for additional analysis of the impacts

from multiple solar projects that have pending applications in this area and in the Mojave ecosystem is discussed further below in the section on cumulative impacts.

C. Desert Kit Fox

Comment 12

While the PSA recognizes that the desert kit fox is a protected animal as a furbearing mammal under California Code of Regulations Title 14 Section 460 (PSA at 4.2-11) and recognizes that desert kit fox occurs on site (PSA at 4.2-4), no surveys were done to quantify the density of desert kit fox that will be displaced and “taken” by the proposed project. As the CEC is well aware, the first documentation of a deadly outbreak of canine distemper was confirmed in late 2011 in desert kit fox, when dead kit foxes found on and adjacent to the Genesis industrial solar project during construction were necropsied by state veterinarians.

Comment 13

Kit foxes have great fidelity to their natal burrows and as documented on the Genesis project site are not easily evicted from their burrows and home ranges through “passive relocation” or hazing. The PSA need to require that “take” permits be acquired for desert kit fox, as the California Department of Fish and Game did on Genesis, to allow for accurate tracking and monitoring of desert kit foxes to determine the efficacy of “passive relocation”. Tracking the “passively relocated” kit foxes will enable monitoring of the ultimate outcome of the hazing activities, and should allow for identification of distemper outbreaks earlier on, where the disease may be more easily controlled.

Comment 14

As the CEC is also well aware, despite the efforts of state and federal biologists, who tried to prevent the distemper outbreak from spreading, their efforts have not been successful, and so far the kit fox distemper epidemic has spread at least over eleven miles south of the Genesis project site. Hope has dimmed that the epidemic can now be contained. Additional disruption of native populations of desert kit foxes from hazing them off this proposed project site will result in additional displaced animals wandering the desert and potentially being vectors for spreading the disease farther through the population.

The state wildlife veterinarian for the California Department of Fish and Game isn't certain the distemper outbreak is connected to the construction activities, but has concluded that habitat disturbance causes stress, and when animals succumb to stress they become more susceptible to disease.

Comment 15

The PSA fails to quantify how many kit fox territories overlap the proposed project site, analyze the impacts from the proposed project or provide any avoidance, minimization or mitigation measures regarding this increasingly rare and declining species. Clearly a supplemental SA needs to include a substantial section on the status of the on-site desert kit fox population and strategies to minimize and mitigate impacts to this species.

D. Desert Tortoise: Analysis of Impacts is Inadequate and the Translocation Plan is Missing

Comment 16

The desert tortoise is continuing to decline throughout its range (USFWS 2008) despite being under federal and state Endangered Species Acts protection as threatened for two decades. We submitted the USGS data set that indicates that most of the proposed project site is located within modeled desert tortoise habitat.

Murphy et al. (2007) undertook extensive genetic analysis across the range of the desert tortoise and identified genetically unique populations within the larger listed population. The desert tortoise located on the HHSEGS site represents a unique genetic group – the Eastern Mojave group. Because these animals represent a unique occurrence in California, adequate avoidance, minimization and mitigation must be applied to this project. The uniqueness of this population is also recognized both in the 2011 Desert Tortoise Revised Recovery Plan (USFWS 2011) as the Eastern Mojave Recovery Unit.

Comment 17

Additionally, the Scientific Advisory Committee of the U.S. Fish and Wildlife Service’s Desert Tortoise Recovery Office has concluded that “translocation is fraught with long-term uncertainties, notwithstanding recent research showing short-term successes, and should not be considered lightly as a management option. When considered, translocation should be part of a strategic *population augmentation program*, targeted toward depleted populations in areas containing “good” habitat. [emphasis added]. The SAC recognizes that quantitative measures of habitat quality relative to desert tortoise demographics or population status currently do not exist, and a specific measure of “depleted” (e.g., ratio of dead to live tortoises in surveys of the potential translocation area) was not identified. Augmentations may also be useful to increase less depleted populations if the goal is to obtain a better demographic structure for long-term population persistence. Therefore, any translocations should be accompanied by specific monitoring or research to study the effectiveness or success of the translocation relative to changes in land use, management, or environmental condition.”¹ Translocation should be used as a tool to *augment populations within depleted recovery units*, not as a mitigation strategy to allow for development in desert tortoise habitat.

Comment 18

As the CEC is well aware, the project proponent *significantly* underestimated the number of desert tortoise on the Ivanpah Solar Electric Generating System (ISEGS) site, despite expert testimony and filings from intervenors including the Center that provided compelling evidence that there would be many more desert tortoise on the project site, based on habitat and survey methodology. Unfortunately the intervenors were correct. So many more desert were found on the project site that the “take” limit for desert tortoise was quickly exceeded and the project was forced to cease construction via a stop-work order while subsequent reconsultation with trustee state and federal wildlife agencies was implemented. Based on this disaster, the proposed project should be held to much higher standards of survey data and analysis or an alternative developed and selected that is out of desert tortoise habitat to preclude impacts to this state and federally

¹http://www.fws.gov/nevada/desert_tortoise/documents/sac/20090313_SAC_meeting_summary.pdf

threatened species. Selecting a better site for project implementation that avoids, and minimizes the impacts to the environment is required under CEQA.

Lack of Desert Tortoise Translocation/Relocation Plan: As noted in the PSA, “the legal and practical ramifications of translocation remain unresolved at this time” (PSA at 4.2-74). While the number of desert tortoise that are proposed to be moved are estimated to be between 6 to 33 adult and sub-adult desert tortoises, 3 to 34 juvenile tortoises and approximately 46 to 158 eggs. Due to the lack of a relocation or translocation strategy, it is impossible to evaluate the impact to on-site desert tortoise from the information presented in the PSA.

Comment 19

If translocation is implemented for use on the proposed project, the agency should carefully review the Desert Tortoise Recovery Plan (USFWS 2011) and require incorporation of the U.S. Fish and Wildlife Service’s most recent (2010) guidance on desert tortoise translocation². Additionally the translocation plan should incorporate new information on current translocation implementation successes (if there are any). Information on desert tortoise home ranges, landscape carrying capacity, and other ecological factors need to be included in a revised or supplemental SA, so that the public and decision makers can more accurately evaluate the impacts from the proposed project

We also request that the following recommendations that originate with the Desert Tortoise Recovery Plan are incorporated into the translocation plan:

- Provide monitoring to confirm that desert tortoise “establish home ranges and integrate into any existing social structure”. Note is taken that no translocation studies have been implemented long enough to confirm integration, so moving forward with yet another translocation without the data required to confirm actual integration of the translocated tortoises into the existing population renders the translocation effort experimental. The experimental nature of the action then requires at a minimum a long-term commitment to monitoring and potential adaptive management to ensure that these animals and the unique genotypes that they represent continue to survive.
- Temporary fencing should be included in the relocation areas as well, due to the well documented fact that desert tortoises will try to return to their home range. Additionally, provisions to deal with the fact that desert tortoises will end up along the new tortoise proof fences of the project site, trying to get back to their home territory, should be included because this behavior leaves them vulnerable to predation.
- Determine the translocation site’s carrying capacity. In light of global climate change and the predicted warming of the desert, translocation zones should only be located at *higher* elevations, not lower areas of the Pahrump Valley.
- At least a two-year study should be undertaken on the host population prior to translocation.

Comment 20

²http://www.fws.gov/ventura/species_information/protocols_guidelines/docs/dt/USFWS%20DT%20Translocation%20Guidance.docx

Comment 21 In addition to the avoidance and minimization measures and any translocation effort, adequate mitigation at a rate of at least 5:1 to off-set the impacts to the desert tortoise is required, including acquisition of private lands in nearby desert tortoise habitat to be set aside as tortoise conservation areas in perpetuity so that the mitigation has durability. In order to adequately mitigate for the desert tortoise population that will be affected by the proposed project, the mitigation needs to occur within this same recovery unit, and as close to the proposed project site as possible. Additionally, the proposed mitigation has differing ratios for Mojave Desert scrub (3:1) and Shadscale Scrub (1:1) (PSA at 4.2-86). As we have brought up repeatedly at workshops, Shadscale scrub is a much rare community type than Mojave Desert scrub, therefore the PSA should not treat these different community types differently. A 5:1 ratio of mitigation is required because 1) the desert tortoise population continues to decline³, 2) more of its habitat is being developed, which is a net loss to the species⁴, and 3) fragmentation of the habitat, including this proposed project continues.

E. Bighorn Sheep: Analysis of Impacts is Incomplete

Comment 22 Important native (i.e. not re-introduced) populations of desert bighorn sheep occur in mountain ranges⁵ adjacent to the HHSEGS. Bighorn are a large and wide-ranging species that require connectivity across large landscapes in order to assure persistence. Existing anthropogenic barriers have already eliminated gene flow between certain populations⁶. Elimination of sheep connectivity by HHSEGS could lead to further isolation and inbreeding issues. Additional information on bighorn sheep movement corridors and the impact of development on them needs to be included. Avoidance of these areas needs to be included, or minimization and effective mitigation if the project actually could impact these important linkages. Indeed, public comment at CEC's June 27, 2012 workshop identified that desert bighorn sheep have been documented on the proposed project site.

Comment 23 To date, no studies have been done on the effects that miles of mirrors may have on bighorn sheep movement or effects of their use of historical lambing areas. Data indicate that human caused disturbance negatively affects species fitness and population dynamics via the energetic and lost opportunity costs of risk avoidance⁷. More information about the potential impact from the installation and operation of mirrors on desert bighorn needs to be included.

Comment 24 Desert bighorn rely on springs and seeps, especially during the hot dry summer months for their survival in the ranges adjacent to the proposed project site and while moving across the valley floor. While the goal of the groundwater mitigation and monitoring requirements is to minimize impacts to the groundwater, there is no guarantee that impacts from this activity will not impact, to some extent the springs and seeps, that

³ http://www.fws.gov/nevada/desert_tortoise/dt_reports.html

⁴ Moilenen et al 2009; Norton 2009

⁵ Epps et al. 2004

⁶ Epps et al. 2005

⁷ Frid and Dill 2002

Comment 24, cont'd

the desert bighorn rely upon. The monitoring plan will only identify water drawdown after it has occurred, and this could be deadly for bighorn and other desert species that depend on the springs and seeps for survival. For that reason, the CEC should consider the requirement of artificial guzzlers at strategic locations to help offset the impacts of the proposed project to bighorn (and other wildlife). Please refer to our water resources section pertaining to impacts to seeps and springs from the groundwater pumping proposed by the project, and please provide an analysis of the potential impacts to bighorn sheep including the potential mitigation of guzzlers in a supplemental SA.

F. Rare Plants: Data and Analysis Incomplete

Comment 25

As noted in the PSA, data is lacking on the spring 2012 surveys for rare plants. As it is, the site appears rich with rare botanical resources (PSA at 4.2-132) based on the reported survey results, and the analysis of impacts to a five of the ten rare plants that occur on the project site are significant and “immitigatable”. What does this term – immitigable - actually mean? While the lack of survey data and analysis makes it impossible to determine the impacts to the species, clearly the proposed project site is poorly sited because of the number of rare plant species that occur on the site. Avoidance is the most preferred method to eliminate impacts to rare plants, many of which appear to be located in the eastern portion of the project area (where other rare biological resources also occur).

If avoidance is not possible, then securing additional sites for conservation in perpetuity will be necessary. Mechanisms must be put in place to secure all areas acquired for mitigation from future impacts such as conservation easements in perpetuity (see discussion below about durability of mitigation).

Comment 26

While transplantation of rare plants has been documented to be mostly unsuccessful⁸, if relocation is to be part of the mitigation effort, then a clear and concise relocation plan should be developed and included as supporting documentation in the Final Staff Assessment for public review. So many times these plans are proposed to be developed in the future, with no public input or review. We believe these plans should be included as part of the CEQA process and that their absence is a violation of CEQA. If plants are to be moved, requirements for interim monitoring during establishment (including triggers for adaptive management to meet the needs of plant survival) need to be put in place. Long-term monitoring for survivorship and successful reproduction and establishment also needs to be included as part of the mitigation requirements if relocation is a chosen strategy.

Comment 27

To assure conservation of the rare plants in addition to avoidance and minimization and mitigation presented above, seed collection and curation into a seed bank should be required, to preclude potential genetic loss of the species if avoidance, minimization and mitigation measures should fail.

⁸ Feidler 1991

G. Western Burrowing Owl

Comment 28 The information in the FSA regarding the status of the burrowing owl on the project site is confusing. It remains unclear how many burrowing owl territories are located in the project area. As with the kit fox, desert tortoise and other species, a plan is to be produced for mitigation and monitoring of burrowing owls, but that plan is not provided in the PSA. It is therefore unclear how the compensation acreage for burrowing owl impacts was calculated (PSA at 4.2-69)

H. Golden Eagles

Comment 29 The PSA recognizes that the proposed project “would remove approximately 3,277 acres of foraging habitat for golden eagle and migratory birds” (PSA at 4.2-4) and that “the USFWS may consider this loss to constitute substantial interference with normal breeding, feeding, or sheltering behavior, which would be considered a “take.”” (Ibid). The PSA fails to present exactly how to mitigate the loss of a substantial amount of foraging habitat for the golden eagle from this project. The fact still remains that significant amounts of foraging habitat will decrease carrying capacity of the landscape and could result in a potential loss of habitat needed to support a nesting pair, which would impact reproductive capacity.

Comment 30 Scientific literature on this subject is clear - the presence of humans detected by a raptor in its nesting or hunting habitat can be a significant habitat-altering disturbance even if the human is far from an active nest⁹. Regardless of distance, a straight-line view of disturbance affects raptors, and an effective approach to mitigate impacts of disturbance for golden eagles involves calculation of viewsheds using a three-dimensional GIS tool and development of buffers based on the modeling¹⁰. Golden eagles have also been documented to avoid industrialized areas that are developed in their territory.¹¹

Comment 31 Furthermore, information on the impacts to avian species from the power tower technology is well documented¹². The PSA fails to analyze impacts to golden eagles from the solar flux and towers. Because the CEC is proposing a workshop on these issues in early August, the PSA once again seems premature, having been issued before data on this key environmental issue is available.

Comment 32 In addition, the construction of the mandatory transmission line, an essential connected project to the HHSEGS, will cause additional direct and indirect impacts to golden eagles, yet these impacts remain unanalyzed in the PSA. Because the transmission line is a connected project that is necessary for the HHSEGS to get the electricity onto the grid, a supplemental SA must include an environmental analysis of this transmission line project.

⁹ Richardson and Miller 1997

¹⁰ Camp et al. 1997; Richardson and Miller 1997

¹¹ Walker et al. 2005

¹² McCrary et al. 1986

Comment 33 Based on the severity of the incomplete impacts identified in the PSA alone, the CEC must consider other alternatives that minimize the impacts to the fully protected golden eagle.

I. Groundwater Dependent Vegetation

Comment 34 As with the rare plants, the impact analysis and mitigation is incomplete, making it impossible to comment on the proposed action. Based on current proposed monitoring scheme, impacts to this rare plant community and vital wildlife resource will still be impacted by the proposed project. Additional off-site impacts to more distant groundwater dependent vegetation communities in the Amargosa Valley do not appear to be included in the analysis either. The supplemental SA needs to clarify the issues associated with the groundwater dependent vegetation.

J. Mitigation, Nesting and Acquisition Ownership

Comment 35 Mitigation acquisitions must mitigate for the impacts of the project. While the project proponent is currently taking advantage of the mitigation opportunities established under SBX8 34 for the impacts to desert tortoise from the ISEGS project, we note that the proposed mitigation does not actually mitigate for the impacts because the land acquired by CDFG are outside of the northeastern recovery unit for the desert tortoise, which is where the impacts from the ISEGS project occurred. The HHSEGS project occurs in the Eastern Mojave Recovery unit, and therefore mitigation for desert tortoise must occur within this desert tortoise recovery unit.

Comment 36 Any “nesting” of mitigation acquisitions must assure that impacted species are actually mitigated by the acquisition property. Therefore species presence at densities found on the proposed project site or greater must be documented through monitoring of the potential mitigation site prior to acquisition in order to adequately fulfill the mitigation requirement.

Comment 37 Mitigation acquisitions must be managed by a land management entity that can assure conservation of those lands in perpetuity. For example, the Bureau of Land Management can not assure conservation of lands donated to it based on its multiple use mandate. Therefore, the PSA should clearly lay out a mitigation strategy to assure land ownership/management that will result in conservation of all mitigation acquisitions in perpetuity.

K. Missing Plans

Comment 38 Numerous plans are relied upon in the PSA to provide adequate avoidance, minimization and mitigation of biological resources. However, these plans are not available for public review, which makes it impossible for the public and decision makers to actually evaluate if these plans do what the PSA intends them to do. Examples of missing plans include:

Comment 39

- Weed Management Plan
- Bird Monitoring Study
- Burrowing Owl Mitigation Plan
- Avian, Bat, and Golden Eagle Protection Plan
- Management plan for desert kit fox and American badger
- Biological Resources Mitigation Implementation and Monitoring Plan
- Desert tortoise translocation plan

These plans should be made available to the public before the FSA in a supplemental SA.

L. Water Resources: Requires Additional Information and Analysis

Comment 40

The PSA indicates that up to 140 AFY of water will be used yearly on the HHSEGS site during normal operations (PSA at 4.15-2), although construction water use could be as high as 288 AFY for up to three years (PSA at 4.15-8). Although no water will leave the site, additional information on the effects of groundwater pumping on nearby seeps and springs in the adjacent mountains is lacking. In fact the seven-day ground water pump test that the CEC required was never completed. We have repeatedly requested that the seven-day ground water pump test be completed and once again ask the CEC to enforce their own requirement. No data is presented that addresses the hydrological connection between these essential wildlife sustaining locations, the Amargosa drainage and the proposed project impacts.

Additionally, because of the substantial evaporation rate at the project site, please provide data on how much pumped ground water will actually be returned to the groundwater basin.

Comment 41

Waters of the State: The PSA indicates that 28.33 acres of Waters of the State (PSA at 4.2-6), which will need to be mitigated. In this arid part of the state, this impact is significant. Again we urge the CEC to look at avoidance and minimization of the impact through alternative siting.

Comment 42

As with the other sensitive resources, securing additional sites for conservation in perpetuity will be necessary, and may be accomplished in conjunction with sensitive species mitigations. Because the proposed project is relying on groundwater pumping as its water source, it is crucial to replicate the existing surface hydrology to enable groundwater replenishment, particularly with regards to the slow pace of groundwater recharge in the desert.

M. Essential Part of the HHSEGS Project Not Analyzed.

Comment 43

As discussed above, the HHSEGS project relies upon an unbuilt transmission and gas pipeline that are currently undergoing National Environmental Policy Act (NEPA) review in Nevada. That NEPA review does not relieve the CEC from including environmental review of those projects which are clearly connected and required by the

HHSEGS project. The transmission lines and gas line do not rely upon the HHSEGS in order to be viable projects, but the HHSEGS relies upon the transmission and gas pipeline in order to be a viable project. Therefore the CEC needs to include the transmission line and gas pipeline as part of the HHSEGS project and must analyze the project and its impacts in a supplemental SA.

Comment 44

N. Cumulative Impacts are Not Fully Disclosed and Analyzed

Comment 45

Even before undertaking a fully adequate analysis of the cumulative impacts as outlined in the Cumulative Scenario, the PSA admits that impacts from this project will be “cumulatively considerable” (PSA at 4.2-172). CEQA requires not only full disclosure of cumulative impacts but a full and fair effort on the part of the agency to first avoid such impacts, and then to ensure any remaining impacts are minimized and mitigated. Until the agency completes an adequate alternatives analysis, the staff conclusions that not all cumulative impacts can be mitigated are premature.

Comment 46

Additionally, the cumulative impacts need to identify the impacts to desert tortoise by translocation and relocation efforts. As the other potential projects get implemented, it will push higher and higher numbers of desert tortoises into smaller and smaller areas. Additional development of other renewable energy projects in the Pahrump valley in Nevada will also further isolate the existing population of resident, relocated and translocated desert tortoise in the Eastern Mojave recovery unit. These same potential isolation issues due to the cumulative impacts of projects proposed in the Pahrump Valley also need to be discussed for desert bighorn sheep and groundwater pumping. All of these cumulative impacts need to be included and analyzed in a supplemental SA.

O. Conformance with the Desert Renewable Energy Conservation Plan

Comment 47

The CEC is signatory to the planning agreement for the Desert Renewable Energy Conservation Plan (DRECP), a proposed conservation plan under the Natural Communities Conservation Plan Act (NCCPA). The NCCP Act 2810 (b)(8) requires that “interim process during plan development for project review wherein discretionary projects within the plan area subject to Division 13 (commencing with Section 21000) of the Public Resources Code that potentially conflict with the preliminary conservation objectives in the planning agreement are reviewed by the department prior to, or as soon as possible after the project application is deemed complete pursuant to Section 65943 of the Government Code and the department recommends mitigation measures or project alternatives that would help achieve the preliminary conservation objectives. As part of this process, information developed pursuant to paragraph (5) of subdivision (b) of Section 2810 shall be taken into consideration by the department and plan participants”. The current preliminary conservation strategy of the DRECP¹³ identifies the proposed project site as moderate biological sensitivity, surrounded by high biological sensitivity area and considers it for conservation purposes, not development purposes.

¹³ <http://www.drecp.org/documents/#conservation>

Comment 48

To that point, the PSA fails to provide an evaluation of the conformance of the HHSEGS with the preliminary conservation objectives of the DRECP as required under the NCCPA. Therefore, we request that the supplemental SA include an analysis of the conformance of this proposed project with the DRECP.

III. CONCLUSION

From a scientific perspective, developing utility scale renewable energy project in the California deserts without comprehensive planning is a huge gamble for wildlife¹⁴. For this and future proposed projects, mechanisms should be put in place that encourage solar facilities to be proposed and sited on disturbed lands instead of in fully ecologically functioning habitat such as is found in the Pahrump Valley at the Hidden Hills proposed project site, which support a variety of rare and threatened species.

We hope and expect that the agency will carefully consider the proposed impact reducing alternatives and others and go beyond the admittedly incomplete and preliminary information provided in the PSA. The CEC should revisit these issues in detail, filling in the missing data gaps and analyses and provide a full range of alternatives, including distributed solar generation, as part of a supplemental SA for public review.

Thank you for the opportunity to submit these comments. Please feel free to contact me for additional information at 535-654-5943 or at ianderson@biologicaldiversity.org

Respectfully submitted,



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¹⁴ Lovich and Ennen 2011

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OSTA's Public Comment on CEC Preliminary Staff Assessment of Cultural Resources, in conjunction with the license application for Hidden Hills Solar Energy Generation System (HHSEGS)

Submitted July 23, 2012



The OSTA Comment and Its Confidential Appendix

The Old Spanish Trail Association submits the following comments regarding the California Energy Commission's Preliminary Staff Assessment (PSA), particularly the section dealing with cultural resources, which was issued on June 15, 2012.

This public comment addresses non-site specific statutory measures providing for the protection of National Historic Trails. These are all matters of public law and administration. Separately, OSTA is submitting a Confidential appendix to this comment--which will be subject to the same confidentiality strictures as the CH2MHill's cultural resources reports. The Confidential appendix addresses specific issues concerning the trail route in and near the HHSEGS site.

OSTA'S Previous Submission to the CEC and the PSA

OSTA's cultural resources report, submitted to the CEC in May, focused on the Old Spanish National Historic Trail/Mormon Road (OSNHT/MR) in and around the Hidden Hills project site. We demonstrated through the use of archival documents, historical maps, and our on-the-ground survey, that portions of the OSNHT mule trace and the later Mormon Road must have passed across the project site.

The Commission's PSA, issued in June, essentially agreed with OSTA's findings. Among the PSA's conclusions on historical cultural resources, we cite the following:

- (quoted from pp. 70-71) "While not all of the traces on the project site have been ground-truthed, it is clear that the project site lies squarely among all of these tracks/traces and, therefore, within the OST-MR Northern Corridor, a regionally and nationally significant travel/trade corridor that aided the exploration and shaped the development of the southwestern United States. Although not formally included in the Act, staff has concluded that these tracks/traces should also be considered part of the Old Spanish National Historic Trail. As such the Corridor is a historical resource for the purposes of the CA Environmental Quality Act and potential impacts resulting from the proposed project must be evaluated. The proposed project has the potential to significantly impact the OST-MR Northern Corridor by erasing traces/trails on site and visually

- impacting traces/tracks off site, which could jeopardize the integrity of the OST-MR segment in the Pahrump Valley."
- (p. 71) "The visual quality of this section of the OST-MR would be permanently damaged, resulting in a substantial adverse change in the significance of a historical resource and a significant and unmitigatable impact..."
 - (p. 72, emphasis added)" *[CEC] staff is unaware of any action, short of project relocation or denial that would directly avoid or substantially minimize the significant effects that the proposed project would have on the OST-MR Northern Corridor identified in this document.*"

OSTA's Response to the PSA Findings

In light of previously published research on the Old Spanish National Historic Trail and the Mormon Road, and considering the archeological survey and archival data submitted by OSTA in our Cultural Resources report to the CEC, OSTA is pleased that the PSA essentially upholds our contention that the HHSEGS project will severely impact the OSNHT/MR. In this comment we wish to emphasize several major points and express additional concerns regarding the project and the PSA findings.

1. The integrity of the OSNHT route is high in the project area, regardless of whether the applicant finds no physical traces.

The significance of the OSNHT is evidenced by its inclusion in the National Trails system, an inclusion based upon extensive research in 200 and 2001 (NPS Feasibility Study 2001). The act designating the OSNHT included maps showing the trail route, with a variability factor to account for areas of disturbance, mapping errors, alternative branches, traversal of private property, etc. In some places, the physical remains of the track may have disappeared, particularly in soft soils. This does not negate the trail route, however. Many important historical sites—battlefields, historical river crossings—may have no remaining physical traces. Their location is established through documentation and oral tradition.

In addition, there is the “goes-in-one-side, comes-out-the-other” argument. The OSTA cultural resources report provided abundant archival evidence that springs and forage areas just to the east of the HHSEGS site were used by travelers on the OSNHT/MR. Likewise OSTA has located and recorded “stubs” of the OST mule trace leading directly away from the project site to the west (Prichett 2012:17).

2. Applicant wrongly concludes that trail and road resources that occur within the HHSEGS project site are not eligible for inclusion on the National Register of Historic Places (NRHP) or the California Register of Historic Places. This conclusion is based on a false and prohibitively narrow view of NRHP and CEQA criteria.

Whether or not segments of the OSNHT/MR are still present on the HHSEGS site, it is clear from the historical evidence that the trail must have passed across the Hidden Hills site, as OSTs the CEC's PSA concluded. That being the case, the integrity of the trail route in the project area allows for the application of NHRP and CEQA criteria.

- Applicant's own citing of Applicable Standards (CH2MHill 2012:5-1)) states one criteria for NRHP listing: It [resource] is associated with events that have made a significant contribution to the broad patterns of history (Criterion A). The fact that Congress in 2002 designated the OST as a National Historical Trail is prima facie evidence of the route's historical importance.

Consider these measures of the OSNHT's historical significance: The trail served as a path for American explorers of the far west in the first half of the 19th century. Even before the first mule caravan in 1829, its route—south from Utah, across the Mojave, and down the Cajon Pass into southern California—was followed by mountain men, such as Jedediah Smith and perhaps Pegleg Smith (Hafen and Hafen (1993:109-129 and 136). Later, Col. John C. Fremont left California via the Old Spanish Trail in 1844. Fremont's 1845 report on his expedition of 1843-44—including his establishing the fact that the Great Basin is indeed a basin, with no outlet to the sea—brought broad, new understanding of the geography of the western U.S. ***“This report and the Fremont (Preuss) map which accompanied it, changed the entire picture of the West and made a lasting contribution to cartography,”*** wrote Carl Wheat (1955 2:194; emphasis added).

- Applicant further cites NHRP criterion that: It [resource] is associated with the lives of persons significant to our past (Criterion B). This criterion is clearly met in the case of the OSNHT/MR in and near the project area. We have just mentioned Col. John C. Fremont, who camped within a few miles of the project boundary (Steiner 1999:156-159). Kit Carson traveled the OSNHT more than once, his name being indelibly associated with the Hernandez massacre at Resting Springs, the destination of parties leaving the complex of springs immediately to the east of the project. Immigrants arriving in California over the OSNHT include pioneer George Yount, businessman William Workman, and other key builders of American California.

3. In addition to meeting Criterion A and B, the OSNHT in the project area is likely eligible under the NRHP's category of Rural Historic Landscapes (NRHP 1999).

According to the NRHP a historic landscape is: a geographic area that historically has been used by people, or shaped or modified by human activity, occupancy,

or intervention, and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways, and natural features.” (U.S. Department of the Interior 1999:3).

The Bulletin lists a number of types of rural historic landscapes based upon historic occupation or land use. Two of the categories are transportation systems and migration trails. The OSNHT/MR clearly fits into both these categories. The Bulletin notes: “Because of the overriding presence of land, natural features, and vegetation, the seven qualities of integrity called for in the National Register criteria are applied to rural landscapes in special ways.”

These qualities include Location, Design, Setting, Feeling, Association, Materials, and Workmanship. In the case of a trail, Design, Materials, and Workmanship do not apply. However, the following do:

Setting—the physical environment within and surrounding a property, such as mountains, rock formations and vegetation—has a very strong impact on the integrity of Setting. The majestic, largely unspoiled natural setting of the HHSEGS project site, would meet the NRHP standard. The project’s construction of towers and mirror arrays would violate this standard.

Feeling—although intangible (the Bulletin says) is evoked by the presence of physical characteristics that reflect the historic scene. This relates to the standard of modern-day visitors being able to vicariously enjoy the experience of travelers on the OSNHT/MR. The project’s construction of towers and mirror arrays would violate this standard.

Association—the direct link between a property and the important events or persons that shaped it—is more complicated to assess. However, the definition states that “New technology, practices, and construction, however, often alter a property’s ability to reflect historic associations.” The project’s construction of towers and mirror arrays would violate this standard.

4. Segments of the OSNHT/MR near the Nevada state line and the associated complex of freshwater springs must be considered as having high potential for registration to the National Register of Historical Places.

Stump Spring and the others in the spring complex at the foot of the Spring Mountains (the complex includes Hidden Spring, Le rocher qui pleu, Brown Spring, and Mound Spring), mark a key transition point on the trail route. Las Vegas, with its huge spring and good forage, and the Spring Mountains both supplied good water and animal feed on the way to Stump Spring.

The spring complex at the foot of the mountains, however, marked the beginning of a long desert stretch that only ended with the descent down Cajon Pass into

the Los Angeles basin. From Stump Spring onward the way to Los Angeles became more difficult for men and animals. Steiner notes that the section from Salt Spring to Bitter Spring in California was one of the most difficult passages of the entire OST. "It took at least a day and a half to travel from Salt Spring to Bitter Spring and there was no reliable water source ;in between. Many oxen died on this part of the Trail." At Stump Spring (or others in the complex), travelers knew that this hostile stretch of trail lay ahead.

The significance of Stump is manifest. It appears on nearly every 19th century map showing the OST/MR in this area and it is mentioned in numerous travellers' accounts (Fremont 1845, Pratt cited in Hafen and Hafen 1993, Lorton 1849). Stump and the other nearby springs were key stopping points on the OSNHT/MR. Under the criteria outlined in Sections 1, 2, and 3 above, OSNHT/MR segments and the associated springs must be considered as high-potential candidates for nomination to the NRHP.

5. California's State Historic Preservation Office should have been consulted under provisions of the National Historic Preservation Act.

Applicant's report states that the NHPA and Executive Order 12372 require that potential effects of an undertaking on historic properties are presented to the State Historic Preservation Office (CH2MHILL 2012:5-1).

OSTA wishes to know whether the California SHPO was notified and to see their written response to the notification.

6. The CEC must consider not only the impacts of the HHSEGS plant, but the cumulative effects of HHSEGS with other projects upon the area.

OSTA is concerned about the cumulative effects that the HHSEGS project will have, both on the OSNHT/MR, the adjacent springs, and the surrounding desert environment.

Two other possible solar projects are planned for the area near HHSEGS. As Figure 1 (following page) shows, the Sandy Valley Project and the Element Solar Project both fall partly within a six-mile radius of HHSGES.

The combined effect of these projects, proposed on vast tracts of relatively undisturbed open land, will result in fundamental changes in how the desert and the OSNHT/MR are experienced by the public. The cumulative effects of these projects will also result in substantial impacts to a wide range of environmental resources in the local desert. These include impacts to biological resources and ground water.

To ensure that desert solar projects are sited in appropriate locations, using appropriate technologies to avoid impacts to our nation's natural and cultural heritage, it is imperative that landscape level analyses be conducted to fully

evaluate the implications of the widespread deployment of renewable energy projects and their associated support facilities, on public lands. This is crucial in the case of HHSEGS because:

- the cumulative effects of the three proposed projects would effect BLM-owned lands in Nevada and nearby BLM-owned lands in California.
- the plants' associated support facilities will be substantial. These include dozens of miles of new transmission lines and service roads and a large gas pipeline to supply HHSEGS. The transmission lines and gas pipeline will impact BLM lands in Nevada.

7. The CEC must consider the cumulative effects of HHSEGS and the other projects on visual resources, i.e., the desert landscape and the ability to vicariously experience the OSNHT/MR.

The two towers proposed for HHSEGS are each 750 feet tall. This is nearly three-quarters the height of the Empire State Building. The towers will be visible for miles and will place a strong visible imprint on the Pahrump Valley. Should there be a second phase of the project, or should either of the two nearby proposed projects (Section 6, above) erect towers of similar height, the area from Nevada Highway 160 to Charleston View, California, would become a virtual forest of skyscraper like towers.

Such a collection of huge, industrial structures will destroy the broad desert vistas the area now affords. It will also destroy the historic sense of place in what could be classed a Rural Historic Landscape (Section 3, above).

*** *** ***

Conclusion: HHSEGS Will Do Irreparable Damage to the Old Spanish National Historic Trail and the Later Period Mormon Road; to associated historic sites, particularly springs used for watering and forage; and to largely unspoiled desert landscape.

The Hidden Hills project, if approved, would forever change the landscape of the local area and irreparably degrade the integrity of the OSNHT, both on the project site and closely adjacent areas. These adjacent areas include freshwater springs intimately related to use of historically significant transportation corridor represented by the OSNHT and the Mormon Road, which followed much the same route after 1848.

The damage to the OSNHT/MR and the surrounding landscape will diminish the public's experience and understanding of the historic expeditions (including the Col. John C. Fremont' 1843-44 expedition) that used the trail and impact cultural understanding of the Mexican period (1821-1848) and succeeding American period (1849-ca.1900) in this largely unexploited desert portion of California.

In short, the project area and its surroundings comprise a jewel in California's desert lands. The high peaks of the Spring Mountains form a dramatic backdrop to a vast sweep of visually pure desert extending westward.

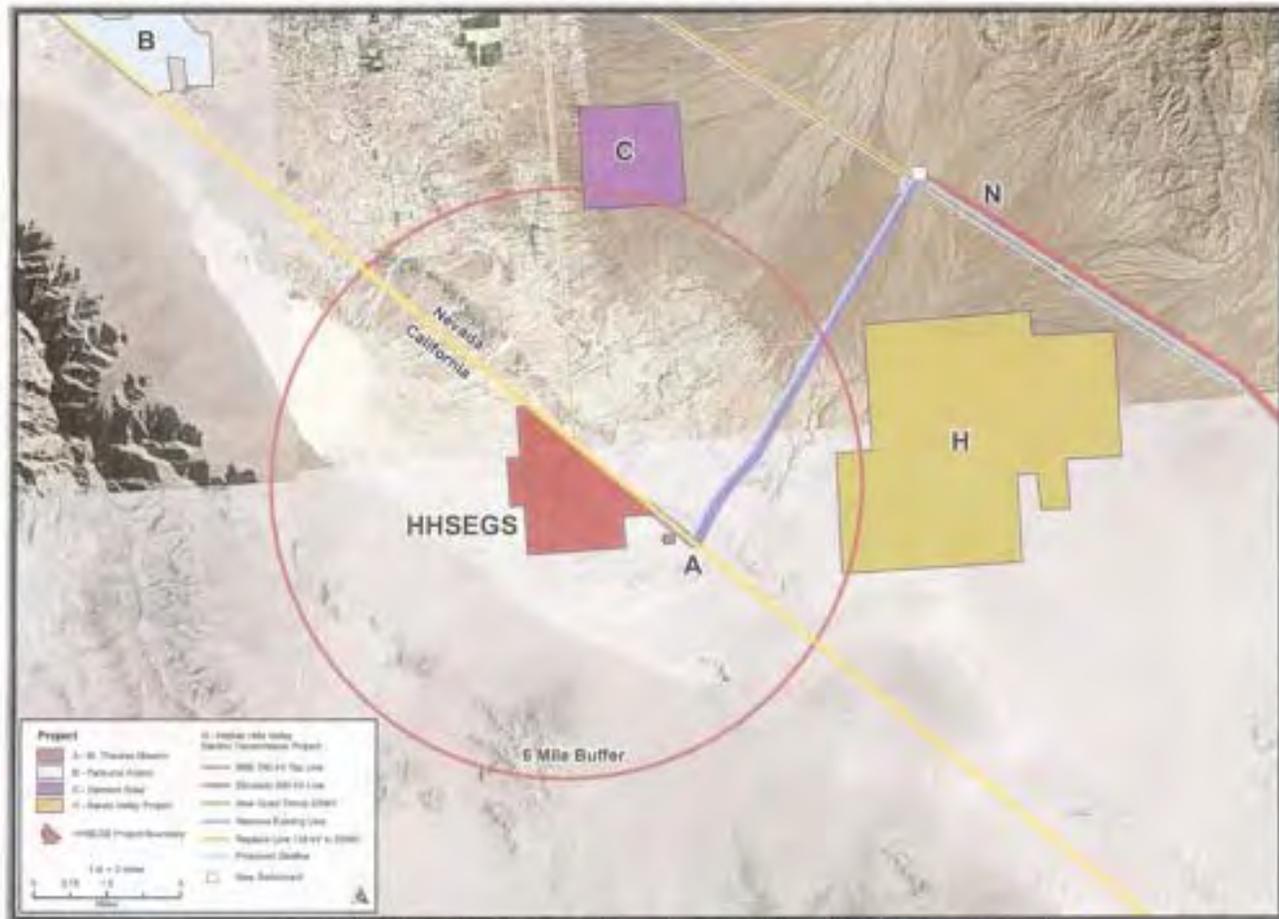
This land at the foot of the mountains has been the site of a well-documented, ancient travel corridor, over which American Indians traded goods in a network that extended from the Pacific Coast well into the Great Basin (Hafen and Hafen 1993, Crampton and Madsen 2007, Myhrer et al 1990, Lyman 2004). The OSNHT/MR adapted that water source-to-water source pathway to their travel needs—creating the mule caravans of the OST and the wagon trains of the American period.

In light of this irreplaceable heritage, a high-potential site for nomination to the National Register of Historic Place, OSTA reiterates its position: HHSEGS is the wrong project in the wrong place. The mitigation measures proposed in the PSA, CUL-9 and CUL-10 are palliative afterthoughts that will do little to compensate for the massive damage done to a historically important transportation corridor and to the desert landscape. Short of sacrificing part of our national heritage, there is no alternative but to relocate the proposed solar project.

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Figure 1. Map showing proximity of HHSEGS to other potential solar plants

CUMULATIVE PROJECTS - FIGURE 2
 Hidden Hills Solar Electric Generating System (HHSEGS) - Cumulative Projects within a Six Mile Buffer of HHSEGS Boundary



CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: BLM Southern Nevada District - Renewable Energy in Southern Nevada, BLM California - Renewable Energy Priority Projects, and Los Angeles Department of Water and Power.



**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
COMMISSION OF THE STATE OF CALIFORNIA
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**APPLICATION FOR CERTIFICATION FOR THE
HIDDEN HILLS SOLAR ELECTRIC
GENERATING SYSTEM**

Docket No. 11-AFC-02

**PROOF OF SERVICE
(Revised 9/20/12)**

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DECLARATION OF SERVICE

I, Cenne Jackson, declare that on December 21, 2012, I served and filed copies of the attached, dated December 21, 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>].

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OR, if filing a Petition for Reconsideration of Decision or Order pursuant to Title 20, § 1720:

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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 Cenne Jackson